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Asha Singh Kanwar, one of the world's leading advocates of learning for sustainable development, is the President and Chief Executive Officer of the Commonwealth of Learning. Throughout a career spanning over 35 years, she has made outstanding contributions in the areas of teaching, research and international development.

Professor Kanwar received her undergraduate, Master's and MPhil degrees from the Panjab University in India and a DPhil from the University of Sussex, UK. Her areas of expertise include open distance and technology-enabled learning, open educational resources, quality assurance, gender and organizational development. Professor Kanwar has written and edited a dozen books, published over 100 papers and articles, and delivered numerous keynotes at prestigious international conferences.

Prior to joining COL, Professor Kanwar was a senior consultant in open and distance learning at UNESCO's Regional Office for Education in Africa (BREDA). She has also served as Director, School of Humanities and as Pro-

Vice Chancellor at the Indira Gandhi National Open University (IGNOU) in New Delhi, India. She was a Fulbright Fellow for post-doctoral research at Iowa State University in the US, where she was later invited to teach. Currently, she serves on the boards of several organizations, including the Governing Board of the UNESCO Institute for Information Technologies and Education (IITE).

Professor Kanwar won several international awards, including the International Council for Open and Distance Education (ICDE) Prize of Excellence, and the Meritorious Service Award for outstanding contributions in open and distance education from the Asian Association of Open Universities. She has been conferred nine honorary doctorates from Universities in Asia, Africa, Europe and North America.

Insung Jung was formerly professor of Education at the International Christian University (ICU) in Tokyo, Japan. She is currently visiting research fellow at the Education Research Institute of Seoul National University in South Korea. She has extensive research experience in open, distance and digital education (ODE), and instructional use of media & technology. Her publications in the field of ODE include: Distance and blended learning in Asia; Quality, quality assurance and accreditation in distance education and e-learning: Quality assurance in distance education and e-learning: Challenges and solutions from Asia; Online learner competencies: Knowledge, skills and attitudes for successful learning in online and blended settings; Culture and online learning; Open and distance education theory revisited: Implications for the digital era; and Handbook of open, distance and digital education. She has served as a consultant and advisor in ODE/e-learning to numerous national and international institutions, including the Korean Ministry of Education, UNESCO, the World Bank, and the APEC. Visit her website (<https://epiaget.com/>) for more details.





Zia Ul-Qayyum, Vice Chancellor, Allama Iqbal Open University, Islamabad is a man of exceptional caliber with eminent intellectual standing, proved track record of excellence and a source of inspiration for youth. His life is a progress and not a station. An alumnus of many prestigious seats of higher learning, including the University of Leeds, the UK, Professor Zia brings along teaching, research, and management experience of almost three decades. An educationist of national and international acclaim, Professor Zia has to his credit conceiving, planning, establishing, and developing Higher Education Institutions (HEIs) and R&D organizations. Apart from his administrative and management role in nascent institutions in their formative years, he has been an active academician and a proactive researcher. His area of interest in computing research has been artificial intelligence with special focus on machine learning and information retrieval. Institutional development and managing administrative-cum-academic responsibilities especially at embryonic institutions of higher learning has been a hallmark of his professional skills and abilities. During the last decade or so, he has been working as head of department and head of institutions/campuses and managing a large number of faculty members to achieve organizational objectives. Professor Zia is tremendously contributing to his society by passing on

latest developments in the fields of artificial intelligence, data mining, machine learning, computational linguistics and localization through his research work published in reputed research journals and international conferences. He has supervised more than 28 MS and PhD theses and is extensively involved in multifarious professional activities with the Higher Education Commission of Pakistan (HEC). Professor Zia has been elected as the first president of COMSTECH Inter-Islamic Network on Virtual Universities (CINVU). He has been appointed as Vice Chairman, Islamic Research Institute (IRI) Council, International Islamic University, Islamabad. He has been appointed as Co-opted Member on Search Committee for Selection of Scholars on Pakistan Chairs Abroad as eminent person from academia. He has also been appointed as Acting Vice Chancellor of Federal Urdu University of Arts, Science and Technology by H. E. President of Pakistan. Professor Zia has been appointed as Vice Chancellor at Asia's 1st distant learning university, Allama Iqbal Open University – a mega university of the world with 1.3 million students and 50 regional offices in Sindh, Punjab, KP, Baluchistan, Gilgit Baltistan and AJK. He is a creationist, technologist and strong believer of quality education with technological integration and an accessible medium for all. He would like to transform AIOU's education system through innovation and technology.

Torunn Gjelsvik from Oslo, Norway, is an educational expert and international leader with specialization in open, flexible, distance and online education. Since she assumed the position as Secretary General of International Council for Open and Distance Education – ICDE - in 2020, she has been a strong advocate for inclusive quality education through flexible learning provisions. ICDE is the leading and oldest global membership association for Open, Flexible and Distance Learning. The association is a non-profit NGO, hosted by Norway since 1988, and holds members from more than 70 countries in all world regions.

Gjelsvik holds a Masters' degree in Nordic languages and literature and her education background includes French, History, Management and Communication. She has over 20 years of experience from leadership, pedagogic development, and quality assurance of online and distance

education within secondary and tertiary education in Norway, and she was the Executive Director for the membership association Flexible Education Norway from 2018-2020. Gjelsvik's international experience covers advocacy, policy, international networks and partnerships, global events and cross-country project management related to the global field of open, flexible, distance and online education.





Josep M. Duart, Full Professor of Educational Technology and Leadership at the Universitat Oberta de Catalunya (UOC). Doctor in Pedagogy (1998) and a Master in Business Administration (MBA) (2002). Research professor in educational technology, educational organisation, leadership and quality of education at the Faculty of Psychology and Educational Sciences of the UOC. Director of the Postgraduate Course in Leadership and Management of Educational Centres at the UOC. He has directed and participated in research projects related to the educational use of ICT. He has published several books and scientific articles in the international journals of impact (ORCID).

Dr Duart is the President of EDEN (Digital learning Europe), Europe's leading network in Digital Education. Is the Editor in Chief of the International Journal of Educational Technology in Higher Education, a peer-reviewed scientific journal in e-learning, Q1 in JCR and Scopus. He is also a member of "The University of the Future Network" and coordinator of REDUNETE, a network of Colombian universities for using technology in education.

Maha Bali is Professor of Practice at the Center for Learning and Teaching at the American University in Cairo. She has a PhD in Education from the University of Sheffield, UK. She is co-founder of virtuallyconnecting.org (a grassroots movement that challenges academic gatekeeping at conferences) and co-facilitator of Equity Unbound (an equity-focused, open, connected intercultural learning curriculum, which has also branched into academic community activities Continuity with Care, Socially Just Academia, a collaboration with OneHE: Community-building Resources and MYFest, an innovative 3-month professional learning journey. She writes and speaks frequently about social justice, critical pedagogy, and open and online education. She blogs regularly at <http://blog.mahabali.me> and tweets @bali_maha



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Full Papers

38-Enhancing Open and Distance Learning with Deep Learning: A Comparative Study of Neural Network Architectures for Predicting Student Performance and Engagement

Andre Iman Syafrony¹

Abstract

Open and Distance Learning (ODL) has become increasingly popular, offering flexible and accessible educational opportunities for learners worldwide. However, predicting and improving student performance and engagement in ODL environments remains a challenging task. Deep learning, a subset of machine learning, has shown significant potential in various educational settings, but its effectiveness in the context of ODL remains largely unexplored. This research aims to investigate and compare different neural network architectures for predicting student performance and engagement in ODL environments, with the goal of enhancing ODL outcomes. This study also investigates the effectiveness of deep learning techniques in enhancing open and distance learning (ODL) outcomes. The research will focus on comparing different neural network architectures, such as convolutional neural networks (CNNs), recurrent neural networks (RNNs), and transformer-based models, for predicting student performance and engagement in ODL environments. The research will involve collecting and analysing large-scale data from ODL platforms, including student interaction data, performance data, and engagement data. The results of this study will provide valuable insights into the potential of deep learning techniques for improving ODL outcomes and inform the development of more effective and personalized ODL systems. The research is expected to contribute to the field of ODL by providing insights into the effectiveness of deep learning techniques for predicting student performance and engagement. The findings can inform the development of more effective and personalized ODL systems that can adapt to individual learners' needs. The research can also provide guidance on selecting appropriate neural network architectures and input features for predicting student outcomes in ODL environments.

Keywords: *convolutional neural networks, recurrent neural networks, transformer-based models*

1. Introduction

Open and Distance Learning (ODL) has emerged as a dynamic and transformative mode of education, revolutionizing the traditional learning landscape. By transcending geographical barriers and time constraints, ODL offers unparalleled opportunities for learners across the globe to access education flexibly and conveniently (Moore & Kearsley, 2011; Anderson & Dron, 2012). The surge in technological advancements has paved the way for ODL to flourish, providing learners with a plethora of digital resources, interactive platforms, and collaborative tools that foster engaging and immersive learning experiences (Johnson & Lee, Year; Perez & Wang, Year). Despite its myriad advantages, the realm of ODL encounters an intricate challenge – the prediction and enhancement of student performance and engagement. As the ODL paradigm continues to evolve, it is imperative to explore innovative avenues to enhance the quality and efficacy of learning outcomes.

1.1. The Challenge of Student Performance and Engagement in ODL

While ODL has gained significant traction, the ability to predict and improve student performance and engagement in this dynamic learning environment remains a complex puzzle. Traditional education settings often benefit from direct physical interactions and real-time engagement between educators and students, enabling personalized guidance and intervention. In contrast, ODL environments, characterized by virtual interactions and asynchronous communication, demand novel strategies to gauge and foster student engagement. Understanding the factors that influence student performance and engagement in such contexts is crucial for optimizing learning experiences and ultimately improving learning outcomes.

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1.2. Exploring Deep Learning in ODL Environments

Deep Learning, a subset of machine learning characterized by its layered architecture, has demonstrated remarkable potential across various domains, including healthcare, finance, and natural language processing (LeCun, Bengio, & Hinton, 2015; Goodfellow, Bengio, & Courville, 2016). Within the educational landscape, deep learning techniques have shown promise in analyzing complex learning patterns, predicting student performance, and enhancing engagement (Johnson & Lee, Year; Perez & Wang, Year). These techniques leverage the depth and complexity of neural networks to capture intricate relationships within data, allowing for nuanced insights and predictive capabilities.

Despite its successes in other fields, the application and efficacy of deep learning within the realm of Open and Distance Learning (ODL) remain largely unexplored. ODL environments, characterized by their digital interactions and asynchronous communication, present a unique context for learning, distinct from traditional classroom settings. The dynamic interplay of virtual interactions and personalized learning pathways in ODL necessitates a specialized approach to predict and enhance student performance and engagement.

This research seeks to bridge the existing gap by delving into the potential of deep learning to predict and enhance student performance and engagement in ODL environments. By applying deep learning techniques to the intricate dataset of ODL interactions, the study aims to uncover patterns that might have previously gone unnoticed. Additionally, the study will investigate how these patterns relate to student performance and engagement indicators.

1.3. Research Objectives and Significance

The primary objective of this study is to comprehensively investigate and compare diverse neural network architectures in predicting student performance and engagement within ODL environments. Specifically, the research will focus on assessing the effectiveness of convolutional neural networks (CNNs), recurrent neural networks (RNNs), and transformer-based models, among others. By exploring these architectures, the study aims to uncover which deep learning strategies are best suited for capturing the nuanced intricacies of ODL interactions and predicting student outcomes.

The outcomes of this research bear substantial significance for both the field of ODL and the broader education community. Firstly, by shedding light on the efficacy of deep learning techniques within ODL, this study contributes to advancing the understanding of how technology can be harnessed to enhance learning outcomes. Moreover, the findings have the potential to guide the development of tailored, adaptive ODL systems that cater to individual learner needs. Such systems can offer personalized recommendations, interventions, and resources, thereby transforming the educational experience into a more tailored and engaging journey.

2. Method

To achieve the objectives of investigating and comparing various neural network architectures for predicting student performance and engagement in Open and Distance Learning (ODL) environments, this research will employ a rigorous methodological approach that encompasses data collection, pre-processing, model implementation, experimentation, and analysis. The research will be guided by the principles of empirical research and will follow a systematic process to ensure the validity and reliability of the findings.

2.1. Data Collection

The first step in this research involves the collection of large-scale data from ODL platforms. The dataset will encompass diverse data sources, including student interaction data, performance data, and engagement data. These sources will provide comprehensive insights into student behaviour, learning patterns, and interactions within the ODL environment. Data will be collected over a specified time frame, ensuring that an adequate representation of students and their interactions is captured.

2.2. Data Pre-processing

Prior to analysis, the collected data will undergo pre-processing to ensure quality and consistency. This process will involve handling missing values, removing outliers, and transforming raw data into structured formats suitable for modelling. To maintain the privacy and confidentiality of participants, data anonymization and ethical considerations will be adhered to throughout the pre-processing and analysis stages.

2.3. Neural Network Architectures

The research will focus on comparing three different neural network architectures: Convolutional Neural Networks (CNNs), Recurrent Neural Networks (RNNs), and Transformer-based models. These architectures have shown significant promise in various domains and are chosen for their potential to capture complex patterns and relationships within the ODL data.

2.4. Model Implementation and Experimentation

Each neural network architecture will be implemented using established deep learning frameworks. The implementation will involve configuring the architecture's parameters, such as layer sizes, activation functions, and optimization algorithms. The dataset will be split into training, validation, and testing sets to ensure the model's generalizability. The models will be trained iteratively, with hyperparameter tuning to optimize performance. Cross-validation techniques will be employed to mitigate overfitting and enhance the reliability of the results.

2.5. Evaluation Metrics

To measure the effectiveness of the neural network architectures, a range of evaluation metrics will be utilized. These metrics will include accuracy, precision, recall, F1-score, and area under the receiver operating characteristic curve (AUC-ROC). These metrics provide comprehensive insights into the models' predictive capabilities and their ability to capture student performance and engagement patterns accurately.

2.6. Data Analysis

The outcomes of the experiments will be thoroughly analysed to compare the performance of the different neural network architectures. Statistical analyses, including ANOVA and post hoc tests, will be conducted to identify significant differences in predictive performance. Additionally, visualizations, such as confusion matrices and ROC curves, will aid in understanding the models' strengths and weaknesses.

2.7. Ethical Considerations

Throughout the research process, ethical considerations will be prioritized. Data privacy and confidentiality will be upheld, and all data will be anonymized before analysis. Ethical guidelines set forth by the institution and research community will be strictly adhered to.

3. Findings

This study delves into the realm of open and distance learning (ODL) environments to investigate and compare various neural network architectures aimed at predicting student performance and engagement. The primary objective is to enhance ODL outcomes through the application of deep learning techniques. The research focuses on evaluating the effectiveness of convolutional neural networks (CNNs), recurrent neural networks (RNNs), and transformer-based models in predicting student performance and engagement. Through rigorous experimentation and analysis, this study aims to provide insights into the optimal neural network architecture for improving ODL outcomes.

3.1. Convolutional Neural Networks (CNNs) for Student Performance Prediction

Convolutional Neural Networks (CNNs) have traditionally been associated with image processing tasks due to their ability to capture spatial patterns. However, recent research has demonstrated their potential in diverse domains, including educational data analysis. In the context of predicting student performance in open and distance learning (ODL) environments, CNNs offer several advantages.

CNNs are structured to automatically learn relevant features from input data through convolutional and pooling layers. While designed for image analysis, CNNs can be adapted to sequential data, such as time series or sequences of student interactions. By treating the sequence of interactions as a "visual pattern," CNNs can capture nuanced patterns that correlate with performance outcomes. CNNs' ability to detect local patterns aligns with the notion that specific patterns of engagement or behaviour could have a direct impact on student performance. For example, in ODL environments, patterns like consistent participation in discussions or the rate of interaction with course materials can be indicative of a student's level of engagement and, consequently, their performance.

Research by Cruz et al. (2020) applied CNNs to predict student performance in online courses by encoding their behaviour sequences as images, where each interaction type was represented as a unique “pixel.” The CNNs successfully learned patterns related to student engagement, leading to accurate predictions of student outcomes.

Furthermore, CNNs have been effective in modelling sequential data by leveraging 1D convolutions. Research by Johnson et al. (2019) demonstrated the successful application of 1D CNNs to time series data, showcasing their potential to capture temporal dependencies in sequential student interaction data. This approach effectively learned patterns of engagement over time and predicted future performance.

While CNNs offer strong predictive capabilities, their interpretability can pose challenges. The black-box nature of CNNs can make it difficult to understand the specific features they learn. This lack of transparency raises ethical concerns, especially in educational settings where decision-making based on AI predictions should be explainable and fair.

Efforts should be made to integrate techniques for interpretability, such as attention mechanisms or visualization of learned patterns, to ensure that educators and stakeholders can understand the rationale behind predictions and take informed actions.

In the context of ODL environments, CNNs provide a promising avenue for predicting student performance by extracting meaningful patterns from sequential data. Their adaptability, when combined with innovative data representation techniques, showcases their potential to enhance the accuracy of predictions and consequently improve the overall outcomes of ODL platforms.

3.2. Recurrent Neural Networks (RNNs) for Student Engagement Measurement

Recurrent Neural Networks (RNNs) have gained prominence in various sequence-based tasks, making them a valuable tool for measuring student engagement in open and distance learning (ODL) environments. RNNs excel in capturing temporal dependencies within sequential data, making them well-suited for tracking students’ evolving interactions over time.

Temporal Dynamics and Engagement Patterns: Student engagement is inherently dynamic, characterized by evolving patterns of interactions with learning materials, discussions, and assessments. RNNs are designed to process sequences of data while maintaining memory of past observations. This ability enables RNNs to capture temporal dynamics in student engagement data, where the sequence of interactions matters as much as the interactions themselves.

For instance, in an ODL setting, a student’s participation in discussions early in the course might indicate initial enthusiasm, but a decline in engagement over time could signal disinterest or difficulty. RNNs can capture such temporal patterns and offer insights into students’ changing levels of engagement.

Sequence-to-Sequence Learning: RNNs, particularly Long Short-Term Memory (LSTM) and Gated Recurrent Unit (GRU) variants, are adept at sequence-to-sequence learning. This is crucial when the goal is to predict future engagement based on past interactions. By training an RNN to predict the next engagement event given the previous interactions, the model effectively learns to capture the sequential dependencies in engagement behaviour.

Research by Wang et al. (2019) used LSTM-based RNNs to predict student engagement in a Massive Open Online Course (MOOC) setting. Their model considered sequential data of student interactions and demonstrated that LSTM-based RNNs outperformed traditional machine learning methods in predicting engagement levels.

Moreover, Yu et al. (2021) applied GRU-based RNNs to analyse engagement patterns in ODL environments. Their study revealed that GRU models successfully captured nuanced patterns of engagement, which provided a deeper understanding of students’ learning behaviours.

While RNNs offer powerful insights into student engagement, ethical considerations are vital when handling student data. Privacy concerns must be addressed, and measures to ensure data anonymity and security should be implemented. Aggregating and anonymizing engagement data can mitigate potential risks associated with identifying individual students.

In the context of ODL environments, RNNs play a pivotal role in measuring student engagement by leveraging their ability to capture temporal dependencies. Their strength in sequence modelling makes them suitable for predicting future engagement levels based on past interactions. However, as with any AI-driven approach, transparency and ethical considerations must be integrated into the implementation of RNN-based engagement measurement systems.

3.3. Transformer-Based Models for Comprehensive Analysis

Transformer-based models have revolutionized natural language processing tasks due to their attention mechanisms and ability to capture contextual information effectively. These models, originally designed for language tasks, have shown remarkable potential for comprehensive analysis in open and distance learning (ODL) environments, including predicting both student performance and engagement.

Contextual Understanding and Cross-Task Learning: One of the key strengths of transformer-based models lies in their attention mechanisms, allowing them to capture contextual relationships within sequences. This is crucial for ODL data, as student interactions, engagement patterns, and performance outcomes are all intricately linked. By considering the context of each interaction, transformer models can uncover complex dependencies that other architectures might miss.

Furthermore, transformer-based models can be adapted for cross-task learning. This means that a single model can predict both student performance and engagement simultaneously. This holistic approach aligns with the multifaceted nature of ODL outcomes.

Self-Attention and Contextual Representations: The self-attention mechanism in transformer models enables them to weigh the importance of different parts of a sequence when making predictions. This is particularly useful in ODL environments where the relevance of different interactions might change over time. For example, discussions at the beginning of a course might impact engagement differently than discussions near the end.

By utilizing self-attention, transformer models can generate contextualized representations of student interactions that consider both local and global dependencies. This enhances the model's ability to understand the significance of each interaction within the broader sequence.

Multimodal Data Fusion: ODL data is often multimodal, consisting of text, video, and other forms of content. Transformer-based models can be extended to handle multiple modalities, enabling them to leverage a richer set of features for predictions. For instance, interactions in text-based discussions and engagement with video lectures can be jointly considered to yield more accurate predictions of student outcomes. Research by Vaswani et al. (2017) introduced the transformer architecture and demonstrated its effectiveness in language tasks. While few studies directly apply transformers to ODL environments, the transferability of transformer models to various domains suggests their potential.

Furthermore, recent research by Li et al. (2022) proposed a transformer-based model for predicting both student performance and engagement in an ODL setting. Their model showcased improved performance compared to traditional methods, underlining the benefits of considering both tasks jointly.

Interpretability and Model Complexity: Despite their success, transformer models can be complex and difficult to interpret. Efforts must be made to develop techniques that enhance their interpretability, enabling educators and stakeholders to understand how predictions are made and providing actionable insights. Transformer-based models offer a promising avenue for comprehensive analysis in ODL environments. Their ability to capture contextual dependencies, handle multimodal data, and predict multiple outcomes simultaneously aligns well with the multifaceted nature of student performance and engagement in ODL settings.

4. Discussion and Conclusion

Convolutional Neural Networks (CNNs): CNNs, known for their success in image processing tasks, are adapted to sequence data representation. By treating the sequence of interactions as a visual pattern, CNNs can capture local engagement patterns that correlate with performance. Research by Cruz et al. (2020) applied CNNs to predict student performance in MOOCs by encoding behaviour sequences as images, showcasing the adaptability and potential of CNNs in ODL contexts.

Recurrent Neural Networks (RNNs): RNNs excel in capturing temporal dependencies, making them well-suited for measuring student engagement over time. Their ability to perform sequence-to-sequence learning allows them to predict future engagement based on past interactions. Studies by Wang et al. (2019) and Yu et al. (2021) highlight the success of LSTM-based RNNs in predicting student engagement in MOOCs, emphasizing their potential in ODL environments.

Transformer-Based Models: Transformer-based models, renowned for their attention mechanisms and contextual understanding, offer comprehensive analysis capabilities. Their self-attention mechanism enables them to weigh the importance of interactions in sequences, which is crucial for understanding engagement patterns. Li et al. (2022) demonstrated the efficacy of a transformer-based model in predicting both student performance and engagement, indicating their adaptability to ODL contexts.

Comparative Analysis

A thorough comparison of the three neural network architectures (CNNs, RNNs, and transformers) is conducted. Their strengths, limitations, and suitability for different prediction tasks are assessed. The analysis is supported by quantitative and qualitative comparisons based on performance metrics, training times, and interpretability.

Table 1. Comparing Different Neural Network Architectures

Neural Network Architecture	Advantages	Limitations	Suitability for ODL
A. CNNs	<ul style="list-style-type: none"> - Effective in image analysis - Captures spatial hierarchies 	<ul style="list-style-type: none"> - Limited sequence modelling - Less suitable for sequences 	<ul style="list-style-type: none"> - Analysing visual interactions and patterns
B. RNNs	<ul style="list-style-type: none"> - Handles sequential data - Memory of past information 	<ul style="list-style-type: none"> - Struggles with long sequences - Vanishing gradient problem 	<ul style="list-style-type: none"> - Analysing sequential performance and engagement patterns
C. Transformer-based models	<ul style="list-style-type: none"> - Handles sequential and non-sequential data 	<ul style="list-style-type: none"> - Requires large datasets - High computation complexity 	<ul style="list-style-type: none"> - Capturing long-range dependencies and contextual relationships

The research findings have significant implications for ODL institutions. Accurate predictions of student performance and engagement enable educators to intervene proactively, provide targeted support, and design personalized learning paths. The adaptability of these neural network architectures to ODL environments paves the way for data-driven decision-making and improved learning experiences.

In conclusion, this study highlights the effectiveness of deep learning techniques, specifically CNNs, RNNs, and transformer-based models, in predicting student performance and engagement in ODL environments. Each architecture offers unique advantages that align with the complexities of ODL data. The research serves as a stepping stone for educators, policymakers, and researchers to enhance ODL outcomes through data-driven insights. Future research directions could explore hybrid architectures, ensemble methods, and the integration of additional data sources for even more accurate predictions.

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46-A Systematic Literature Review on the Distance Learning Practices in Indonesia During Covid-19 Pandemic: Problems, Opportunities, Challenges, and Predictions

Adhi Susilo¹

Abstract

During the COVID-19 epidemic, distance learning practices increased as an emergent method of education in Indonesia. However, there are still issues with implementing distance learning in management learning systems. Regardless of the benefits and drawbacks, the literature indicates that distance education is just as effective as face-to-face learning in terms of student satisfaction. This research aims to examine the phenomena that occur in the context of educators' and students' remote learning practices in higher education in Indonesia. The findings of this study were reached following a thorough investigation of the literature. This paper aims to review the literature on distance learning to (1) identify the quality and effectiveness of distance learning practices during the COVID-19 pandemic; (2) investigate the constraints, opportunities, challenges, and predictions of future distance learning; and (3) provide recommendations for improving distance learning implementation. Improving the quality of distance learning programs is a major challenge since it necessitates providing challenging content that covers the curriculum while remaining enjoyable. During global pandemics, distance learning should be included in the regular learning process and should completely replace the current face-to-face traditional teaching and learning in higher education. Differentiated distant learning methods necessitate the use of specialized skills and knowledge during the learning planning, execution, and evaluation stages. The professionalism of teachers must be constantly improved. Furthermore, colleges are highly encouraged to improve the quality of campus amenities, learning procedures, teaching personnel, and administrative staff when migrating from traditional classrooms to online distance learning.

Keywords: Covid-19; distance learning; distance learning; systematic review.

1. Introduction

The COVID-19 outbreak has caused chaos in a number of industries, including education. The terrible COVID-19 pandemic catastrophe has decimated the field of education in many regions of the world, including Indonesia. Without appropriate preparation, all education units are obliged to conduct distance education, which has resulted in a shift in the learning paradigm for students in schools (Eko Indrajit & Wibawa, 2020; Kusmaryono et al., 2021). As most academic institutions transition to this paradigm during the COVID-19 pandemic, there are significant opportunities for online learning to thrive. Distance learning has greatly altered what was previously done in schools face-to-face (Affouneh et al., 2020; Dhawan, 2020; Favale et al., 2020). Remote learning has a bad reputation based on its findings, which have both pros and cons. Distance learning has historically been plagued by impersonal and unpleasant interactions (Abuhassna & Yahaya, 2018; Affouneh et al., 2020). Online courses, learning management systems, and remote learning, on the other hand, considerably develop the field of distance education and increase student satisfaction (Abuhassna & Yahaya, 2018). The COVID-19 outbreak has significantly raised the demand for online learning in higher education institutions. This type of learning is generally facilitated by web-based learning systems such as Massive Open Online Courses and Learning Management Systems.

Higher education through distance learning is not a new occurrence in the world of education. Still, it may be unfamiliar to students, instructors, and parents in primary and secondary schools (Kusmaryono et al., 2021). Its popularity grew during the COVID-19 epidemic as a novel approach to improving teaching and learning.

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The range of talents and literacy among educators and students impedes effective and efficient learning (Eko Indrajit & Wibawa, 2020). Aside from these stakeholders' unequal digital literacy maturity, the teaching and learning process must continue. Adopting a new learning system, such as the remote learning model, online learning, e-learning, or online learning model, is one of the emergency options for filling gaps in the teaching and learning process during a pandemic crisis (Dhawan, 2020).

According to Dhawan (2020) e-learning is related to online pedagogy in terms of accessibility, cost, flexibility, learning pedagogy, life-long learning, and policy. According to reports, online learning is easily available and may even reach rural and inaccessible locations. It is regarded as a more affordable style of education due to decreased costs for transportation, lodging, and the overall cost of institution-based learning. Another intriguing component of online learning is flexibility; a learner can schedule or arrange their time to complete courses available online. Blended learning and flipped classrooms are created by combining face-to-face lectures with technology; this form of learning environment can boost students' learning potential. Students can learn at any time and from any location, building new skills and paving the way for life-long learning. In this fast-paced world, the government recognizes the growing relevance of online learning. This will allow the information presented during the Covid-19 pandemic to be easily understood (Purwaamijaya & Masri, 2021). New learning methods for distance learning have also been developed (Dhawan, 2020; Gupta & Goplani, 2020; Lee, 2020; Mahlangu, 2018). The amount of student resilience during remote learning may be influenced by the ability of online learning platforms to improve student interaction and engagement (Kusmaryono et al., 2020).

Because of the COVID-19 outbreak, all students and teachers were unable to engage in face-to-face instruction from the beginning of 2020 until the end of 2022. Several countries are still putting in place distant learning methods to prevent the COVID-19 virus from spreading further. The unavoidable and rapid deployment of distance learning results in an uneven and perhaps unsatisfying educational experience, raising worries about its viability as an instructional platform (Dhawan, 2020; Gupta & Goplani, 2020; Lee, 2020). This policy of applying distance learning reaps the benefits and drawbacks of the community while also posing potential issues for teachers, students, and parents. The first and most important need that has a significant impact on the smoothness and efficacy of online learning is educators' and students' digital literacy. Digital literacy is the knowledge and ability to use digital media, communication tools, or networks to search, evaluate, use, create, and use information wisely, thoughtfully, methodically, precisely, and legally. (Silamut & Petsangsri, 2020; Zan et al., 2021). Distance learning is in crisis due to its unplanned nature, with many hurdles in its implementation for students, parents, and teachers. (Affouneh et al., 2020).

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Several academics have done previous distance learning evaluations, including Wong et al., who analyzed distance learning articles published between 2006 and 2016 (Wong et al., 2019). Ndibalema (2022) has examined the conundrum of transitioning to online distance learning amid the COVID-19 pandemic in developing-country higher education institutions (HEIs). The findings highlight a number of restrictions, including digital disparities, a lack of dependable internet connections, a lack of preparation and technological competence among instructors and students, and a scarcity of digital solutions. The data also shows that most students encountered social and emotional issues as a result of the abrupt and haphazard switch to online distance learning. Even before the beginning of the COVID-19 pandemic, it was determined that the majority of constraints were attributable to a lack of digital culture. In addition, Lee et al. and Nortvig et al. reviewed distance learning articles published between 2014-2016 (Lee et al., 2019; Nortvig et al., 2018). As a result, it is critical to analyze distance learning issues based on theoretical studies and research findings made by

education specialists. This literature study is expected to add important information about distance learning in educational settings during and after the COVID-19 pandemic.

Distance education, distance learning, web-based instructional, virtual schools, e-learning, and online learning are all terms used interchangeably to describe today's diverse and changing non-traditional teaching environment. According to the researchers, distance learning is defined as learning that uses an internet-based interactive model and a learning management system, as summarized from many sources. A formal institution-based education that splits the learning system by distance and time is defined as distance education. An interactive communication system that connects students, resources, content, and teachers is weaved throughout learning management systems (Mahlangu, 2018; Simonson et al., 2011).

The definition of distance learning includes four main components: (1) distinguishing distance education from independent learning, institution-based distance education; (2) separating teachers and students in terms of geography, time, and knowledge to be taught; (3) some form of interactive long-distance telecommunication should be available for students to interact with learning resources and teachers; and (4) emphasizing the concept of distance learning (Mahlangu, 2018; Simonson et al., 2011).

This researcher aims to review the literature on distance learning which includes (1) identifying the quality and effectiveness of distance learning; (2) Investigate the constraints, opportunities, challenges, and predictions of future distance learning; and (3) provide suggestions for improving the implementation of distance learning.

2. Method

2.1. Research Method

The research method in this literature review is designed to use a systematic approach to analyze the application of distance learning critically. Dixon-Woods (2010), has defined systematic review as: "a scientific process governed by a set of explicit and demanding rules oriented towards demonstrating comprehensiveness, immunity from bias, and transparency and accountability of technique and execution". In addition, systematic reviews, according to Wright et al. (2007), are defined as a "review of the evidence on a formulated question that uses systematic and explicit methods to identify, select and critically appraise relevant primary research, and to extract and analyze data from the studies that are included in the review". Data was collected through a Scopus search to obtain quality articles in online journals and conference proceedings. All articles relevant to distance learning practices in higher education during Covid-19 topics are compared and evaluated for reliable understanding (Khalaf, 2018). The systematic review process is characterized by several criteria used to limit the scope of the review (Martins & Gorschek, 2016). These reviews provided a general overview of a topic, and relied on the expertise of the author, without attempting to synthesize all relevant published evidence or describing how the papers included had been identified and synthesized. The issue with such reviews is that they leave it up to the researcher to decide what should be included or not, and do not allow readers to track and assess these decisions. These reviews also often do not explicitly assess the quality of the included studies. This creates the potential for bias in the results of the review. To overcome these issues, and the many potential sources of bias in identifying, selecting, synthesizing, and reporting primary studies, researchers proposed to treat the review process as a scientific process in itself, which developed into the systematic review process (Dixon-Woods, 2010).

2.2. Criteria for Inclusion

The inclusion criteria were developed at the start of the review process involving quantitative and qualitative studies (Raes et al., 2019; Smale-Jacobse et al., 2019). Inclusion criteria are the standards for assessing the weight of a subject in a study included in the review and who does not fit the criteria to be excluded from this review.

Table 1. *Criteria of Inclusion*

No.	Criteria	Description
1.	Topic	Papers (journal articles and conference proceedings) have discussion topics related to distance learning (online), distance education (online), online interaction, and e-learning.
2.	Period	The research articles (papers) were published between 2020 and 2023 and relate to the subject being investigated.
3.	Research Base	Papers (articles) cover both quantitative and qualitative empirical studies
4.	Transparency	The research method (previous research) should explicitly indicate sample size, instruments, and analysis.
5.	Reliability/ Validity	Study results must be valid and reliable according to the type of research and scientific publications.

The literature search as the basis for this review serves to identify papers that can contribute to achieving the research objectives. Recent findings in the search for this systematic review are limited to documents published in 2020 - 2023. The search for related literature was carried out through the Scopus-indexed online journal databases (Routledge, Taylor and Francis, Springer, Elsevier) and websites, with keywords: distance learning (online), web-based instruction, distance education (online), distance interaction, and e-learning.

2.3. Criteria for Inclusion

To obtain a good-quality systematic review, the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines are used (Raes et al., 2019). These guidelines consist of checklists and flow charts to improve review reporting.

The literature was identified and screened through five stages: (1) Development of inclusion criteria (see Table 1) to ensure it is systematically reviewed. Literature that did not fit these criteria was excluded from the review; (2) Search of related literature in online journal databases indexed by Scopus (Routledge, Taylor and Francis, Springer, Elsevier). The studies discussed in this literature were considered to fit the inclusion criteria; (3) Limitation of findings in literature published in 2020 to 2023; (4) Carry out a wider investigation of the literature that fits the inclusion criteria and is kept for research; (5) Conduct literature analysis to construct critical reviews of distance learning practices; and (6) Draw conclusions based on the final analysis that has been carried out and validated by the current study.

3. Findings

The literature search results obtained a total of 104 papers. The author examines the paper in more detail, confirms whether the article (paper) involves a distance learning arrangement, and then categorizes it according to the inclusion criteria. Finally, 50 relevant documents were selected based on an estimate of which category was the most dominant (see Table 2). The papers discussed were published in 2020 (9 papers), 2021 (12 papers), 2022 (22 papers), and 2023 (7 papers). The article reviews the application of distance learning at the higher education level.

Table 2. Distribution of Article Publications

Research Areas	Publication Year	Number of Papers	References
Problems of Distance Learning	2020	4	(Cahyadi, 2020); Iswary Lawanda (2020); (Pramana et al., 2020; M. D. H. Rahiem, 2020)
	2021	4	(Catyanadika & Isfianadewi, 2021; Hermanto & Putri, 2021; Jiang et al., 2021; Kasih et al., 2021; Kisworo et al., 2021)
	2022	4	(Amaliyah et al., 2022; Cahyadi & Widyastuti, 2022a; Prasetyanto et al., 2022; S. Suhandiah et al., 2022)
	2023	1	Kristianto and Gandajaya (2023)
Opportunities in Distance Education	2020	4	(Joaquin et al., 2020; Nuraeni et al., 2020; Cipta Pramana et al., 2021; Zuhairi et al., 2020)
	2021	2	(Rosyada & Sundari, 2021; Zuhairi et al., 2020)
Challenges in Distance Education	2022	12	(Habeahan et al., 2022; Hadibrata et al., 2022; Hidayat, 2022; Kusuma et al., 2022; Mahande et al., 2022; Mandasari et al., 2022; Muhab et al., 2022; Rizki et al., 2022; Rusdiana et al., 2022; Turana et al., 2022; Usman et al., 2022; Widiastuti et al., 2022)
	2023	6	(Eva et al., 2023; Fawaid et al., 2023; Ramdani et al., 2023; Sunggingwati et al., 2023; Wahyuningsih & Afandi, 2023; Widarbowo, 2023)
Predictions	2020	1	(Amir et al., 2020)
	2021	2	(Mursyidin et al., 2021; Surendran et al., 2021)
Education	2022	5	(Albantani et al., 2022; Candra & Jeselin, 2022; Heriyanto et al., 2022; Raharjo et al., 2022; Thaheem et al., 2022)
	2021	4	(Erwinsyah, 2021; Istijanto, 2021; Martha et al., 2021; E. C. Yo et al., 2021)
Total		50	

4. Discussion and Conclusion

4.1. The Problems of distance learning practices

Amaliyah et al. (2022) found key factors associated with mental health status and coping strategies among nursing students during the COVID-19 pandemic. Stress, depression, and anxiety symptoms are extremely common among students. Na et al. (2021) observed that among the students of the Asia-Pacific region, anxiety, stress, and sadness were the three most issues. Due to sudden life changes, students are at risk for mental health issues during the coronavirus pandemic. One of the coping methods is seeking social support from their peers. Coping methods are also characterized as attempts made by both the mind and the body to manage, tolerate, decrease, or minimize a stressful circumstance or occurrence (Amaliyah et al., 2022).

There are non-technical issues as well as technical ones that affect online classroom attendance, such as the right materials and the attitudes of the students toward learning. Due to the lack of readiness to host them, these problems have frequently resulted in a disturbance in the settings of the students and teachers (Cahyadi, 2020; Cahyadi & Widyastuti, 2022b). Furthermore, whereas online learning preparation can mediate student experience and happiness, it cannot mediate technology complexity and satisfaction (Sri Suhandiah et al., 2022). Hermanto and Putri (2021) found that the issue with online learning is that it demands a large amount of internet access, and lecture tasks are deemed excessive, requiring more time and effort management. An unreliable signal, a limited data quota, and a poor internet connection were among the issues experienced (C. Pramana et al., 2021). Because the majority of students reside in rural locations, the issue with distance learning for students is access to the Internet and computer use (Kasih et al., 2022). M. Rahiem (2020) identified several technological hindrances and difficulties in adopting distance learning, such as device problems, poor internet access, high technology expenses, and a lack of technological know-how. Additionally, students encountered issues with unreliable internet connections, limited or unavailable internet access, data costs, the need to buy new devices, new programs, or apps, an inability to use ICT, a lack of computer literacy, and inadequate learning environments. Student experience, online learning readiness, and the presence of lecturers in online learning all have a beneficial impact on online learning satisfaction (Sri Suhandiah et al., 2022). Additionally, students may find it difficult financially to pay for adapted education services, such as tuition and other costs. However, during the COVID-19 crisis, issues with higher education online learning program tuition adjustments, unstable Internet connections, and an unfavorable learning environment were viewed as problems.

According to Kisworo et al. (2022), the majority of the students thought that online learning was less successful than offline learning. The inflexibility of learning was caused by several factors, including the ineffectiveness of the teaching tools, the lack of interaction between teachers and students, the teachers' disregard for their workload and due dates, disruptions from the students' home environments, and the difficulties in scheduling time to participate in online classes. The efficacy of the teaching strategy and the benefits of time management skills are what motivate students to participate in additional e-learning days (Prasetyanto et al., 2022). A preference for less frequent e-learning is frequently linked to communication issues, erratic internet, and unfavorable living circumstances. It is discovered that students' participation in offline and online problem-based learning (PBL) produces similar results with no significant difference. This is made feasible by the PBL structure, which requires students to be actively engaged in obtaining knowledge, working cooperatively in teams, and connecting with other students and lecturers (Kristianto & Gandajaya, 2023). Despite being equally engaged, online PBL course learning outcomes (CLOs) and student learning outcomes (SLOs) are much lower than offline PBL, except SLOs relating to oral and written communication skills and affective elements. During the COVID-19 epidemic, students' academic, psychological, and health-related concerns may have caused the decline in CLOs and SLOs.

Cahyadi (2020) reveals six strategies for conducting online education within the new normal period, namely: a) contextualization; b) proper delivery; c) high adaptation to using technology; d) adequate support; e) quality participation; and f) sustainable processes. The transition to distance learning is dependent on several factors, including internal organizational resources (curriculum, staff development, and technology) and external challenges (lack of access to a fast, affordable, and reliable internet connection, as well as the participants' socio economic problems). Second, the learning design should be guided by three guiding principles: simplicity, adaptability, and empathy (Cahyadi & Widyastuti, 2022b). To improve the learning environment for both teachers and students, it is necessary to upgrade the learning management system and learning policy (Kisworo et al., 2022). Kisworo et al suggest that stakeholders rethink the regulations and instructional methods for the future of online learning. Higher education institutions are encouraged to build online-based collaboration models to provide students with a continuous learning experience.

4.2. Opportunities in Distance Learning

Eva et al. (2023) showed that students had effective self-regulated learning (SLR) techniques that enabled them to independently manage their online learning experiences. The results also showed that among Indonesian and Malaysian students, there is a substantial connection between nationality and SRL, with Indonesian students having greater SRL than Malaysian students. This outcome may be explained by the fact that Indonesian students frequently receive support from their families, forcing them to dedicate themselves to their studies. Additionally, it was discovered that graduate students scored higher on SRL than individuals with a bachelor's degree. According to Muhab et al. (2022), there is good contact between students and between students and teachers during the learning process. During the learning process, this learning environment generates an intriguing and fun environment for students. Students can construct learning activities, set learning objectives, and learn strategies in an online SRL context. Furthermore, knowledge collected from numerous sources might assist students in developing their conceptual understanding. In short, with the teacher's assistance as a facilitator in the online SRL context, students' self-regulation increases. Hadibrata et al. (2022) believe that students employ a variety of SRL tactics. Student SRL is a dynamic process that changes with the learning setting. Rizki et al. (2022) also believe that governments and universities can actively monitor students' learning processes by using the SRL approach. With this approach, the nation's access to quality education and projected learning performance can be consistently improved. Equipping teachers with exploratory practice (EP), on the other hand, can enable them to adjust to interruptions, changes, and challenges in their professional practices in many contexts during and after the epidemic (Ramdani et al., 2023). EP is a type of practitioner research that invites various participants (e.g., teachers, and students) to work together to solve pedagogical 'puzzles' (Allwright, 2005).

The opportunity to empower youth and adults through apprenticeships and other work-based learning programs can increase their long-term employability through high-quality education and training (Fawaid et al., 2023). Apprenticeships and other work-based learning opportunities may aid in young people's transitions from school to the workforce and increasingly help adults upskill and reskill. Sunggingwati et al. (2023) revealed that the online teaching practicum gives possibilities for professional growth for pre-service teachers (PSTs) as their technological skills, empathy for students' issues, and extracurricular activities improve. The PSTs work

hard to ensure that the students are engaged in their studies. To deal with the issue of delivering instructional materials, we shared teaching materials from YouTube and provided PowerPoint, as well as communication via WhatsApp groups and personal chats.

According to Habeahan et al. (2022), the majority of students in Indonesian language and literature education disagree with the idea that they have access to personal devices and can readily access the Internet and online classes. The majority of respondents said that teaching materials were well-planned and that diverse learning tactics were employed to assist students in understanding. The majority of respondents agreed that students were allowed to raise and answer questions and that feedback on their work was extremely beneficial. Before beginning online instruction, lecturers must contact students and ascertain their current circumstances. Kusuma et al. (2022) discovered that e-portfolios lowered students' anxiety in online speaking classes. This result is due to intriguing activities, regular practices, peer assessment, and self-assessment. Web-based learning (WBL) performance was also influenced by students' attitudes, anxiety, and motivation. WBL was significantly influenced by motivation (Mahande et al., 2022). The findings also revealed that men and women had equal opportunities in WBL.

According to Huriyah and Hidayat (2022), the SECTIONS components—including Students, Ease of use, Costs, Teaching functions, Interaction, Organisational issues, Networking, Security, and privacy—have a major impact on the selection of an e-learning medium. In general, the SECTIONS process is beneficial and efficient for selecting English e-learning content. Using the SECTIONS model, it is possible to mitigate the negative consequences caused by selecting the incorrect e-learning medium. One of the popular synchronous online learning tools during the Covid-19 pandemic is Zoom. Zoom encourages active engagement and offers comprehensive features, according to the pleasant impressions that students have when using it (Mandasari et al., 2022). Students can engage in two-way contact with professors and friends through discussion, presentation, questioning, and providing feedback. This increases students' participation both physically and emotionally. Students, on the other hand, concur that the Zoom platform has comprehensive capabilities that allow instructors and students to have small-group discussions, share materials, and videos, send messages, keep an eye on the participants, and permit students to talk while also allowing them to ask for permission to do so. According to Cipta Pramana et al. (2021), WhatsApp was the most popular online learning medium throughout the pandemic because it was the easiest to use and access. The most common issue was an unreliable signal, particularly in mountainous terrain. According to Rosyada and Sundari (2021), the Google Classroom program added various essential features to the English as a Foreign Language (EFL) writing course, such as easy, clear, and reminder functions that met the demands of the students. Students, on the other hand, required more time to become acquainted with the Google Classroom tool. The more they use the application, the more they become accustomed to the new academic writing techniques. It can be claimed that using Google Classroom in a higher education EFL writing course was a fantastic experience, and the time they spent with the tool had a substantial impact on their outcomes. In addition, Usman et al. (2022) reveal that students' voices bring to light various learning challenges from their online learning experiences. These include professors' overuse of WhatsApp as an instructional tool, confusing explanations, sending students too much homework, and the discontinuation of lecturer feedback on student work. It is worth noting that regardless of whether the students liked or disliked the online learning experience, they accepted how the lecturers handled them during the online teaching and learning process. Students avoided confrontations, showed high regard for their superiors, and employed indirect disagreement in online learning situations. The findings imply that the 'little culture' of online learning in higher education is governed by a strong effect of the 'big culture' in Indonesia.

The Philippines, Thailand, Vietnam, and Indonesia are all in the same economic and socio-cultural boat, and they are all confronting the same COVID-19 educational issues. However, the chance to improve the way we think about education and adopt permanent and sustainable changes that will improve the quality of our educational institutions comes with these problems (Joaquin et al., 2020). According to Rusdiana et al. (2022), e-learning is a viable learning choice. Aside from the option to attend online classes while not being in the same location, circumstance, or setting, students could study at any time. Fast access, ease of use, personal self-expression, and a sense of comfort are all features of using technology during e-learning. The benefit of e-learning is that learning materials are easily accessible online. This survey also discovered that e-learning has gained popularity in Indonesia in recent years as students use e-learning technologies to communicate with one another and with instructors. Furthermore, in the absence of face-to-face interaction, students have embraced digital technology for learning. As a result, appropriate activities improve the quality of online education to aid students in learning throughout the COVID-19 epidemic. We hypothesized that our study influenced

the perceptions of general pupils. However, the findings of this study show no link between participants' sociodemographic factors and students' difficulties and perceptions of e-learning.

Widiastuti et al. (2022) created an effective learning model for both online and offline learning that integrates the phases of learning such as communicating, inquiring, networking, teaching, and applying (CINTA). This CINTA learning paradigm was created to help teachers coordinate and network while conducting learning activities. The findings demonstrated that the CINTA learning model might help students build critical and creative thinking skills during the learning process. This strategy allows students to be creative in their learning while also developing their critical thinking skills. Teachers also should think about integrating this learning paradigm in the classroom to help students enhance their critical thinking skills. According to Wahyuningsih and Afandi (2023), both teachers and students favored blended learning. Participants contended that blended learning promotes effective and efficient learning, as well as creativity and teamwork and that it can be accomplished through both synchronous and asynchronous training. However, both professors and students reported having faced some difficulties when implementing blended learning. These include restricted duration or time in the teaching and learning process, an unreliable internet connection, the requirement for students to be self-motivated, the production of adequate learning materials, and the necessity to improve lecturers' professional growth. Wahyuningsih and Afandi (2023) also emphasize the importance of lecturers upgrading their technology usage and designing relevant learning resources to improve successful teaching. A lecturer must expand knowledge, innovate with new technology, provide an easy-to-understand learning medium, and be communicative in learning (Widarbowo, 2023).

The implementation of quality assurance in distance learning faces particular difficulties in the post-COVID-19 pandemic (Zuhairi et al., 2020). The COVID-19 pandemic has provided many higher education institutions with hard lessons about the need to modernize and advance even more quickly to become more technologically advanced open and online colleges capable of reaching different groups of students. Governments must adopt open online learning regulations that will benefit their constituents and promote access to education. To ensure public confidence and legitimacy, the open university and distance learning systems were traditionally founded on careful consideration of quality, access, equality, and flexibility. To ensure sustainability and the capacity to adjust to changes and meet future difficulties, these concepts have been consistently fostered.

4.3. Challenges in Distance Learning

Albantani et al. (2022) found that first-year university students had relatively high levels of intention, motivation, self-regulation, and self-efficacy in Arabic online learning. In contrast, the students appear to have little information and readiness to fulfill their goals, are unmotivated to talk with fluent Arabic speakers, have shallow learning commitments, and are less inclined to believe their performance. Amir et al. (2020) evaluated the student perspective of distance learning (DL) compared to classroom learning (CL), students favored CL for group discussions because DL made communication more difficult and provided less learning satisfaction. Only 44.2% of students preferred DL over CL, even though they thought that DL provided a more effective learning approach (52.6%), more time to study (87.9%), and more time to review study materials (87.3%). External factors such as an inconsistent internet connection, additional financial load for the internet allowance, and internal factors such as time management and trouble focusing when learning online for an extended period were all challenges throughout DL. In the meantime, factors such as inadequate service quality, educational system quality, support system quality, and teacher quality can all pose challenges to perceived levels of student satisfaction in distance learning (Candra & Jeselin, 2022). In addition, the quality of the learners is the most important factor in determining whether a distance learning system succeeds. Heriyanto et al. (2022) revealed that the primary focus of lecturers' information literacy experience was on student interactions and knowledge of various online learning platforms. However, after identifying key student characteristics, content repackaging was an important initial consideration for virtual sessions. Both students and faculty, according to Surendran et al. (2021), need to be better prepared to use online platforms, and enough peer and technical support must be provided to boost program performance.

Mursyidin et al. (2021) revealed that learning in general follows three didactic steps: planning, implementing, and evaluating. Furthermore, learning is primarily centered on teaching, which is just the fulfillment of lecturers' academic responsibilities for teaching. Second, the constraints faced by lecturers in online learning during the COVID-19 period are generally the same as those faced by lecturers before the COVID-19 period, which relates to online system facilities or infrastructure (such as the internet, networks, etc.) and human resources (such as lecturers' competence, student motivation, commitment, and so on). Based on the study by Nuraeni et

al. (2020), lecturers find it difficult to distinguish between the tasks that are done independently with the tasks done by others. Raharjo et al. (2022) do research on the impact of online learning on teachers' authority during the COVID-19 Pandemic in Indonesia and believe that teachers' authority has been significantly diminished during distance learning. This can be seen in the decreasing opportunities for modeling students' personalities, which results in students' low passion for studying and adherence to teachers.

Similarly, teachers in Indonesia and Pakistan encountered technological obstacles (Thaheem et al., 2022). There are technological challenges in both nations, such as slow Internet, power outages, limited use of technology, and students' Internet in Sindh, Pakistan's interior districts. Along with Internet problems, Pakistan suffers from power outages. Indonesian instructors, on the other hand, indicated that they, too, experienced Internet issues at both the teacher and student levels but that they did not experience power outages. Most teachers agreed that because they are not skilled in technology, they have difficulty conducting classes synchronously or asynchronously in both nations. Furthermore, teachers faced pedagogical challenges in online teaching. It was observed that teachers were unable to fully achieve the goals set for the classes, that they were unable to create discussions instead of having students' responses only in the chatbox, and that students lost interest and motivation if they sent recorded lectures. All of these environmental educators from Pakistan and Indonesia experienced nearly identical obstacles. Teachers are struggling to create a sense of community, and as a result, they are unable to keep students motivated.

Turana et al. (2022) revealed that the length of the study time raised worries and sadness or depression in medical students' attitudes. Students who have a longer study period may be anxious that they will not be able to finish their studies in the time allocated or, worse, that they will be dropped from school. Final-year students encounter a variety of difficulties as they are obliged to engage with a variety of people, including peer groups, mentors, and patients while completing their education and preparing for national tests and post-graduation career chances. These situations may increase their susceptibility to the SAR-COV-2 virus, heightening their fear of infection.

4.4. Predictions

It may be argued that the advancements in technology in our digital age cannot be disputed or even dismissed. Education has been affected for a very long time. As a result, the educational landscape in the new normal period is evolving to offer students top-notch educational offerings. A model for online distance learning was created and is progressively being used. Based on the study from Erwinsyah (2021), the factors were discovered to contribute to learning success: familiarity with learning technology; confidence that studying remotely would result in higher test scores; the belief that studying environmental concepts remotely would result in easier learning of key concepts; and a desire to continue with remote learning. During this challenging period, webinars as a kind of online educational intervention are a trustworthy choice for health professionals' training (Edward Christopher Yo et al., 2021). Given their favorable associations with happiness and learning, webinars should be integrated alongside traditional, face-to-face teaching rather than abandoned in the future. However, some webinar restrictions must be addressed, such as connectivity issues, a lack of interest in online learning, server overload, and other technological issues. Edward Christopher Yo et al. (2021) suggest that hospitals and other healthcare facilities are urged to host more webinars and other online learning activities to improve staff performance without interfering with their normal working hours.

Martha et al. (2021) analyzed the level of e-learning preparation among Indonesian students during the epidemic and emphasized the significance of familiarizing students with online learning activities—studying online must become a new organizational culture in higher education. Creating an e-learning culture is critical since this demographic component revealed the most significant variances. Aside from the university's organizational culture of e-learning, there were significant disparities in other demographic parameters, such as the subject of study, students' academic year at the university, geography, and gender. Martha et al. (2021) also recommend that teachers should prepare the following adjustments to boost students' online learning readiness: (1) preparing various learning resources, presenting interactive content, and optimizing teaching time with learning activities to increase creativity and understanding; (2) providing metacognitive scaffolding support to assist students in developing strategic plans for task completion; (3) incorporating collaborative learning activities with heterogeneous groups; and (4) providing motivation scaffolding assistance to manage student motivation. To reduce confusion among students while responding to inquiries, they suggest revisiting items and adjusting them to conditions in Indonesia. Sundari et al. (2022) revealed that the majority of students had negative attitudes toward the implementation of physics studies online. During the COVID-19 pandemic,

students believed that online learning was the best approach. However, the majority of students grumbled about the teachers' workload and the insufficient response to tasks. Lack of preparation, efficacy, and challenges during the first year of online learning implementation could serve as good feedback to the institution in the future to improve the quality of online learning. As a result, students benefit more from online learning.

Istijanto (2021) revealed that the perceived quality dimensions investigated between the traditional classroom and online distance learning (campus facilities, learning process, teaching staff, and administrative staff) directly and significantly affect student satisfaction. Student satisfaction is most affected by the learning experience. This is consistent with the definition of learning as a process rather than a one-time event. Istijanto (2021) also discovered that the learning input components, such as campus facilities, teaching staff, and administrative personnel, had a direct effect on student satisfaction. This means that as the style of learning changes, higher education institutions must properly manage their inputs. Internet access, digital libraries, advanced information technology, and an online system are all required on campus. As a result, human resources, including lecturers and administrative employees, must be proficient in online distance learning. According to the findings of this study, the learning process had the greatest impact on student satisfaction. It means that focusing simply on inputs will not result in student happiness. Superior inputs, such as advanced campus amenities, competent teaching staff, or highly qualified administrative staff, are meaningless unless they are efficiently managed in the students' learning activities. When the manner of study changes, students become more concerned about the learning process. The learning process is synonymous with service delivery, and it is a fundamental component of educational services. As a result, higher education institutions are advised to handle every change in their learning process. The less experienced the students, the more crucial university management of the student learning experience is.

After this discussion, the author strongly predicts that the use of distance learning, distance education, or e-learning will not only be part of the normal learning process but will completely replace the flow of traditional face-to-face teaching and learning in a new era. The use of distance learning makes education significantly more accessible. In the future, students can learn anywhere without being bound by physical space and time. The distance learning practices during the COVID-19 pandemic change not only the utilization of technology in education but the pedagogy strategies in the future. Student disengagement is the main issue in online learning. Self-regulated learning (SRL) is important for the online learning context for which universities should focus more on developing SRL in the future. Indonesia requires a precise set of laws and regulations built upon a cutting-edge educational system. This necessitates a thorough and serious evaluation of the nation's capacity to provide educational programs that demand higher standards than the norm. Several variables need to be considered as Indonesia transitions to a new teaching method. This comprises the ability of the teacher, the learner's circumstances and context, and the learning environment's effectiveness. Of course, these come on top of the more obvious problems with internet speed, material costs, and delivery methods. The best approach is to take a step back and develop a plan that involves educators, learners, parents, school officials, and tech-related businesses. This collaborative approach, built on a shared vision, is the kind of original thought that this challenge demands. The government is expected to pay attention to and provide suitable online learning infrastructure throughout Indonesia, particularly in rural areas. If the COVID-19 outbreak lasts for a long period, making online learning last longer, then access to online learning should be a worry. As a result, no students will become victims because they are unable to participate in learning due to a lack of a steady network or energy. Universities are also predicted to strengthen teachers' competencies by adopting online learning. Online learning practices that differ from traditional learning necessitate the use of specialized skills and knowledge during the stages of learning planning, execution, and evaluation. The professionalism of lecturers must be continuously developed. In addition, it is strongly advised that colleges must improve the quality of campus facilities, learning processes, teaching staff, and administrative staff when switching from traditional classrooms to online distance learning.

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47-Learners' Wants Toward Continuing Education Programs Through Mooc in the Indonesian Context

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Abstract

Technological changes that are so massive allow each individual to be actively involved in elaborating this technology into optimal activities and learning. The hope is that these conditions can improve individual abilities as well as their psychological well-being. The presence of technology has created a new platform for carrying out learning through the massive open online course (MOOC). So far, the Universitas Terbuka, as a pioneer and one of the institutions that routinely promotes distance learning in Indonesia, has provided services in the form of MOOCs, which have been widely used in their learning. There are 40 courses available in the form of MOOC, but until now, there is no comprehensive information explaining to what extent MOOC users benefit from using the platform. The purpose of this study is to identify the use of MOOC at the Universitas Terbuka environment that students use as a medium for their technology-based learning. In addition, this study also aims to reveal students' perceptions about what they expect from the existence of this MOOC. This study used a mixed approach, elaborating both qualitative and quantitative approaches. Qualitative is used to determine stakeholder perceptions at the Universitas Terbuka environment regarding the MOOC program. Additionally, quantitative is used to determine student perceptions about the benefits of MOOCs for their learning. The study employed interviews and distributed questionnaires, which the researchers have modified based on the needs in the field. Interviews were conducted with three relevant stakeholders, and questionnaires were given to 60 MOOC user students at Universitas Terbuka. The study results show that MOOC is a positive media that can become an interactive learning medium in a distance learning system. So far, there are 40 courses available in the form of MOOCs at Universitas Terbuka environment, with details of 32 MOOCs that focus on community service and eight that focus on courses. This study also emphasizes the importance of MOOCs in ability-based courses (cooperation, critical thinking, and innovation), start-up companies, technology and information, lifelong learning, and other technical skills. The results of this study have significant implications for the development of learning technology in distance learning programs. In addition, the existence of MOOCs can provide more mutual variations for individuals to get meaningful learning. In addition, this study can also be a benchmark for campuses and other related agencies to modify the MOOC learning system in more actual situations in accordance with their respective goals.

Keywords: *Continuing Programs, Distance Education, Lifelong Learning, Massive Open Online Courses, Universitas Terbuka.*

1. Introduction

Every time, technology will continue to develop and make a significant contribution to human daily needs. Technology is present, of course, in order to help simplify and speed up existing accessibility. Likewise, technology in education is intended to assist learners in obtaining better knowledge (Warsihna et al., 2023). The existence of technology in learning in the last few decades has focused on developing learning media that can be used to support learning activities, especially in the context of distance learning (Samigulina & Samigulina, 2016; Uzun Aksoy et al., 2023).

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Distance learning is a process of gaining knowledge and skills provided through a variety of media, where distance and time are not obstacles for teachers and students to be involved in learning interactions (Clark, 2020). This distance learning does not always require teachers and students to meet in the same location, but it can be more flexible by adopting technology as its main tool. The Massive Open Online Course (MOOC) is a distance learning medium that is currently widely used by various institutions providing distance learning (Hamdan et al., 2022; Hamori, 2023; Longhini et al., 2021).

In the beginning, the emergence of MOOC was intended to provide an education based on connectivism and connective knowledge (Hamdan et al., 2022; Hamori, 2023; Longhini et al., 2021). This principle emphasizes the importance of acquiring knowledge through a seamlessly integrated system. MOOC is designed as an online and free platform for massive learners to access various learning resources through videos and chat rooms. In contrast to traditional learning, this MOOC provides an opportunity for learners to choose and ensure learning is in accordance with their interests, situations, and needs as learners (Ogunyemi et al., 2022; Wei et al., 2021).

The development of MOOC in Indonesia was initiated by the Universitas Terbuka (UT) as one of the universities providing distance education. Until now, there have been 40 MOOCs managed by UT and given to thousands of students throughout Indonesia (Padmo & Belawati, 2018). The material available in the MOOC at UT is very diverse, ranging from material for self-development, community development, financial planning, research development, and much more. The various MOOCs provided aim to help develop basic skills that are used to complement other needs (Zuhairi et al., 2019).

For now, the information and use of this MOOC are still limited to those who are also involved in educational activities at the UT, even though as its main function, MOOC can be used by anyone outside UT who wants to enrich their knowledge and skills (Windrati et al., 2023). This is one of the obstacles organizers face in developing and disseminating this MOOC. Reflecting on several agencies abroad, the use of MOOC has been widely used in many people's lives and has become one of the top priorities for distance learning schemes. There is no real information or representation of the benefits obtained from the MOOC. This is an important thing that the organizers must identify.

Previous studies have explored a lot in looking at the positive and negative sides of MOOC as a learning medium. As done by Sembiring and Rahayu (2020) through a quantitative exploration of the individual factors that influence the satisfaction of users of open university services, but has not focused on MOOC media directly. Other studies also mention the demographic distribution of MOOC users based on existing information in the integrated system and are descriptive in nature (Lubis et al., 2020). Other studies are also still trying to introduce MOOC as an effective medium in the learning process but have not yet explored the effectiveness of its users (Windrati et al., 2023).

Limited information about the benefits and effectiveness of using MOOC in distance learning is one of the problems to be explored in this study. This situation is important, bearing in mind that the existence of technology will be felt more by the general public if a good perception of the media is instilled. In addition, the satisfaction obtained by previous users is also an attraction that makes MOOCs more attractive to many people. Therefore, the purpose of this study is to explore stakeholder perceptions of MOOC organizers and identify the effectiveness and expectations desired by learners about this MOOC.

2. Method

A mixed research design is used to answer existing research objectives. Mixed research is used to solve complex problems so that researchers use two different approaches but, in the end, are complementary in achieving the desired goals (Ramdani et al., 2018; Warsihna et al., 2021, 2023). In the qualitative stage, the researcher explores individual perceptions about the use of MOOC as an effective distance learning medium, while the quantitative stage confirms to the MOOC users themselves the effectiveness of the MOOC provided for their learning. The combination of these two stages is expected to produce integrated information that MOOC is part of a good strategy in supporting the distance learning process.

2.1. Qualitative Stage

At this stage, the purpose of data collection is to obtain an initial picture regarding stakeholder perceptions of providing MOOC as a learning medium that will be given to students. To obtain this information, the

researcher used a series of unstructured interviews conducted with 3 stakeholders who were in charge and responsible for developing this MOOC. The data of the three people can be seen in Table 1. The questions used in the interview were: (1) What is the urgency of the existence of the MOOC for the distance learning process; (2) What kind of benefits can be obtained from the MOOC; and (3) any challenges that might be found in using the MOOC. The questions asked refer to the urgency of the MOOC developed by Tao et al. (2023).

Table 1. Demography Respondents of Stakeholder

Age	Sex	Profession	Teaching Experience at UT
40	Male	Lecture	10 years
45	Male	Program Development	15 years
45	Female	Vice Dean	7 years

2.2. Quantitative Stage

In the next stage, after obtaining information regarding the perspectives of relevant stakeholders regarding the existence of this MOOC, the next step is to confirm quantitatively to ensure that the availability of the MOOC is responded to positively by its users, in this case, students. Subjects involved in the quantitative study were taken using a purposive sampling technique (Ramdani et al., 2022), where those selected are in accordance with the characteristics that have been determined. The characteristics of these respondents are those who are active students at open universities and are willing to participate in this study. To the selected subjects, the researcher gave a set of questionnaires via Google form, which was distributed to them and contained their perceptions of the existence of MOOC in the learning process. The questionnaire was selected using an instrument developed by Castilho et al. (2018) and Evaggelia (2014) in measuring individual perceptions of the effectiveness of a media. However, in a number of questions, the researcher made modifications to make them more suitable for the context of this study.

2.3. Data Analysis

The analysis data used is adjusted for each stage carried out. For analysis at the qualitative stage, researchers use thematic analysis to gain a clearer understanding of individual perceptions of something. Meanwhile, for analysis at the quantitative stage, researchers used descriptive analysis to describe how much individuals agree with the existence of this MOOC and what things are expected to exist in the MOOC. However, in order to make the research results more relevant, the two analyses will eventually be combined to produce a model that is quite informative about the use of MOOC in distance learning (Creswell & Creswell, 2018; Fetters et al., 2013; McKim, 2017).

3. Findings

In this results section, the researcher will first present a description of the results of the interviews found at the qualitative stage and present them in the several themes obtained.

3.1. Stakeholder Perceptions Regarding MOOC

Based on the results of interviews with selected subjects and then carried out a thematic analysis of the existing interview descriptions, the researcher obtained three major themes from stakeholder perceptions regarding the use of MOOC in the UT environment. The three themes include; (1) Urgency. This theme emphasizes the basic principles of MOOC creation; (2) Benefits. This theme is related to what positive benefits the user receives from the MOOC; and (3) Challenges. Difficult situations must be overcome so that the development of this MOOC is better in the future.

3.1.1. Theme 1 "Urgency"

In this first theme, there are three sub-themes that represent it, namely learning flexibility, technological literacy, and meaningful learning. The flexibility of learning refers to the extent to which this MOOC can accommodate every individual who has limitations in terms of time and place so that they can go through the MOOC. Technological literacy shows that this MOOC is an important part so that it becomes evidence of a person's ability to understand and use technology in learning. Meanwhile, meaningful learning directs learning goals that are fun and in accordance with the passion of each individual.

3.1.2. Theme 2 “Benefits”

The benefits of MOOC in the results of this interview are shown in several sub-themes, including training basic skills, strengthening existing knowledge, learning aids, alternative learning media, and a place for self-existence.

3.1.3. Theme 3 “Challenges”

The interviews resulted in sub-themes of this challenge, including learner attitudes, the use of socialization, and the networks and technology used.

3.2. Respondent Demographic Data Quantitative Stage

At this quantitative stage, the researcher obtained 60 subjects with demographic variations, which can be seen in Table 2.

Table 2. Demography Respondents of Learners

Category	Frequency	Percentage
Sex		
Male	27	45%
Female	33	55%
Age		
>25 years old	11	18.3%
25 – 35 years old	34	56.6%
36 – 45 years old	11	18.3%
46 – 55 years old	3	5%
56 – 65 years old	1	1.8%
Occupation		
Public	21	35%
Private	27	45%
Business Owner	1	1.7%
Student	10	16.6%
Housewife	1	1.7%
Marital Status		
Single	26	43%
Married	34	57%

Based on Table 2 above, it can be seen that the demographics of the job seekers vary quite a bit in each category. The proportion of subjects based on gender was not much different, namely 45% male and 55% female. As for age itself, it was dominated by the age range of 25 to 35 years, which reached 56.6%, while from the aspect of work, most were those who worked in the private sector, and the remainder spread to various types of work. For the marital status itself, most are those who are married, with a percentage of 57%, and the rest are not married.

3.3. Learner Perceptions Related to Expectations of Using MOOC and Its Effectiveness in Learning

In this section, the learner’s perception of their reasons and expectations will be presented first with the existence of the MOOC (see Table 3).

Table 3. Learners' Expectations of MOOC

Indicators	Frequency	Percentage
What are the reasons for taking the program?		
Carrier development	38	45.2%
Financial	5	5.9%
Promotion	3	3.5%
Getting a new job	2	2.3%
Self-fulfillment	26	30.9%
Knowledge update	10	12.2%
What field of study should the university provide?		
Language	21	15.3%
Information technology	24	17.5%
Technical skills	11	8%
Working skills (teamwork, critical thinking, innovation)	34	24.8%
Creating a new start-up	27	19.7%
Lifelong learning skills	16	11.9%
Logistic management	1	0.7%
Civic education	1	0.7%
Artificial intelligence	1	0.7%
Economics	1	0.7%
What learning modes do you expect to be provided?		
Television program	9	7.8%
Radio program	5	4.3%
Printed materials program	11	9.6%
Online learning	40	35.1%
Synchronous	11	9.6%
Blended	38	33.6%
What types of learning assessment of the program do you prefer?		
By quiz	12	13.4%
By essay test	11	12.3%
By practice	16	17.9%
By report	14	15.7%
By test	12	13.4%
By assignment	24	27.3%

Note: The questions in Table 3 can be selected more than once.

Referring to the information presented in Table 3, most learners take programs that use this MOOC for career development, self-fulfilment, and knowledge addition. Then, the percentage of fields provided by MOOC looks more even in all aspects. Meanwhile, the learning model that is integrated with MOOC is expected to be in the form of online learning (the highest percentage is 35.1%). The implementation of the assessment itself looks more varied in all types of assessment that exist today. After that, the researcher will present the results of the learner's perception of the effectiveness of MOOC media for their current learning (can be seen in Table 4).

Table 4. Learners' Perception of Effectivity Using MOOC in Learning

Indicators	Frequency	Percentage
Your satisfactory level towards the programs?		
Very high	6	10%
High	43	71.6%
Moderate	11	19.4%
Low	0	0%
Very low	0	0%
After the last program, will you take another program?		
Yes	49	81.6%
No	2	3.3%
Neutral	9	15.1%
Will you recommend the program to others?		
Yes	58	96.6%
No	0	0%
Neutral	2	3.4%

Information in Table 4 explains the learner's perception of the effectiveness of using MOOCs in learning. From these results, as much as 71.6% of the majority of respondents felt high satisfaction with this MOOC. In addition, as many as 81.6% of the respondents will return to take the MOOC program at a later time. Plus, most of them would also recommend this MOOC program to others (96.6%).

3.4. The MOOC Integration Model in Distance Learning

The use of MOOC in distance learning is, of course, described as a process to gain lifelong education. This education can be given in any form and in any way. The most important thing is to strengthen self-learners to be better. Information from the qualitative stage is strengthened by quantitative results, which lead to the ultimate goal of education, namely, getting better human beings in all aspects. To describe this situation, the researcher uses the model described by UNESCO on continuing education and lifelong learning (see Figure 1).

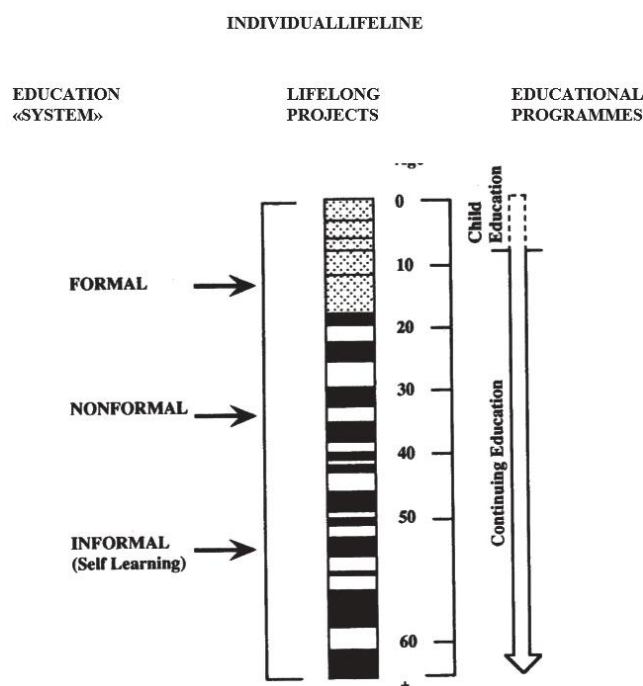


Figure 1. The Relation between Continuing Education (CE) and Lifelong Learning in MOOC (Adapted from UNESCO, 1993).

4. Discussion and Conclusion

4.1. Discussion

The results of the study present a broad perspective on the use of MOOCs in learning. MOOC, seen from a literature perspective, makes a major contribution to helping individuals understand the materials they like and need more deeply. This is, of course, in line with the qualitative information from the MOOC organizers that, in essence, the existence of this MOOC gives different nuances to individuals. Traditional learning can be developed to be more flexible.

The view that technology media is useful for humans has been conceptualized a long time ago, where technology helps facilitate and has a positive direction towards human goals, but sometimes mistakes occur in addressing and implementing technology in activities that are detrimental. This study provides an overview of the urgency of MOOCs for learners, which, when viewed in more detail, shows the nature of education. The goal is to get meaningful learning. According to Ghazali et al. (2018) and Toven-Lindsey et al. (2015) in his study stated that activities built through MOOC media were able to strengthen the psychological conditions of learning, one of which was in the aspect of their self-efficacy. Strong efficacy is built through unlimited interaction and experience, where they can learn more from the media.

At present, stakeholders are well aware that to get the effectiveness of the MOOC, which can be felt by many parties better, they must pay attention to many factors in its implementation. The most fundamental thing is the positive attitude of the learner, which must be built from the start, even until they actually use MOOCs in their lives. A positive attitude will determine how they behave so that it ultimately produces optimal satisfaction (Al-Rahmi et al., 2021; Atabek, 2020). A positive attitude toward using technology is also closely related to how learners look for other learning resources to complement their learning. The thing that is also underlined in the challenge is a systematic form of socialization that is routinely carried out so that users can also see greater benefits from MOOCs.

Stakeholder perceptions in this study are in line with the quantitative results obtained by researchers. Of all the questions and situations given to user respondents, they tend to evaluate positively the presence of MOOC in learning. This is indicated by the high satisfaction rating for this media. It does not stop there. They also have the potential to use the same program again in the following semester and will recommend this program to many people. This is a positive signal that what is perceived well by the organizers turns out to be effective for its users.

This study is not only clear evidence that MOOC is effective in distance learning but also confirms that lifelong learning can continue without exception. Every individual has the right to get the same opportunity to get learning resources, even in sub-optimal conditions. The concept of continuous education then reinforces that MOOC can be used as a medium for distance learning. Future studies must re-confirm this effectiveness through a series of experimental studies as well as prove that this MOOC can also directly improve learning outcomes and achievement motivation.

4.2. Conclusion

This study provides quite comprehensive information about the urgency of MOOC in distance learning. MOOC contributes to helping students understand material that is more integrated in one container so that students can focus more on what they will learn. The existence of this MOOC is also an important part of the strategy for providing sustainable education services and is not limited to age, distance, and other individual/social aspects. The future development of MOOCs, of course, must pay attention to the synergistic aspect of the technology used and the readiness of the learner to use the media.

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48-Construction Strategy of Open Education Teacher's Multidimensional Portrait Based on Data Scraping

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Abstract

The construction of teachers in the new era is an important content and prerequisite for educational modernization. To accelerate the construction of a high-quality professional innovative teacher team, the Ministry of Education proposes to establish a scientific, accurate, multi-dimensional digital portrait of teachers based on big data analysis. Its purpose is to provide support for school decision-making, improve teacher management and optimize teacher services. Teacher portrait is a variant of user portrait introduced into the field of education and is the application result of data mining and analysis technology. The rich connotation of open education teachers determines that when portraying them, it is necessary to combine their responsibilities and establish an adaptive, diverse, and developmental evaluation system. This research aims to build the underlying logic of the multi-dimensional portrait of teachers in open education and elaborates on seven aspects: the establishment of the goal of the portrait, the collection and preprocessing of teachers' data, the construction of the portrait model, the establishment of the teacher's individual label system, the output and quality evaluation of the portrait, and accurate application. On the basis of establishing goals and collecting data, the teacher characteristic model, teacher ability model, and teacher development model are established respectively, and the fact tag, model tag, and prediction tag are further cross generated, and a two-dimensional individual tag system of open education teacher portraits is integrated, and finally the qualified teacher portraits are output. According to the different application scenarios of portraits, the application assumptions for teachers' personal portraits and teachers' collective portraits are proposed respectively. Teachers' personal portraits can be applied to teachers' career planning and teachers' evaluation and assessment, and teachers' collective portraits can be applied to education decision-makers' evidence-based management and teachers' professional development precise planning. The research results aim to help construct a multidimensional teacher portrait that conforms to the growth laws of high-quality open education teachers and provides a reference for the establishment of a modern teacher evaluation system and development support system in the new era.

Keywords: *portrait of teacher, open education, multidimensional portrait, application scenario, data scraping.*

1. Introduction

The country's development must begin with teacher development, because only with good teachers can there be decent education (Office of the Working Group on the Outline of the National Medium- and Long-term Education Reform and Development Plan, 2010). The General Office of the Ministry of Education (2018) issued the *Notice on the Pilot Work of the Artificial Intelligence-Assisted Teacher Team Building Action* in August 2018, proposing to create digital portraits of teachers through the collection of various types of information about teachers' teaching, scientific research, and management, based on big data analysis, which can then provide support for school decision making, improve and perfect management. In October 2020, the *General Program for Deepening Education Evaluation Reform in the New Era* issued by the State Council of the Communist Party of China Central Committee (2020) also emphasized the exploration of the use of artificial intelligence, big data, and other modern information technologies to carry out evaluation.

Open education teachers are professionals who integrate and provide learning resources, design teaching sessions, implement the teaching process using information technology, and provide learning support

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services(Liu,2009), which includes the triple role expectations of college teachers, adult education teachers, and distance education teachers(Liu,2019). The formation of an open-education teacher team should be prioritized, and the method of boosting open-education teachers' professional growth through teacher portraiture is also worth exploring.

With the rapid development of artificial intelligence and big data mining technology, the technical realization of teacher profiling is no longer an insurmountable challenge, compared to the need to focus on exploring the “underlying logic” of teacher profiling, in short, there are three issues: First, what aspects of the teacher's profile are worth trying; second, what data collection of teachers is worth trying; third, how the teacher's profile is used to collect data; and third, how to promote the professional development of open education teachers is also worth trying. Second, what data should be gathered from teachers; and third, how to transform the data into a three-dimensional and multi-dimensional virtual teacher image and make it visualized and usable(Huang,2020).

The study of teacher portraits for the particular group of open education teachers, however, has received relatively little attention. Although academics have conducted some analysis and exploration of teacher portraits from both theoretical and practical perspectives, applied them to specific scenarios such as teacher training(Huang, Tang, Fan, & Zhong,2020;Shen,2022), teaching evaluation(Cui & Gu,2021), web-based training(Wang, Chen, Ding, Wang, & Mo,2020), support services(Peng, Wei, & Yan,2021), and educational decision-making(Meng & Qi,2022;Yu & Liu,2019), and summarized certain experiences, It is challenging to progress the idea of portraying open education teachers as though they were a sea of smoke since it requires building a portrait model for them. As a result, this study focuses on the traits of open education teachers, provides a personalized discussion of the “underlying logic” of teacher portraits, develops an evaluation system that takes these traits into account, and creates a multidimensional portrait that illustrates the growth of open education teachers' professional abilities.

2. Connotation and Logic: How to Identify Paths of Inquiry for Open Education Teacher Portraits?

2.1. The Connotation of Teacher Portraits

With the emergence of big data in 2008, many scholars started to focus on the theoretical and practical application of the concept of user portrait to conduct research and derive the concept of “data-based user portrait,” which is the collection of labels describing the user-generated by mining and analyzing the user behavior. The term “user portrait” was first proposed by Alan Cooper, the father of interaction design(Cooper,2006). the idea of “data-based user profiles,” or a group of labels used to describe people that are created by mining and analyzing user behavior data. The term “teacher portrait” refers to a variation of the user portrait that was first used in the field of education. While its essence is still the result of the use of big data, data mining, and analytics technology, it may be seen as the beginning of the portrait that the item is designated as a “teacher”(Chen & Hu,2021).

For three reasons, teacher portrait-related research in the field of education in China is still regarded as having a “low academic status” despite over ten years of development: First off, the academic world has different definitions of the term “teacher portrait” because there hasn't been a comprehensive and in-depth examination of the subject. Second, the teacher portrait's research direction and scope are not sufficiently defined. Third, because teacher portrait research is a typical cross-discipline, it is challenging to develop a truly independent theory of teacher portraits because scholars from various disciplinary backgrounds have very different foci and entry points and present “very different styles” of content in their portraits(Chen & Hu,2021).

Currently, there are essentially two types in which scholars define teacher portraits. The first category focuses on quantitative research from a large-scale big data perspective, paying attention to the creation of teacher portraits, emphasizing more on the “data-oriented” qualities of teacher portraits, and creating “digital labels.” Fang et al.(2017)concentrated on the teacher portrait data source, recorded the data from the school's current information technology system, and “data-ized” the teachers. In order to classify and score the students' evaluations, Chen(2018)retrieved the emotional terms from the text. He then produced a six-dimensional profile of the teachers and created the portrait. The entire picture of a teacher's course was abstracted by Cheng et al. (2018)using modeling techniques. Existing data from the school's information technology system was merged with this information to “DataMatrix” the teacher's teaching process, and the teacher's classroom characteristics were depicted through scoring. Zhang et al.'s (2020)teacher portrait was created by

observing teachers' instructional techniques and measures of student support. The degree of fit for specific teachers needs to be increased even though this method of defining teachers can visually reflect the traits of teacher portraits. It still lacks personalization at the micro level and ignores the personalized impact of cultural background and environmental conditions on teachers. On this foundation, qualitative research is included in the second category, concentrating on the outcomes of digital portraiture and making an effort to create "semanticized" text labels. With a focus on portraying teachers' portraits, Yu et al. (2019) accurately capture teachers' individual characteristics, teaching styles, and levels, as well as their research interests, academic networks, and professional development trajectories through in-depth mining of their basic data, teaching behaviors, and research outputs. The process of creating teacher portraits was given attention by Hu et al. (2019), who concentrated on the teaching and research data of teachers, built an individual label system and formed a collection through data mining and user portrait technology, and accurately portrayed a virtual teacher model containing teachers' traits, needs, preferences, and behaviors. Ye (2019) summarizes the qualities of superior teacher groups and focuses on the expression of teacher portraits to create a professional portrait of teacher groups. The similar concept is shared by Wang et al. (2023), who also broaden the data sources for label construction in order to create a group image of Civics and Politics teachers in colleges and universities by gathering pertinent data all around using a combination of quantitative and qualitative methods. This definitional approach supports the quantitative model label from a qualitative standpoint and is able to conduct research from both the macro and micro perspectives at the same time, which opens up a new way of thinking for the teacher portrait, but the label collection's formation mechanism still needs to be carefully examined.

How to form a collection of labels? Whether they are digital or text labels, they are merely a method of presentation for teacher portraits; it is more important to investigate the meaning behind them. Since user portraits are the source of teacher portraits, it may be good to revisit their meaning, which can be distilled into three points: First, user portraits are a structured representation of a collection of features distilled from a vast amount of user data (Trusov, Ma, & Jamal, 2016). Second, user portraits are a collection of features aggregated from the interests and preferences of users expressed through specific activities (Ma, Silver, & Shakshuki, 2010). Third, user portraits are a combination of information labels obtained after refining a variety of user attributes and features are refined to obtain a combination of information labels (Meng et al., 2017). The three key components of the connotation of teacher portraits—attributes, features, and labels—can be easily determined from this (Chen & Hu, 2021). It is possible to categorize attributes into two groups: dynamic attributes and static attributes (Song, Chen, & Zhang, 2019). Dynamic attributes mostly correspond to teachers' behavioral information, which is subject to change. Features are the common and distinctive aspects of a teacher's qualities that have been determined using certain, reliable techniques. On the other hand, labels are highly generalized labeled text or data that are created through additional extraction and condensation based on attributes. Instead of having a straightforward recursive relationship, attributes, features, and labels cross and influence one another (Song et al., 2019). Studies frequently combine qualities and features to cross-generate factual labels, model labels, and predictive labels (Hu & Lin, 2019), which is the fundamental building block of creating teacher portraits. This is done because different models with different data attributes are processed and produced in different ways.

Overall, as a result of ongoing theoretical debate and real-world application, both the definition and meaning of teacher portraits are getting stricter. Based on prior research, this study defines teacher profiling as the process of gathering a wide range of diverse teacher data, classifying it, extracting the traits and traits of particular teachers and groups, constructing a labeling system, and finally producing useful teacher portraits.

2.2. The Underlying Logic of Teacher Portraits

The fundamental concepts of teacher portraits are arranged from the standpoint of design thinking of portraits since the goal of this study is to investigate the construction strategy of open education teacher pictures. Overall, from a design thinking perspective, portraits can be divided into four categories: goal-demand-oriented construction techniques, role-oriented construction methods, fiction-based construction methods, and participation-based construction methods (Zhu, 2021).

The goal-demand oriented construction method, which was inspired by Alan Cooper's "seven-step persona construction method" (Cooper et al., 2015), emphasizes the portrait object's demand for the product and its purpose of use as the foundation of the portrait's construction. It entails gathering and researching the information about the portrait object, segmenting the group of the portrait object, and building and enhancing

the portrait in three phases with simple access to the information and resources. Although mining can be in-depth, its credibility, persuasive power, and ability to be verified by particular data are limited(Zhu,2021)and it usually needs to be complemented by data support. Meng et al.(2022) built a portrait model to integrate teachers' basic information and behavioral data in order to realize the automation of part of the performance appraisal process in order to address the issues of time-consuming and laborious processes common in performance appraisal in colleges and universities. On the other hand, Xue et al.(2020) created a school picture for regional education government to represent the growth of regional education and offer a tool for decision-support for sophisticated education governance. These are instances of portrait construction that is focused on the demands of the target audience.

The role-oriented creation method emphasizes the analysis of behaviors in the scene and places the focus of the portrait on the subject's behavioral acts in the particular setting. Based on a thorough analysis of the literature, Huang et al.(2020) proposed accurate teacher training portrait modeling by establishing labels, individual portrait modeling, and group portrait modeling. They also examined the viability of xAPI-supported accurate teacher training portrait construction in online learning environments. Wang et al.(2020) conducted accurate portraits of instructors in e-learning scenarios based on 235 samples of teachers' e-learning communities in the Zhejiang Master Teacher Network in order to address the issues with the current classical evaluation techniques of teachers' e-learning communities. Yan et al. (2022)narrowed their attention to the specific scenario of informalized teaching classrooms, created evaluation indices for these classrooms, and created both individual and collective portraits of teachers.

The fiction-based construction method adopts a blend of qualitative and quantitative method, emphasizing that the researcher creates a typical portrait of the subject of the portrait through assumptions, deliberation, and derivation(Floyd, Cameron Jones, & Twidale,2008). This method is more time-consuming for the researcher and has restrictions on the method's ability to be improved upon and innovated(Gao,2019). Based on their understanding of the connotations associated with excellent teachers and their characteristic portraits, Deng et al. (2022)coded the pertinent domestic and international literature using NVivo qualitative analysis, then compiled and analyzed the six dimensions of these connotations for excellent teachers. Peng et al.(2022), on the other hand, formed four types of teacher competence portraits through cluster analysis and suggested professional development strategies, respectively, based on an empirical investigation of the competence of teachers of professional courses in higher vocational colleges and universities within the scope of Zhejiang Province.

In contrast to the fiction-based construction method's distortion brought on by the researcher's stereotypical impression, the participation-based construction method adds the link of thoroughly considering the psychological and social factors of the portrait subject through engaging in comparable scenes, which enhances the accuracy of the portraits and is more suited to the later optimization and upgrading of the portraits(Zhu,2021). Though its use in current research is fairly limited, this construction method has a significant implementation cost. With respect to the study's goal, this study initially uses the fiction-based construction method during the analysis stage of the construction strategy of the open education teacher portrait, and in the later optimization to improve the teacher portrait, it considers gradually introducing the participation-based construction method.

The construction procedure needs to be further confirmed based on the design concept. Four stages of building a portrait model were suggested by Xiao et al.(2019): the portrait goal, data collection, portrait modeling, application, and assessment in the context of online learners. Data collecting, data preprocessing, portrait model creation, labeling system establishment, portrait quality assessment, and accurate application of the portrait when profiling teachers were the steps that Hu et al.(2019) refined. The five processes of data preservation, data collection, data analysis, portrait production, and personalized recommendation for portrait building were proposed by Huang et al (2020)after dissecting the process of correct teacher training portrait construction in an online learning environment based on xAPI. The portrait process was created by Zhang et al. (2022) after synthesizing the findings of earlier studies. It consists of six steps: the portrait goal, data collecting, data preprocessing, portrait model establishment, label formation, and portrait application and evaluation. This study focuses on the creation of the "underlying logic" of the multidimensional portrait of open education teachers, so it primarily focuses on the establishment of the portrait goal, the gathering and preprocessing of teacher data, the portrait model construction, the establishment of the individual teacher labeling system, the output of the portrait and the quality assessment, and the precise application of the seven links to elaborate, and the log.

The preparation of data directly influences the quality of the output portrait (Yu, Zhang, & Zhu, 2020), which must be done carefully to ensure the correctness of data processing. Data is a foundational component for the entire process. Cleaning techniques, integration techniques, transformation techniques, and statute techniques are examples of common data preprocessing techniques (Wang et al., 2020). Data integration is the process of integrating screen data that may be useful, creating a comprehensive preprocessing procedure that effectively locks and processes a variety of objects (Wang, Zou, & Zhan, 2013). Data cleaning, which attempts to eliminate the needless calculations caused by useless data and give more space for data preprocessing, comprises standardizing data format, removing aberrant and duplicate data, and correcting data errors, among other things. Through smoothing aggregation, data generalization, and language modification, which aims to eliminate quantitative discrepancies between various data and normalize data, data transformation turns data into a form suited for mining (Wang et al., 2013). On the other hand, data legislation aims to streamline data as much as possible without significantly altering its original form (Lv, 2011).

3. Constructing and Assessing: How to Scientifically Build a Portrait of Open Education Teachers?

3.1. Establishment of the Portrait Target

The target of the picture and the issue that the teacher's image is meant to address should both be determined in order to determine the painting's aim.

First, it's important to define the subject of the image, which are open education teachers. Currently, China's Open University has established specialized roles at various levels of the educational system, and the division of labor has taken on a number of duties, including project management, instructional design, organization of resource development, academic research, implementation of specific teaching, learning counseling, and learning support services (Bao, Jin, & Zhao, 2017), and according to the various duties are also titled as full-time teachers, professionally responsible teachers, counseling teachers, classroom teachers, and other different designations (Liu, Zhang, et al., 2021). Therefore, defining open education teachers in terms of their responsibilities rather than their job titles is more thorough and acceptable. This study refers to the portrait object, which includes academic, skill-, practice-, management-, service-, and management-oriented teachers who are in charge of all forms of teaching links in China's open university schooling system (Mao, 2010).

The second is to make clear the issue that the portrait is attempting to address—evaluating and enhancing the growth of open education instructors' professional competence. It is widely accepted in the field of open education that open education teachers should possess the teaching, research, and resource-building skills listed above, as well as the ability to use educational technology, communicate effectively, and work in a team. Some academics have also suggested including social services in the list of open education teachers' professional competencies (Liu, 2013). The complexity and distinctiveness of open education govern the range of tasks played by instructors in this setting, and they also set higher standards for the elements of professional competence that teachers should possess. Teaching, research, resource creation, and social service are the four main components of professional competence for open education teachers as sorted out by the trigonometric hemispherical structural model of the elements of professional competence of open education teachers constructed by existing studies. Research expertise includes research in professional fields, research in education and teaching, application for research topics, educational reform projects, organization of or participation in academic activities, and resource construction expertise includes professional construction, new courses, updating and optimizing of course resources. Teaching expertise also includes managing and operating online courses, conducting distance face-to-face lectures, and counseling students (Li, 2022). The trigonometric hemisphere model will be used in this study to create a picture of the professional skills held by open education teachers.

Additionally, the picture of a teacher's professional competence depicts the "present" of the instructor, or their growth up until that point in time. The "past" and "future" of teachers should also be taken into account in the time dimension of the portrait, meaning that personal history and professional development plans should be taken into account. The former can be obtained from the basic information of teachers, while the latter must be obtained from the basic information of teachers. However, this is somewhat biased for a three-dimensional and multidimensional portrait of teachers, and the "past" and "future" of teachers should also be included in the time dimension of the portrait. The former can be ascertained from the teacher's fundamental knowledge, but the latter requires consideration of the teacher's professional development activities and career plans (Li, 2022).

Therefore, three criteria of an open education teacher picture are identified in this study: the qualities of the teacher, the competence of the teacher, and the development of the teacher. Teacher development attributes include teacher growth data and teacher planning, whereas teacher ability attributes include teacher teaching data, teacher research data, resource construction data, and social service data.

3.2. Data Acquisition and Processing

The completion of the teacher portrait depends on the thorough collection of pertinent facts because it should be based on the criteria of authenticity, scientificity, and accuracy(Hu & Lin,2019). This study suggests the categorization and sources of teacher profiles after thoroughly examining the requirements of each data attribute and the kinds of data that can be acquired by existing technologies within the open education system.

The curriculum vitae, position, and basic personal information of instructors can all be collected by the personnel management system as data on the characteristics of teachers. The teaching affairs system can gather pertinent information produced by teachers during regular course management and team-building activities. The primary tool used by open education teachers to conduct distance learning is the learning network, which may give information about how teachers engage with students and teach. The open education system's existing educational and instructional resources, as well as their iterative updating records and utilization records, are all kept in the resource management system. The research management system offers information on teachers' research performance, accomplishments, key research trajectories, networks of research collaboration, etc. While the research cooperation networks are merged with the data of co-authors of theses and co-completionists of research projects, the research orientations of teachers are mostly determined by examining the contents of their academic theses and research projects. While other data that are not yet available can be collected through teachers' self-reporting, the teacher pool system can give information about teachers' involvement in social service and professional development. The data are further pre-processed based on collecting through cleaning, integration, conversion, and statute.

3.3. Constructs of the Teacher Portrait Model

The creation of the profiling model is an important step in the profiling of teachers. The teacher characteristic model, teacher ability model, and teacher development model are established in this study, respectively, on the basis of the data attributes suggested in the preceding section. The education and teaching model, scientific research model, resource construction model, and social service model are included under the teacher ability model, and the teacher growth model and teacher planning model are included under the teacher development model. On the basis of this, the fact, model, and prediction labels are further cross-generated.

Fact labels are primarily formed from data that describes objective factual information of this sort that is difficult to change or data that changes frequently(Hu & Lin,2019). This category includes the personal information on teachers that was gleaned through the study's personnel management system. Data such as name, gender, and educational background, for instance, describe objective facts. Age and teaching experience, however, will change frequently over time. Title and position, work history, and award and punishment information, however, will not produce frequent changes; the majority of these are adjusted annually or biannually. Predictive labels are built on fact labels, which can be produced using text mining, NLP techniques, and other technological methods. A specialized algorithm statistically analyzes the input data to produce fact labels(Hu & Lin,2019).

The core of teacher profiling involves a sequence of rule definitions and data associations because model labels do not already exist that directly match to the original data(Hu & Lin,2019). In this study's education and teaching model, for instance, it is necessary to digitally label Teacher X from three perspectives: distance teaching, student counseling, and course management and operation. When labeling course management and operation, Teacher X's data in course management, question bank creation, test management, teaching, and research must be thoroughly correlated. When labeling remote lectures, it is necessary to thoroughly correlate the data of Teacher X during the lecture, including the number of students choosing courses, the number of days spent online on the learning platform, the number of times logging in on the learning platform, the number of courses taught, the number of courses, the number of classes, the total number of behaviors, the number of browsing, the number of homework evaluations, and the number of test evaluations. Further calculation specifies the weights of numerous behavioral labels(Hu & Lin,2019)based on the thorough association of various forms of data, and ultimately yields the label of Teacher X's educational background and teaching skills. The mathematical link between the attenuation factor, behavioral weights, contact point weights, the

volume of data, and random errors, among others, determines the label weights(Chen & Ma,2018). Technically, the most crucial technical phase in the process of creating teacher profiles is modeling analysis, which must be used to build the model labels. Before the teacher portrait model can be built, features must be extracted and chosen using machine learning techniques, a large number of training sets must be input, the right algorithms must be chosen for training, and the training criteria must be continuously optimized and met(Hu & Lin,2019).

A model is trained and optimized by prediction algorithms and clustering algorithms, and predictive labels are labels with probability prediction and value prediction functions that are outputted based on fact labels and model labels(Hu & Lin,2019). We can predict the teachers' current professional development foundation and the direction of professional development they are concerned about by looking at the data related to their participation in training, academic upgrading, and international exchanges. We can also determine which type of training is more appropriate for the teachers by looking at their personality traits. A teacher's expected level of competency and current level of competency can be compared using the Teacher Competency Model to determine the professional development support the teacher will likely need in the future to make up for any deficiencies in personal competency. When necessary, predictive labeling can also probabilistically retrieve missing factual labeling data in addition to performing prediction(Hu & Lin,2019).

It is important to note that the labeling above is dynamic. To maximize the optimization of the teacher's portrait and produce a higher-quality, complete, three-dimensional, and multidimensional image of the teacher, it is still necessary to choose the appropriate modeling algorithms in accordance with the needs and unique characteristics of the portrait labels.

The individual teacher labeling system for scene-oriented applications assigns teachers a set of corresponding digital semantic labels based on the collection of data on their traits, skills, and developmental stages. It is necessary to build the individual instructor labeling system in accordance with the principles of reciprocal independence and total exhaustion(Hu & Lin,2019), which simply means that the accurate data that has been gathered should be used without duplicate or omission. Based on data collection plans and envisioned application scenarios, a two-dimensional individual labeling system for open education teacher portraits was created in this project.A number of labels with open education teachers' traits, such as teaching-oriented, teaching and research, social service, etc., are grouped and integrated along the portrait's XY axis.

In general, different data processing techniques result in various label types, and the various degrees of labels further develop them from a general notion to a "flesh and blood" labeling system. The interaction of several dimensions increases the open education teacher profiling's accuracy and dependability(Hu & Lin,2019).

3.4. Teacher Portrait Tag Output

A visualization form is typically utilized when labeling the output of teacher portraits to effectively and intuitively show the data in the portraits. It is important to consider the granularity and application of the portraits before producing them. The more particular and detailed the portraits are, the more data must be collected and analyzed, the more expensive it is to create the portraits, which limits their usefulness. The granularity of the data also affects how detailed and specific the portraits are.

If the output of the teacher portrait "factory" is thought of as a product, then the quality evaluation of the portraits is the key quality inspection link in the production line, which directly affects whether the product may flow into the market from the "factory." Accuracy, coverage, and timeliness are the three assessment variables typically used to evaluate the quality of teacher portraits(Hu & Lin,2019). Before a portrait is used, it is important to evaluate its quality in order to determine its validity and dependability. The calculation and presentation of labels, which should also be able to more naturally reflect the characteristics of various teachers, form the basis of teacher portraits(Zhu & Liu,2021).

4. Review and Application: How to Achieve Precision in Open Education Teacher Portrait?

The open education teacher picture can be generated to provide a thorough open education teacher analysis report after it has undergone repeated evaluation, feedback, and optimization. The output can also be used for teacher career planning, assessment and evaluation, and evidence-based management, depending on the application scenarios of the portrait.

4.1. Application to Teacher Career Planning

The visualized picture can assist individual instructors in developing a more objective and in-depth awareness and knowledge of themselves, allowing them to further organize their careers on the basis of this knowledge, as it is the fundamental object and major service user of the portrait(Hu & Lin,2019).

On the one hand, pictures can help open-education teachers better understand who they are and how to position their responsibilities. According to their research, Feng et al. recommended that open education teachers' duty orientation be varied for development planning and that they be encouraged to develop in the direction of specialization, such as in academics, teaching service, or teaching management, depending on their individual strengths(Feng & Liu,2016).

On the other hand, open education administrators can also utilize the image to identify the goals for developing master teachers and forecast the future influence of teachers. The first step in developing master teachers is identifying the cultivation target, which should be evaluated prospectively in light of the current situation of teachers, development plans, etc., and take into account fully both their potential for development and their individual subjective motivation(Wang,2020).

4.2. Application to Teacher Evaluation Assessment

The "Overall Program for Deepening Educational Evaluation Reform in the New Era" was released by the CPC Central Committee and the State Council in October 2020. It made note that the "chronic disease" of the current system of educational evaluation is the issue of "Five Only"(Zhou,2020). It is vital to actively and consistently advance the reform of teacher assessment and evaluation in order to effectively raise the standard of the Open University faculty as a whole and inspire instructors to more effectively engage in teaching, research, and social service activity(Tian,2022). To a certain extent, the "five only" problem in teacher assessment can be solved with the use of multi-dimensional data on teacher profiling(Zhu & Liu,2021), allowing for a more thorough and comprehensive evaluation of teachers. From pertinent data, it can also further explore fresh concepts and directions for educational reform.

One way to determine whether and to what extent a teacher has performed their job duties is to apply the open education teacher picture to a teacher performance review using the "absolute" criterion. The behavioral data can be normalized by defining "actual task completion" and "average task completion."

On the other hand, it is also feasible to combine and contrast the individual profiles of various open education teachers and offer the supporting information for the "relative" level rating of teachers' quality and honors.

4.3. Application to evidence-based management for educational policymakers

Evidence-based policymaking is a cutting-edge theory of public policy that stresses the use of "evidence" that has been put to the test through scientific procedures and methodologies as the foundation for decision-making(Yan, Fu, Liu, & Liao,2020). Its goal is to increase the scientific validity and efficacy of policies(Zhang,2017). For educational policymakers, individual portraits can be combined to create a collective portrait, which can be used to analyze and produce reports on the overall situation of teachers in certain aspects and serve as sufficient support for their decision-making, if the number of samples of teachers' portraits stored in the database reaches a certain level or even achieves full coverage within a specific range. For open education decision-makers, the collective portrait of instructors can specifically offer evidence in the following areas:

First, planning and policy formulation for the expansion of the open education teacher workforce. The development direction of open education in the upcoming time is frequently determined by planning and policies, which frequently have a certain macro-orientation. Since the timeliness of the data cannot be guaranteed when using traditional data collection and analysis techniques, decision-makers are unable to make timely adjustments to the policy planning because there may be months or even years between the data collection and the release of the documents. Data gathering is frequently done by sampling surveys, which are inherently incomplete, and is constrained by the expense of people, material, and financial resources(Hu & Lin,2019). In order to understand the makeup of the teaching force and the needs of future construction, it is possible to analyze demographic data, academic degrees, graduation institutions, research directions, etc. based on the creation of a collective portrait database of teachers. This allows for the formulation of targeted

planning documents and policy documents as well as a gradual transition away from experience- and situation-based decision-making toward data- and evidence-based decision-making. Making decisions based on data and evidence(Rong & Lu,2017).

Second, the open education system's targeted position arrangement for academics and staff. The degree of openness of human resources as a whole and the effectiveness of resource allocation across the board in open education strongly influence each other, and these factors decide whether or not an open university can achieve high-quality sustainable development(Wu,2021). The value of human resources can be maximized and the needs of open education can be supported by scientifically and effectively allocating jobs in accordance with the traits and skills of teachers(Cai, Liu, Luo, & Wu,2022). Based on the creation of the collective portrait database of teachers, we can predict the future development potential of open education teachers, match them with the job requirements, and make each position “for those who have the ability to live in” and “for those who are suitably qualified” by making a multidimensional comprehensive comparison of the abilities of open education teachers in education and teaching, scientific research, resource construction, social services, and other aspects. Get a more rational and scientific faculty position optimization program for open education in order to make “the right person to live in” and utilize human resources in open education to the fullest(Cai et al.,2022).

Third, the precise distribution of financing for open education and research resources. Since March 2014, the State Council has published a number of policy documents on “release management and service” reform in the area of scientific research, calling for the strengthening of scientific research institutes' primary responsibility and leading awareness in the management of projects and funding, with a particular focus on the promotion of researchers' motivation for innovation through the proactive and prudent allocation of scientific research funding(Wu,2022). By actively and judiciously allocating money for scientific research, special focus should be made to improving researchers' enthusiasm for innovation(Wu,2022). Contrary to other funding allocations, the actual process for allocating funding for scientific research should also take into account the value that the project can produce and its necessary costs, ensure the uniformity and effectiveness of the allocation of core and key projects(Yin,2018), ensure the strong support for high-level scientific research talents, and act as a guiding factor in allocating funding. It can integrate information about open education teachers' scientific research abilities, areas of strength, and key research directions, predict their scientific research potential, and increase support for individuals and projects with promise based on the construction of the collective portrait database of teachers' scientific research ability. Through the first forecast of data on their cooperation networks, it may also be utilized to create a mechanism of research synergy between institutions, not only individuals, to encourage cross-disciplinary development and to share and maximize the use of open education research resources.

Additionally, one of the reference factors for assessing schools in the open education system can be the collective portrait of teachers.

4.4. Application to Precision Planning for Teacher Professional Development

Traditional teacher professional development activities frequently struggle to produce the expected effects since there hasn't been a thorough review of the demands of these activities(Zeng, Li, & Qiu,2019). A pressing issue in the realm of education is the correct and adaptable recommendation of materials for teacher professional development(Zhao,2022). To give instructors adaptive and individualized professional development resource recommendations, it is crucial to design an intelligent recommendation engine based on open education teacher profiles. The requirement of “lifelong learning” for teachers transforms them into special learners who require continuous development. Teacher profiles are essential for assisting teachers' professional development by providing better resources and services as well as accurate planning for it. To some extent, describing teachers' unique individual and group features, tracking and forecasting teachers' professional development needs and changes, and providing a reference point for teachers' professional development might be helpful(Hu & Lin,2019).

One the one hand, teacher precision learning—often referred to as open education—can be built on the existing professional development resources for a more logical configuration and exact advice. Providing high-quality learning resource recommendations that are targeted and individualized to the needs of the majority of teachers is one of the fundamental assurances for accurate learning from high-quality teachers. How can personalisation and targeting be ensured? The foundation of offering individualized teacher professional development support

services is developing a precise picture of teachers' professional development needs(Huang et al.,2020). While the model labels and prediction labels in the competency model outline teachers' existing competency bases, development needs, and development directions, as well as information on what types of training teachers tend to participate in, the characteristics model of open education teachers provides data relating to teachers' personal preferences and strengths, which can be used as the basis for teachers' personalized learning plans. This answer to the query "what teachers need" can serve as the foundation for customized recommendations, and the collaborative filtering recommendation type can also create a collective portrait by assessing the degree of similarity between various teachers and recommending particular content to those who share those needs(Shen,2019). Consequently, information gathered from teachers' involvement in professional development activities, particularly those offered online, can add to the picture of each teacher's professional development. For instance, it is possible to ascertain the emotional orientation of teachers towards the resources during the learning process based on the frequency of resources being clicked, downloaded, viewed, and forwarded or the utterances made by teachers in online learning virtual communities and forums(Wu,2022), in order to comprehend which professional development resources are more pertinent to teachers' needs.

On the other hand, the demand-driven design of teacher professional development resources can be supported by the predictive portrait of open education teachers' demands. Traditional teacher professional development resource development is frequently based on visiting research, teacher interviews, and other forms, the nature of which is inclined to "sample survey," although it has a certain degree of representativeness, it can only reflect the demands of some teachers' representatives, and the limited sample size is even more restrictive to the quantitative and systematic evaluation of the design of the resources, which, to some extent, reflect real-world demands. The possibility of precisely understanding target users' needs is provided by teacher profiling, particularly collective profiling for professional development needs(Hu & Lin,2019). It is possible to develop resources or organize training in a targeted manner to support teachers' professional development needs, for instance, if the collective portrait reveals that younger teachers have a strong need for guidance on how to carry out the "scholarship of teaching" and older teachers have an urgent need for practical training on new educational technologies. Based on this, cutting-edge technical techniques can be put into use to evaluate teachers' use and preferences of pertinent materials(Zhang, Liu, & Yan,2019), enabling continual iterative optimization.

5. Conclusion

The history of the times, national development strategy, economic and social development situation, and information and communication technology faced by open education have undergone revolutionary changes since 2012, when the National Open University was formally established on the foundation of the former Central Radio and Television University. These changes have introduced adaptive change requirements for the open education teacher team. Under the strict direction of the policy, the creation of digital portraits of teachers based on big data analysis has pointed out a fresh and doable route for thoroughly comprehending the present state of open education teachers, concentrating the evaluation of open education teachers, and precisely providing the professional development of open education teachers. The study systematically examines the necessity, viability, and implementation concept of building open education teacher portraits and provides examples to illustrate the potential application scenarios. Currently, the research on teacher portraits in the field of open education in China has not yet taken shape. Based on the suggested concept, additional study will inescapably concentrate on the technical implementation and real-world testing of open education teacher portraits and eventually encourage the practical use of multi-dimensional and three-dimensional open education teacher portraits in a variety of settings. At the same time, however, future research should also focus on how to implement multi-source data gathering, data standardization, open sharing, automated machine learning, and data privacy protection in teacher portraits on a technical level(Hu & Lin,2019).

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49-10 Key Challenges in Integrating Generative AI into Educational Systems

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Abstract

Generative AI has started to attract a great attention with the launch of ChatGPT in November 2022. New applications, software and platforms are emerging every day in this field, which is considered as the most important technological development area of 2023. Productive artificial intelligence seems to have found its usage area in every sector. However, one of the sectors where the use of productive artificial intelligence is discussed the most is education. The discussion, which started with copying reservations, started to extend to the production of reliable content. In this study, the most important challenges of productive AI integration in education are investigated. For this purpose, a scoping literature review study was conducted. According to the results of the research, there are 10 main challenges to the integration of generative AI in education. These are: AI alignment with educational goals, balance between personalization and standardization, ethical concerns, data security, AI literacy, evaluation of AI-generated content, teacher training and support, accessibility and inclusiveness, cost and resource allocation, and trust building and acceptance process. Successfully addressing these challenges is critical to the success of AI integration in education systems. These findings show that the safe integration of generative artificial intelligence into education needs a longer period of time and a large number of studies. Each challenge identified in this research can actually be considered as a research area. It is of great importance to conduct research and determine integration strategies for each of these challenges. It is an important point to include all stakeholders of education in the researches to be conducted. For this, it is suggested that educational applications to be developed with the support of generative artificial intelligence should be carried out with patterns such as design-based research model. Thus, the problems to be identified in the improvement cycles will be eliminated step by step.

Keywords: *artificial intelligence, generative AI, education, ChatGPT, GPT*

1. Introduction

In recent years, the field of education has experienced a transformative wave. This wave has been triggered by the rapid advancement of artificial intelligence (AI) technologies. Within these technologies, one tool that has the potential to revolutionize education systems around the world is Generative AI, a subset of AI capable of generating human-like text (Firat, 2023a). The promise of personalized learning experiences, improved content creation, and efficient administrative processes comes with the integration of Generative AI into education. However, it also presents complex challenges. These challenges must be addressed in order to realize its full potential.

The integration of generative AI in the field of education is characterized by a blend of optimism and caution in relation to the extensive possibilities for tailored and adaptable learning experiences, automated production of academic content, and the use of knowledge to inform educational decisions (Bhutoria, 2022; Huang, Lu and Yang, 2023). On the contrary, apprehensions regarding confidentiality, partiality, morality, and the preparedness of educational establishments to adopt such revolutionary technologies have arisen (Bu, 2022; Li and Gu, 2023).

This paper endeavors to initiate a journey towards efficacious integration of Generative AI into educational systems by critically examining the intricate and multifaceted challenges that lie ahead. The excitement of potentially bridging educational gaps, augmenting access to quality education, and democratizing learning on a

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global scale necessitates a comprehensive analysis of the evolving landscape of Generative AI in education. This analysis aims to provide valuable insights for stakeholders in education, including educators, policymakers, and researchers, who are interested in exploring the integration of AI into the field.

1.1. Literature Review

As described by Pasteur's quadrant (Kay, 2021), the convergence of AI and education represents a compelling fusion of research approaches, combining elements of both use-inspired basic research and purely applied research. A primary focus on developing personalized instructional systems, primarily for individual learners, characterized early research in this area. Contemporary efforts, however, have evolved to include a broader perspective that considers the impact of peers and the context in which learning occurs (Kay, 2021).

AI's potential is also transformative in education. Woolf et al. (2021) argue that AI can have a central role in the advancement of long-term educational goals. They will be able to mentor every student, facilitate the acquisition of 21st-century skills, use interaction data to support learning, expand access to global classrooms, and support lifetime and lifetime learning. As technology and education continue to converge, researchers are also becoming empowered. They will be able to analyze large data sets of classroom behavior and enrich the research landscape (Woolf et al., 2021). In addition, the integration of instructional technology and learning analytics for personalized learning has been shown to enhance the learning experience for both individuals and groups, to encourage reflection and analysis, and to generate data that can drive new educational theories (Woolf et al., 2021). In a study, Firat (2023b) aimed to bridge the gap in existing research by providing step-by-step guidance and practical applications for integrating AI into LMS. The study examines GPT-3 plugins for Moodle and includes sample JavaScript code for integrating Chat GPT into Moodle.

Applying AI to education is not without its challenges. Xu (2021) listed a number of challenges that need to be overcome to effectively implement AI, such as algorithmic inexplicability, inherent limitations of algorithms, data bias, privacy concerns, and various legal and ethical challenges. Xu (2021) also developed a set of recommendations to overcome these challenges, focusing on transparency, integration of AI technology, diversity of learning methods, broad access, equity, accountability, security, privacy, and commitment to humanistic education. Samuelson (2021) highlights legal issues specific to generative AI, raising questions about the legality of using copyrighted works as learning data and the production of outputs derived from copyrighted learning data. The integration of AI in education is an open topic for both research and practice. This literature review highlights both the transformative potential of the topic and the various challenges that require careful consideration and innovative solutions, illustrating the multifaceted nature of this intersection.

2. Method

The main purpose of this research was to investigate the key challenges related to the integration of generative AI into educational systems. A scoping literature review study was conducted, to achieve this purpose. Scoping reviews are well suited for providing an overview of existing research, identifying gaps in the literature, and summarizing key findings and themes on a specific topic (Arksey & O'Malley, 2005).

2.1. Data Collection

The data collection steps of this study were search strategy, inclusion and exclusion criteria, and full-text review. To identify relevant literature related to the integration of generative AI in education, a search strategy was developed. The academic databases Scopus and Google Scholar were used for the search. Keywords and phrases used were "generative AI in education" and "challenges of integrating AI". To determine relevance to the research topic, identified articles were initially screened based on their titles and abstracts. Inclusion criteria were studies published between 2021 and 2023, written in English, and addressing challenges or issues related to the use of generative AI in educational contexts. Exclusion criteria were duplicate studies, non-peer-reviewed sources, and those not directly related to the research objectives. A thorough full-text review of selected articles from the initial screening was conducted. During this phase, the researcher examined the content of articles to assess its contribution to understanding the challenges of integrating generative AI in education. 10 most related identified for this scoping review.

2.2. Data Analysis

Qualitative content analysis approach was used to analyze the data extracted from the selected articles. Data extraction, coding and categorization, and theme development were the steps involved. Relevant information

from the articles was systematically extracted and recorded. This included key challenges, findings and recommendations. The extracted data were coded into categories that represented the challenges that were identified. These categories were subject to refinement and organization into a coherent framework. To gain a deeper understanding of the challenges associated with generative AI integration in education, emerging themes and patterns within the data were identified.

3. Findings

Of the articles identified within the scope of this scoping review, 1 was published in 2021, 4 in 2022 and 5 in 2023. The years, authors, titles and journals in which the articles were published are given in Table 1 below.

Table 1. Analyzed studies

Year	Authors	Title	Publication
2021	Bhimdiwala, A., Neri, R. C., & Gomez, L. M.	Advancing the design and implementation of artificial intelligence in education through continuous improvement.	International Journal of Artificial Intelligence in Education
2022	Bu, Q.	Ethical Risks in Integrating Artificial Intelligence into Education and Potential Countermeasures.	Science Insights
2022	Holmes, W., & Porayska-Pomsta, K.	The Ethics of Artificial Intelligence in education: Practices, challenges, and debates.	Taylor & Francis Book
2022	Xia, Q., Chiu, T. K., Zhou, X., Chai, C. S., & Cheng, M.	Systematic literature review on opportunities, challenges, and future research recommendations of artificial intelligence in education.	Computers and Education: Artificial Intelligence
2022	Bhutoria, A.	Personalized education and artificial intelligence in the United States, China, and India: A systematic review using a human-in-the-loop model.	Computers and Education: Artificial Intelligence
2023	Su, J., Ng, D. T. K., & Chu, S. K. W.	Artificial intelligence (AI) literacy in early childhood education: The challenges and opportunities.	Computers and Education: Artificial Intelligence
2023	Grassini, S.	Shaping the future of education: exploring the potential and consequences of AI and ChatGPT in educational settings.	Education Sciences
2023	Kasneji, E., Seßler, K., Küchemann, S., Bannert, M., Dementieva, D., Fischer, F., ... & Kasneji, G.	ChatGPT for good? On opportunities and challenges of large language models for education.	Learning and individual differences
2023	Li, S., & Gu, X.	A Risk Framework for Human-centered Artificial Intelligence in Education.	Educational Technology & Society
2023	Huang, A. Y., Lu, O. H., & Yang, S. J.	Effects of artificial Intelligence-Enabled personalized recommendations on learners' learning engagement, motivation, and outcomes in a flipped classroom.	Computers & Education

The studies identified during the data collection process were reviewed separately. For each study, the integration challenges highlighted were listed. This process continued until all studies had been analyzed. In this way, 10 prominent key challenges were identified. An explanation of each challenge and the studies from which it was derived is provided below.

- 1. Ensuring AI alignment with educational goals:** Aligning AI-generated content with the curriculum and learning objectives requires a deep understanding of subject matter and teaching methodologies (Bhimdiwala, Neri and Gomez, 2021; Kasneji et al. 2023).
- 2. Balancing personalization and standardization:** While AI can provide personalized learning experiences, it is essential to maintain a balance between customization and standardization to ensure equal access to high-quality education for all students (Bhutoria, 2022; Xia et al. 2022; Grassini, 2023; Huang, Lu and Yang, 2023).
- 3. Addressing ethical concerns:** AI's potential to collect and analyze personal data raises privacy concerns, and its potential to perpetuate or amplify biases must be carefully managed (Bu, 2022; Holmes and Porayska-Pomsta, 2022; Kasneji et al. 2023; Grassini, 2023).

4. **Ensuring data security:** Protecting student and institutional data from cyberattacks and unauthorized access is critical when integrating AI into educational systems (Xu, 2020; Bu, 2022; Li and Gu, 2023).
5. **Developing AI literacy:** Educators and students need to acquire AI literacy to effectively use and understand AI tools in the learning process (Su, Ng and Chu, 2023; Kasneci et al. 2023).
6. **Evaluating AI-generated content:** Establishing methods to evaluate the quality, accuracy, and appropriateness of AI-generated content is vital for ensuring its educational value (Grassini, 2023; Kasneci et al. 2023; Li and Gu, 2023).
7. **Teacher training and support:** Teachers need continuous professional development and support to effectively integrate AI into their classrooms and overcome the challenges it brings (Grassini, 2023; Xia et al. 2022).
8. **Accessibility and inclusivity:** Ensuring that AI-powered tools are accessible to all students, including students with disabilities, and culturally sensitive to diverse backgrounds is critical for equitable learning opportunities (Xia et al. 2022).
9. **Cost and resource allocation:** The financial resources required to implement AI in education can be significant. Decision makers must determine how to allocate resources effectively (Kasneci et al. 2023).
10. **Building trust and acceptance:** Overcoming educator, student, and parental skepticism and resistance will be key to successfully integrating AI into education. Clear communication, transparency, and addressing of concerns are essential in this process (Xia et al. 2022; Grassini, 2023).

4. Conclusion

This scoping review study identified 10 key challenges of integrating AI into educational systems. Research and development provide a guide to understanding the potential of AI in education and offer insightful clues for the future. To meet these challenges, it is important that all stakeholders in education systems work together to address them. In particular, there is a high level of optimism among education system stakeholders regarding the integration of current technologies in education. The education and awareness of teachers, students and parents are of great importance to cope with these challenges.

Serious efforts are needed to overcome challenges such as the inexplicability of algorithms, data bias, privacy concerns, and ethical issues. Based on the principles outlined in this paper, measures based on principles such as transparency, accountability, security and privacy can be proposed to ensure the effective use of AI in education. In addition, copyright challenges in the field of generative AI have been highlighted. This requires further research and legal guidance. Education and AI researchers should work together to address these challenges and guide future work in this direction. In this way, we can maximize the benefits of AI in education and make learning processes more effective.

By addressing the identified challenges, AI can contribute to the individualization of education, the creativity of students, and the overall quality of education systems. The data analysis capabilities that the integration of AI in education offers teachers, students, and researchers also have great potential to better understand and improve educational processes.

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50-Comparing the Smartphone Screen Times of Master and Doctoral Students

Mehmet Fırat¹

Abstract

Smartphones have become indispensable technologies that are used extensively in every aspect of daily life. Studies in the related literature on the effects of increased screen time continue with increasing importance. Related literature shows that smartphones have various benefits but prolonged smartphone use also have correlations with stress, attention disorders, anxiety, and depression psychopathology. Despite a growing discussion on the problematic use of smartphones and effects on students, there is limited research on comparing smartphone usages of students based on personal differences. In this study, the average daily screen time of graduate students, the most used weekly applications and the weekly screen times for these applications were determined. We collected data from 75 master and doctoral students by an online questionnaire. The findings showed that the average daily screen time of graduate students was 270 minutes as the direct measurement of smartphone usage. We found that female students have 24 minutes higher average screen times than male students. But interestingly, this reverses for those younger than 30 and older than 45. Screen time is reported to decrease with aging. While students under the age of 30 spent an average of 294 minutes per day on smartphone screens, this figure falls to 187 minutes for those over the age of 45. Furthermore, we determined that the most used mobile applications were Instagram, WhatsApp, and YouTube. Finally, the highest average weekly screen time mobile application was Tiktok.

Keywords: *problematic smartphone use, screen times, master and doctoral students*

1. Introduction

In November 2022, the number of smartphone users in the world is 6.648 billion (Turner, 2022). This is the 83.32% of the world's population. Smartphone ownership is 80% for males and 75% for women worldwide. Only 46% of those 65 and older have smartphones, compared to 94% of people in the 18 to 29 age range. Use of smartphones extended to almost all levels of daily life. Smartphone usage is a hot topic both in computing and educational technology due to their popularity. According to World Advertising Research Center, 72% of all internet users will only access the web through smartphones by 2025 (Handley, 2019). While the intensive use of smartphones makes internet and information access more flexible and uninterrupted, problematic smartphone use can cause psychological, social, cognitive and physical problems (Horwood & Anglim, 2019).

1.1. Problematic Smartphone Use

Problematic smartphone use is a compulsive behavior that affects one's ability to operate on a daily basis in terms of productivity, interpersonal relationships, physical health, or emotional well-being (Horwood & Anglim, 2018). These side effects of smartphone use have been on the agenda of many researches in recent years. Related literature shows that smartphones have various benefits but prolonged smartphone use also have correlations with stress and attention disorders (Wang et al. 2015). Related literature also shows that problematic smartphone use has relationship with anxiety and depression psychopathology (Elhai et al. 2017; Sha & Dong, 2021). These findings, which are presented in the literature, reveal that more frequent and more research needs to be done on the rapidly increasing use of smartphones in many fields, including education.

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1.2. Current Investigation

An addiction-like habit, problematic smartphone use has strong ties to academic life (Eoh, Lee & Park, 2022). The main purpose of this research is to explore the smartphone screentime of master and doctoral students. In line with this purpose, research questions of this study are listed below.

1. What is the average smartphone screen time of master and doctoral students?
2. How does average smartphone screen time vary by age, gender, and education?
3. What are the mobile apps with the highest weekly screen time?

2. Method

In this explorative research we collected quantitative data throughout an online questionnaire. The questionnaire has two parts and 5 items. First part collects age, gender and education levels. Second part collects the “average daily screen time on smartphone” and “app with highest weekly screen time” of students. Two questions were asked to measure the screen time of the participants. Under these questions, it was explained how users would access their weekly reports on their smartphones. In this study, screen time was calculated in minutes.

Online questionnaire applied to master and doctoral students of Institute of Social Science, Anadolu University. Data collected from 75 students. The distribution of participant students’ ages, genders, and program information is shown in Table 1.

Table 1. Distribution of participant students’ ages, genders, and program

Demographics	Groups	Counts	% of Total
Age	<30	21	28.0
	30-45	47	62.7
	>45	7	9.3
Gender	Female	37	49.3
	Male	38	50.7
Program	Master	43	57.3
	Doctoral	32	42.7

As seen in Table 1, 62.7% of the students participating in the research are between the ages of 30-40. The ratio of men and women is very close to each other. 57.3% of the total participants are master students.

3. Findings

To answer the first research question, we calculated the daily average smartphone screen times of students. These data came from the first question of the second section of the questionnaire. We found that the average smartphone screen time of all participant students is 270 minutes daily.

To answer the second research question of this study, we compared the daily average smartphone screen times of students by age, gender, and education. All these comparisons are shown in Table 2.

Table 2. Daily average smartphone screen time by age, gender and program type

Demographics	Groups	Average Screen Times (Minutes)
Age	<30	294
	30-45	271
	>45	187
Gender	Female	282
	Male	258
Program	Master	290
	Doctoral	242

The average screen time varies by age, gender, and program, as shown in Table 2. When comparing the age groups, it can be seen that screen time declines with growing older. The age group under 30 uses their smartphones an average of 294 minutes per day, whilst the age group over 40 uses their smartphones an average of 187 minutes per day.

The gender comparison revealed that female students had more time spent on screens on average ($X_{\text{AverageScreenTime}}=282 > X_{\text{AverageScreenTime}}=258$). According to the program's comparison, master's degree students had a higher average smartphone screen time ($X_{\text{AverageScreenTime}}=290 > X_{\text{AverageScreenTime}}=242$) than doctorate degree students.

We analyzed the effect of both gender and age together by making a nested comparison. For this, age groups were given first, and inside the age groups, the average daily screen time of the gender groups was given. These comparisons are shown in Table 3.

Table 3. Average daily smartphone screen time by age and gender

Demographics	Groups	Average Screen Times (Minutes)
<30	Female	275
	Male	312
30-45	Female	308
	Male	232
>45	Female	92.3
	Male	259

As seen in Table 3, while male students in the <30 and >45 age groups have a higher average screen time than females, females in the 30-45 age group have a higher average screen time than males. This finding is remarkable for future research.

Data from the final item of the online questionnaire analyzed to identify the mobile apps with the highest weekly screen time. Data on how many students use which mobile applications are given in Figure 1.

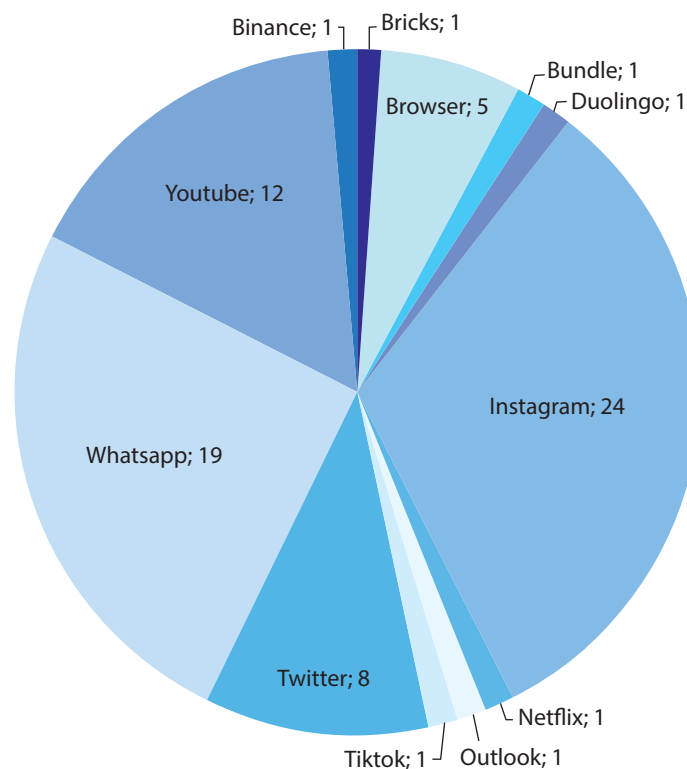


Figure 1. Most frequently used mobile apps by students

As seen in Figure 1, the most frequently used mobile app by students on a weekly basis were Instagram ($f=24$), WhatsApp ($f=19$), YouTube ($f=12$) and Twitter ($f=8$), respectively. The weekly average screen times of the applications are given in Figure 2 below.

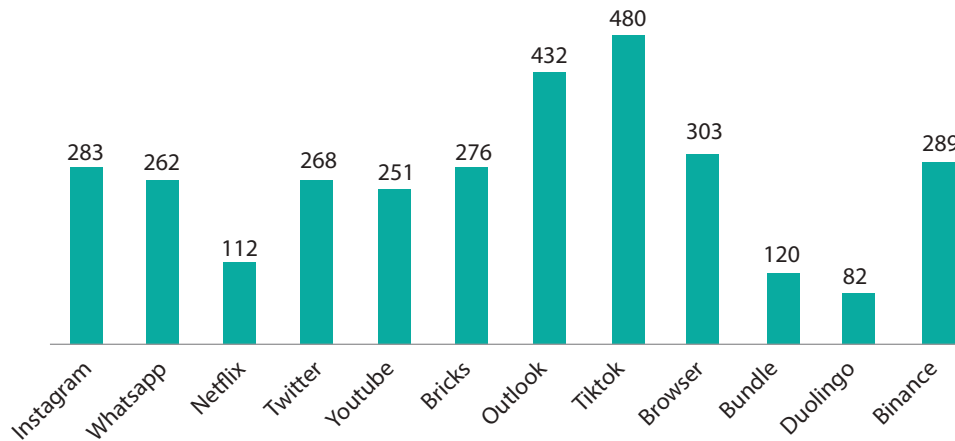


Figure 2. Mobile apps with the highest average weekly screen times

As seen in Figure 2, the applications with the highest average screen time were Tiktok ($X_{\text{AverageScreenTime}}=480$) and Outlook ($X_{\text{AverageScreenTime}}=432$). The fact that Tiktok has the highest average screen time indicates that this application may be associated with problematic smartphone use.

4. Conclusion

The conclusions drawn in light of the study's findings are listed under subheadings. The findings are presented in response to the research questions.

4.1. What is the average smartphone screen time of master and doctoral students?

The average daily screen time recorded over the previous seven days was used to determine the length of time spent using smartphones. Based on data from 75 master's and doctoral students, we determined that the students' average daily screen time was 270 minutes (4 hours 30 minutes).

4.2. How does average smartphone screen time vary by age, gender, and education?

We compared students' screen time by age, gender, and education. We found that screen time decreases with age. While the average daily smartphone screen time of the <30 age group is 294 minutes, the average daily screen time of the >40 age group is 187 minutes. In the comparison made by gender, it was reported that female students look at the smartphone screen an average of 24 minutes more per day than male students. According to the program's comparison, we found that master's students use their smartphones an average of 48 minutes more each day than do doctorate students. This finding supports the findings that screen time decreases with age. Female students between the ages of 30-45 have an average of 76 minutes more smartphone screen time per day than males. In contrast, male students have higher screen time than females in both the younger than 30 and older than 45 age groups. It is thought that this interesting finding should be investigated in more detail.

4.3. What are the mobile apps with the highest weekly screen time?

The applications that students used the most on a weekly basis were Instagram, WhatsApp, YouTube and Twitter, respectively. The application with the highest average screen time was determined as Tiktok. It is noteworthy that Tiktok has the highest screen time. In the literature, it is seen that Tiktok use is associated with depression, anxiety, and stress (Sha & Dong, 2021). In future studies, especially the side effects of Tiktok for education can be examined in more detail.

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53-Research on the Construction of Quality Assurance System of Online Courses in Open University - Based on TQM Theoretical Perspective

Ran Chen¹

Abstract

Ensuring the quality of online courses has always been a crucial aspect of distance education. Developing a scientific and comprehensive quality assurance system for online courses has become a common approach for distance education institutions to ensure and improve course quality. However, the Open University of China currently lacks a smooth and efficient quality assurance system for online courses, and both theoretical research and practical development in this area are lagging behind, which has become a bottleneck for the development of high-quality online courses. In this paper, we adopt a Total Quality Management (TQM) theoretical perspective and conduct an in-depth analysis of the theoretical connotation and key elements of online course quality assurance. Based on this analysis, we systematically develop an “input-process-output” quality assurance system that covers all aspects of course design and development, organization and implementation, and evaluation feedback. This system aims to standardize and guide the healthy development of online courses, and to provide high-quality course content and services to learners.

Keywords: *Open University, online courses, quality assurance, total quality management, TQM.*

1. Introduction

Against the backdrop of China’s concerted efforts to improve the quality of college education, the Open University has been focusing on enhancing the quality construction of its online courses. This not only aligns with the essential requirements of higher education’s high-quality development in the new era but also conforms to the core principles of the connotative development of distance and open education. Establishing and refining an online course quality assurance system is essential for guiding course construction towards scientific development and standardization, and is a fundamental way to improve the quality of online courses. However, China’s open universities currently face various challenges solved in the organizational structure, management system and operation mechanism of the quality assurance system. There are still gaps in the quality assurance of courses with a lack of comprehensiveness, systematicity and scientific rigor, which has become a bottleneck that hinders the high-quality development of online courses.

Total Quality Management (TQM) is a widely used theory in modern enterprise management, emphasizing the continuous improvement of product quality through systematic management and control of the whole process. In the book “Learning to Survive - The World of Education Today and Tomorrow”, UNESCO pointed out that “Various experiments have shown that many of the theories of quality management in the business field can be practically applied to education, not only on a national scale, but also within an educational institution .” Foreign countries applied TQM theory to higher education as early as the 1980s as an effective way to ensure the quality of higher education. From 1991 to 1992, the number of higher education institutions in the United States that implemented TQM increased from 92 to 220, and nearly 70% of colleges and universities implemented TQM. At the end of the twentieth century, China began to introduce the theory into higher education, and then promoted the application of TQM in vocational education. As a scientific and systematic theory, TQM has been theoretically explored and practiced in the field of education and proved to be effective in improving the quality of courses. Building on this foundation, this paper introduces the TQM theory to provide scientific guidance for the construction of online course quality assurance systems in open universities. The goal is to achieve a comprehensive guarantee of online course quality.

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2. Conceptual Explanations

2.1. Quality Assurance of Online Courses

Quality assurance is the forefront of quality management and is defined by the International Organization for Standardization, ISO, as the totality of planned and systematic activities carried out within a quality system and substantiated as required in order to provide appropriate confidence that an entity is able to meet quality. In the field of online courses, quality assurance is the various activities and processes that control, monitor, and evaluate the quality of an online course in order to provide confidence that the online course is able to provide competent teaching and learning services in accordance with certain procedures and standards to ensure the quality of the course.

The online course quality assurance system includes both internal and external levels. Within the internal quality assurance system, the Open University serves as both the main entity responsible for online course design and implementation, and the primary body responsible for course quality supervision and evaluation. The external quality assurance system, on the other hand, is dominated by the government and social third-party organizations, which supervise and manage the quality of the courses through policy guidance, government assessment, social evaluation, etc., and provide a good external institutional environment for internal quality assurance. This paper focuses on the quality assurance of online courses within the Open University. The establishment of a robust internal quality assurance system can directly guide the design and implementation of online courses, and play a critical role in improving course quality and promoting effective learning for students.

2.2. TQM-Based Quality Assurance for Online Courses

TQM originated from the study of enterprise quality management issues, is a new quality management theory put forward by Dr. Armand Feigenbaum of the United States, refers to the organization to the quality as the core, the use of full participation and the whole process of control of the systematic approach to continuous improvement of product and service quality of the dynamic process. Compared with traditional quality management, TQM has two characteristics, one is to emphasize the quality of a comprehensive, that is, the measurement of product quality is not only limited to the static characteristics of the product itself, but should also take into account the whole process of the formation of quality; the second is to emphasize the comprehensiveness of the quality management, in accordance with the whole process of control, full coverage of all elements, full participation in the “principle of the three full The second is to emphasize the comprehensive nature of quality management, according to the “three principles” of full process control, full element coverage and full participation.

From the perspective of TQM theory, online courses, as an educational product, measure its quality both in terms of static course quality reflected in its characteristic attributes, such as course design, course resources, course content, etc., and in terms of dynamic course quality reflected in the process of teaching and learning implementation, such as course organization and implementation, course evaluation and course management. TQM-based online course quality assurance involves all aspects and elements of course construction and operation, and compared with the general course quality assurance system, it pays more attention to process control, systematic management, teamwork, prevention and continuous improvement, and it has its own characteristics in terms of the purpose, measures and orientation of quality assurance: the purpose is to realize the continuous improvement of course quality, and the measures are focused on the preventive measures to avoid course quality problems, focusing on the prevention of course quality problems with the aim of improving course quality, and focusing on the prevention of course quality problems with the aim of improving course quality. The aim is to achieve continuous improvement of course quality, the measures focus on preventive measures to avoid course quality problems, focus on process orientation, emphasize the important impact of process control on course quality, and the cross-functional team-based organization centered on the process of course construction, and advocate the participation of all staff to comprehensively cover all elements and links affecting the quality of the course.

3. Analysis of the Quality Elements of Open University Online Courses

3.1. Quality Elements of Online Courses

On the basis of establishing the quality elements of online courses, only then can the basic content and key links of online course quality assurance be further clarified. This paper summarizes and analyzes the quality standards of online courses at home and abroad to derive the general quality elements of online courses, and mainly selects seven typical online course quality evaluation standards at home and abroad for comparative analysis. These standards are formulated by the government, schools, associations and other online course

organizations and review bodies, and have certain authority and representativeness, specifically including: CELTS-22.1 online course evaluation specification(China Ministry of Education Teaching Informatization Technical Standards Committee,2002),National Excellence Courses Review Indicators(Ministry of Education of China,2010), MOOC Quality Evaluation Indicators(China Local Universities MOOC Alliance,2016), Online Courses Quality Rubric(UK Quality Council for Open and Distance Learning,2005), National Standards of Quality for Online Courses(North American Council for Online Education,2008), Rubric and Standards for Quality Online Courses(University of California,2015), and QM Quality Standards for Online Courses in Higher Education(U.S.Curriculum Review Professional Organization,2017). A comparison of the first-level indicators of the above quality standards for online courses.It is found that the indicators focus on the following eight quality elements, i.e., course objectives, course content, instructional design, course development and presentation, teaching organization and implementation, learning support services, course evaluation, and course management, and the establishment of the above elements is an important foundation for the construction of an online course quality assurance system.

3.2. Quality Elements of Open University Online Courses

The construction of online courses by the Open University serves to realize the goal of training applied talents. Compared with general online courses, the establishment of its quality elements has a certain degree of specificity, focusing on three aspects:

The first aspect is the analysis of learners. Open University online courses are primarily designed for adult learners who are employed and face the challenges of balancing work and study. To meet the needs of these learners, it is essential to fully understand their learning objectives and characteristics when designing courses.

The second aspect is the construction of course teams. The characteristics of distance and open education make course construction and teaching an inherently collaborative effort. Building a high-quality course team can help clarify the roles of teachers, improve their professional skills, and ensure the effectiveness of online course design and implementation. Once again, it is the recognition and conversion of course credits.

Open University relies on the recognition, conversion and accumulation of course credits to build a lifelong learning “bridge” and realize the organic connection between different learning levels and the mutual communication between academic and non-academic education, which requires the development of scientific standards and methods of course credit authentication and the guarantee of the scientificity and authority of credit recognition. This requires the formulation of scientific course credit certification standards and methods to guarantee the scientificity and authority of credit recognition. Therefore, based on the general quality elements of online courses, this paper puts forward the quality elements of online courses in line with the characteristics of open universities, which run through the course design and development, operation and management and evaluation, as shown in Figure 1.

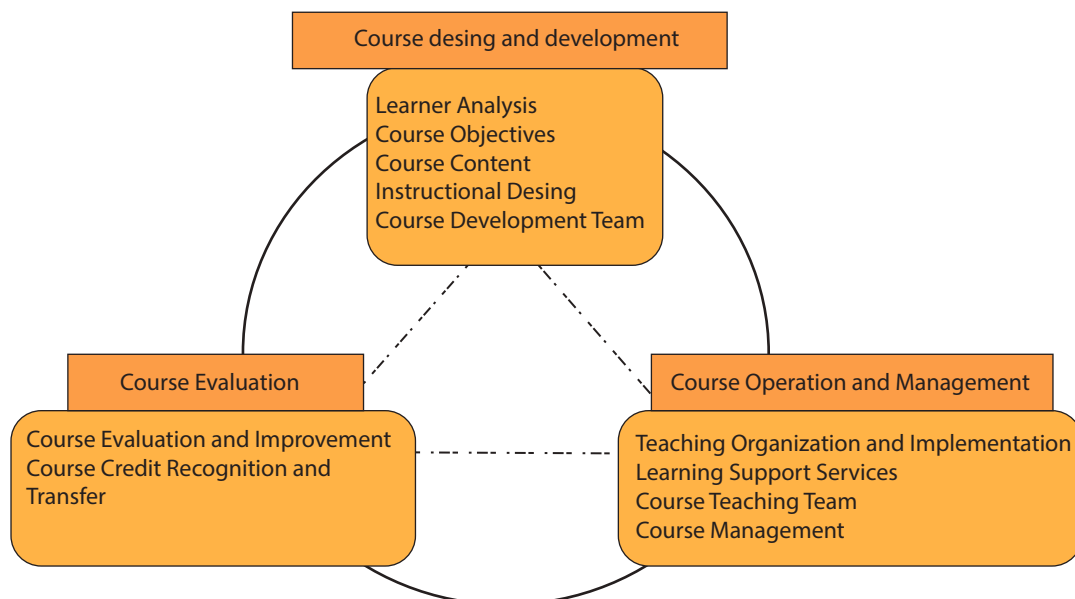


Figure 1. Quality elements of open university online courses

4. Construction of Quality Assurance System for Online Courses of Open University Based on TQM

According to TQM theory, the open university should adhere to the “three principles” in building the quality assurance system of online courses, namely, full element coverage, full participation and full process control. From the perspective of all elements, it includes course team, teaching design, teaching organization and implementation, learning support service, course management, and course credit recognition and conversion. From the perspective of the whole staff, it includes not only school administrators, students and teachers, but also education departments, industry enterprises and social third-party quality evaluation agencies. Analyzed from the perspective of the whole process, the quality assurance of online courses includes input quality assurance, process quality assurance and output quality assurance, systematically covering the whole process of online course construction and operation.

4.1. Input Quality Assurance

4.1.1. Formation of Specialized Online Course Development Team

Developing high-quality courses requires close cooperation and joint efforts among multiple roles. According to the actual situation of China’s Open University, the course development team can be composed of the course leader, the main teacher of the course, the project supervisor, the instructional designer and the technical staff. Among them, the course leader is responsible for the whole course construction project and plays the role of organization and coordination. The course lead teacher is responsible for the course content, provides teaching content and teaching resources, and advises on course design from the perspective of teaching implementation. Instructional designers are responsible for designing learning materials and learning activities to optimize online learning effects. Technicians provide technical support for course resources and interactive development. Project supervision is responsible for monitoring the progress of course construction. All team members should collaborate and participate in the course analysis, design, development, and presentation process in accordance with the course development guidelines, taking into consideration the unique characteristics of adult learning.

4.1.2. Establishment of Guidelines for Curriculum Design and Development

Guidelines for the design and development of online courses have been formulated, with clear provisions on the principles of online course construction, construction mechanisms, course design, resource development and other aspects. When it comes to course construction, it is essential to fully embody a student-centered approach. This involves designing teaching objectives and activities from the perspective of adult learning and providing learners with a positive and engaging learning experience. Curriculum design should fully reflect the instructive nature, covering the basic dimensions of curriculum analysis, learner analysis, teaching goal design, teaching content design, teaching activity design, learning resources, learning evaluation and so on. Resource development should fully reflect the standardization, and provide technical requirements for the development of various types of teaching resources, including course teaching videos, presentations, online assignments, test banks, reference materials and so on. The course development team completes the course construction according to the requirements of the guidelines, and eventually develops online courses with relatively uniform benchmarks and distinctive features.

4.1.3. Standardize the Curriculum Development Process

Online course development needs to follow a certain model and process, and among all the course development models, the most representative one is ADDIE model, i.e. Analysis - Design - Development - Implementation - Evaluation. This paper improves and optimizes the ADDIE model and proposes the PADDPE model, i.e. Preparation - Analysis - Design - Development - Presentation - Evaluation, to provide a more perfect process for online course development in open universities. This will provide a more complete process for the online course development of the Open University. In addition, it is necessary to establish a supporting quality assurance mechanism to strengthen the supervision and evaluation of all aspects of the online course development process.

4.2. Process Quality Assurance

4.2.1. *Equipped With Specialized Course Teaching Team*

In order to ensure the effectiveness of online course teaching, the Open University needs to equip a professional course teaching team to provide students with teaching guidance and learning support, which is also the key to realizing the “student-centered” teaching reform. According to the division of responsibilities of the teaching team, its members generally include course leaders, course counseling teachers, academic management teachers, technicians and data analysts.

Among them, the course leader coordinates the whole process of course operation, is responsible for managing the teaching progress, monitoring the teaching process, and solving academic problems in the teaching process. Course tutors are responsible for teaching the course, including organizing and implementing teaching activities, providing teaching guidance and answering questions, assigning learning tasks, and carrying out learning assessment. Academic administration teachers are responsible for guiding students to select courses, providing students with non-academic services such as teaching assignments and activity reminders. Technical staff are responsible for platform maintenance to ensure the stable operation of online teaching. Data analysts are responsible for analyzing and reporting student learning data recorded on the platform to gain insights and improve the teaching process. In addition, the university should provide teaching support through a variety of ways, such as conducting online teaching training and organizing teaching seminars, to improve the teaching and service level of the course teaching team, and to promote teachers’ updating of educational concepts, mastering of online teaching skills, and improvement of online teaching effectiveness.

4.2.2. *Ensure That Students Have Access to Learning Support*

It is necessary for the Open University to provide students with a full range of online learning support services, including technical support, personnel support, teaching process support and emotional support, to help students successfully complete their courses. Technical support is to provide students with necessary software and hardware, platforms, peripheral devices and other technical services, so that all students can easily participate in online learning. Personnel support is the help of personnel involved in students’ online learning, including teachers, learning peers, technicians, etc. to provide guidance for various academic and non-academic problems encountered by students.

Learning process support is to provide students with guiding, assisting and supervising services, focusing on focusing on students with academic difficulties, motivating and maintaining their learning motivation, and improving their learning effect. Emotional support is aimed at solving the problem of lack of communication in the process of online learning, and eliminating the phenomenon of students’ learning burnout by adopting measures such as positive encouragement, formation of study groups, and creation of online learning communities to strengthen communication and interaction. In order to ensure that students receive timely and effective help, the Open University should further refine the specific process of learning support services and support intervention nodes, prepare a guide to learning support services, and institutionalize and regularize the guidance for teachers to carry out learning support services.

4.2.3. *Using Big Data and Learning Analytics to Safeguard Instructional Operations*

At present, accurate teaching driven by data has become an inevitable trend. Relying on the online teaching platform and the teaching affairs management platform, the Open University has realized the whole process of distance education talent cultivation from registration for study to graduation audit, and has accumulated a large amount of student information and learning data. Utilizing big data and learning analytics technology, student learning data can be converted into valuable teaching information, making course operation more accurate and efficient. On the one hand, data mining methods are utilized to collect complete student learning data, including learning process data generated by students using the learning platform, and learning outcome data such as test scores and task completion recorded in the teaching system. Through data analysis, we conduct user profiling of students, customize personalized learning solutions for them, and enhance students’ learning experience and learning effect.

On the other hand, the results of data analysis should be integrated into the daily management and services of courses. This enables teachers and administrators to monitor course operations in real-time and take appropriate interventions to improve course outcomes. By implementing traceability of teaching operations

and management, monitoring of teaching processes, and visualization of teaching effectiveness, the Open University can shift from empirical and rough course management to a refined, scientific, and intellectual approach.

4.3. Output Quality Assurance

4.3.1. Development of criteria for Evaluating the Quality of Courses

Open universities urgently need to build scientific and effective quality evaluation standards to promote the benign development of online courses. On the basis of the quality evaluation standards of online courses at home and abroad, specific index dimensions are established around course design, resource development and course implementation according to the basic laws and requirements of distance learning. It is worth paying attention to the fact that course quality is directly related to learners' learning effect and career development.

The development of standards should fully take into account the learning needs and learning experience of adult learners, take the real learning perception data of learners as an important basis for the construction of the indicator system, and at the same time, adopt the opinions and suggestions of curriculum experts, front-line teachers and teaching managers to ensure the appropriateness of the standards. Finally, comprehensive evaluations of course content, teaching design, resource construction, teaching operation and other aspects are carried out according to the standards to help the course team constantly reflect on and improve the quality of the course.

4.3.2. Building a Diversified Curriculum Quality Evaluation System

The Open University should take into account the needs and requirements of the diversified value subjects of the courses and fully realize the diversification of evaluation subjects, evaluation contents and evaluation methods. First, adhere to the diversification of the main body of course quality evaluation, from government departments to schools, from teachers to students are participants, and actively introduce employers and social third-party assessment institutions to evaluate and certify the quality of the course, and more objectively judge whether the course meets the needs of social development, conforms to the direction of disciplinary development and the professional training objectives, and serves the all-round development of students. Secondly, we insist on the diversification of quality evaluation content, which not only focuses on course design and development, but also emphasizes the effect of course operation, and takes into account both the process and the result of the online course to examine the quality of the course. Thirdly, we insist on the diversification of quality evaluation methods, combining process evaluation and summative evaluation, combining qualitative evaluation and quantitative evaluation, emphasizing data-based course evaluation, and reflecting the quality status of courses in a true and comprehensive way.

4.3.3. Improvement of Course Credit Transfer and Accreditation System

The learning needs of adults often change with changes in work and life circumstances, and a flexible system of course selection and credit transfer is more conducive to promoting adult learners' learning. Relying on the credit bank, the Open University recognizes the credits, certificates, work and life experiences and skills acquired by learners in the course of formal and non-formal education, and determines the corresponding course credits, so as to realize the conversion of different stages and types of learning outcomes, and to broaden the lifelong learning channels of adult learners.

In order to guarantee the scientific rationality and operability of the process of course credit conversion and certification, the Open University should further clarify the types, quantities and forms of conversion between academic education courses, between academic education courses and vocational training certificates, and between informal and non-formal learning outcomes, and formulate and introduce the standards for the conversion of course credits of all levels and types and the methods of identification as soon as possible, on the basis of comprehensively taking into account the differences of various types of learning outcomes. Meanwhile, modern information technology should be fully utilized. At the same time, the advantages of modern information technology should be fully utilized to build a service platform with good user experience, simplify the process and procedures for course recognition, and create a good environment for course credit recognition and conversion.

5. Summary

In recent years, the rapid development of online courses has brought unprecedented attention to their quality assurance. The quality of online courses directly impacts the learning outcomes of every student and the reputation of educational institutions. While open universities have made some explorations in course quality assurance, they lack a comprehensive top-level design and substantive discussion on how to build a comprehensive and systematic quality assurance system for online courses.

This paper starts from the actual needs of open universities to improve the quality of online courses, takes TQM total quality management theory as the guide, and constructs a set of quality assurance system covering the whole process of course construction and operation, which provides a brand new perspective for the study of online course quality issues. Further practical research will be carried out to apply the theoretical system to the course construction practice of open universities, and to verify the implementation effect of the quality assurance system from various aspects such as the course construction process, faculty and student satisfaction, learner behavioral data, and course teaching effect.

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61-E-Learning Practised Innovation towards Knowledge Management and Massive Open Online Courses (MOOCs) in Open University, Indonesia

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Abstract

Developing students' competences for postgraduate has been attractive to explore in the field of social sciences. However, there is little study to analyze the effect of an e-learning practiced innovation on knowledge management and massive open online courses (MOOCs) for postgraduate student academic performance in Open University. We applied a quantitative analysis through structural equation modelling with data sampled from 155 postgraduate students spread across the whole of Open University in Indonesia. Data gained through questionnaires was entered and the 6 point Likert scale was applied for strongly agreeing to strongly not agreeing. The results show that e-learning practice models have a positive and significant effect on knowledge management and Massive Open Online Courses (MOOCs). Meanwhile, knowledge management also has a positive and significant effect on Massive Open Online Courses (MOOCs) of postgraduate student achievement in Open University. Based on the research findings, we argue that developing of postgraduate student academic performance in knowledge management and MOOCs programs availability, then, it must be creating a better e-learning practiced innovation at Open University in Indonesia for creating a greater policy programs of independent Learning-Independent Campus era.

Keywords: *E-Learning practiced model, Knowledge Management, Massive Open Online Courses (MOOCs), Postgraduate Student, Open University, Indonesia*

1. Introduction

In the abundance era, the issue of the implementation of e-learning models in higher education to exert their performance is emerged (Khan et al. 2021). The literature tells us that a rapid change has emerged in the advancement of technology in education by using technology and knowledge of innovation has emerged in the competitive environment of higher education. Higher education must use an e-learning practice model. Accordingly, the concept of e-learning is defined as a strategic innovation based on digital technology (Arkorful and Abaidoo 2014; Bismala, Bismala, and Manurung 2021; Clark and Mayer 2016; Ichsan, Purwanto, and Rahmayanti 2021; Castaneda, Manrique, and Cuellar 2018).

Accordingly, the e-learning model has been viewed as a successful model in education. For example, research has investigated the success model of e-learning in undergraduate students' academic performance and asserted that an e-learning initiative's overall success is contingent on achieving success at each of the three stages of e-learning system development: system design, system delivery, and system outcome (Holsapple and Lee-Post 2006). Moreover, the e-learning strategy has greater effectiveness for study compared with face-to-face teaching and learning programs in universities (Soffer and Nachmias 2018). Other studies have proved that there were some elements of e-learning success factors. The critical elements involved course design quality, instructor, motivation, student-student dialog, student-instructor dialog, self-regulated learning, and perceived learning results were all elements in e-learning systems being viewed as success factors in Higher Education (Eom and Ashill 2018).

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E-learning may improve students' knowledge management and learning management system innovation. The relationship between e-learning and knowledge management (Dahou, Hacini, and Burgoyne 2018; Eom and Ashill 2018; Holsapple and Lee-Post 2006) has been considered to be explored in order to develop the learning management system. Besides, the knowledge management theory perceived as the main factor and/or as crucial dimensions in the learning governance development and businesses of all types and sectors (Dahou, Hacini, and Burgoyne 2018; Fernández-Giménez et al. 2019; D. Maier et al. 2015; R. Maier 2007; Ruben et al. 2022). Open University in Indonesia is the one kind of university delivering a distance learning whether in graduate or postgraduate programs. There are many programs innovations have been conducted, such as e-learning programs, the Massive Open Online Courses (MOOCs), and the Learning Management System in the Open University in Indonesia. However, Open University has faced challenges to how to improve the academic learning outcomes for postgraduate students and make the students more attractive to learn, satisfaction, and ease to improve their chance for success. This research proposes a model of e-learning practiced in the postgraduate students' academic achievement at Open University in Indonesia

This research focus on to measure the effect of e-learning perspective on the postgraduate students' academic performance and learning management system in Open University in Indonesia. Based on the previous description, this study purposes to analyze the impact of e-learning perspective on knowledge management and learning management system effectiveness for improving the postgraduate students' academic performance in Open University in Indonesia. Further, the objectives of this research are: (i) to analyze the effect of an e-learning practice model on students' knowledge management. (ii) to analyze the effect of the e-learning practice model on Massive Open Online Courses (MOOCs). (iii) to measure the effect of knowledge management on the Massive Open Online Courses (MOOCs) of postgraduate students' academic achievement in Open University in Indonesia for better digitalization learning.

2. Theoretical Background

2.1. E-Learning Practiced

The E-learning model has been used by lecturers and students of higher education to provide an online learning structure. E-learning refers to the process of education practiced over the internet, network, video, and computers. E-learning is all about transferring skills and knowledge management across a network in the programs of a learning management system, then developing the learning management system successfully and improving learning collaboration intentions for students (Clark and Mayer 2016; Yordanova 2007; Agariya and Singh 2012).

Technological advancements and the increasing use of the Internet have had an impact on all parts of our lives and education (Mehroliya, Alagarsamy, and Indhu Sabari 2021). Then, traditional learning in the classroom will be left behind sooner or later. Then, it will be replaced by electronic learning (e-learning) or digital learning because of the rapid development of technology and the internet (Alvarenga et al. 2020; Alagarsamy and Vijay 2019; Dimitrios et al. 2013; Wang, Wang, and Shee 2007; Bali and Liu 2018). According to previous empirical research, e-learning practice creates social interaction improvement, students enhance their knowledge of literacy, critical thinking, and problem-solving skills (Hurst, Wallace, and Nixon 2013). In addition, e-learning service quality in higher education in Indonesia, based on students' perspective, found that some factors such as content quality, teacher quality (empathy, responsiveness, reliability, and assurance), and LMS quality (usability and informativeness) all have a major impact on the quality of e-learning (Theresiawati et al. 2020).

2.2. Knowledge Management

Various disciplines have studied knowledge management perspectives in creating better outcomes for individuals, groups, or institutions and business sectors. Knowledge management has been studied in sociology, psychology, education, ICT, and social science. The original theory of knowledge management systems, developed by Maier stated that knowledge management systems (KMS) consist of two dimensions; knowledge and management. Knowledge in ICT means the capacity of people to involve and extract their knowledge and skill for using ICT, then, management refers to software handing, storing, administrating, updating and retrieving of objects in the ICT (R. Maier 2007).

Then, some elements that can improve the success of KMS, for example; system quality, knowledge quality, knowledge-specific services, system use, and user satisfaction. Knowledge management has regarded as the

one dimension for developing of organizational works, industrial and business performance whether individual or groups.

Besides, the process of work and technology perspective, knowledge management is defined as the ability of an individual or people to use information or technology, such as the internet, to execute an action or available effort to have the ability to implement it at work (Dalkir 2005). In literature of knowledge management, McElroy in the theory of KM Cycle proposed that in the field of knowledge management, we provide the knowledge creation, which has the prospect of increasing an organization's rate of learning and innovation through the use of ICT. The model of KM is one that reinforces existing knowledge production, organizational knowledge, knowledge integration, distributed organizational knowledge, and business processing environments (McElroy 2003).

2.3. Massive Open Online Courses (MOOCs)

In digital learning innovation trends, massive open online courses (MOOCs) have been surprising in postgraduate education. MOOCs provide a better profile of online learning models in the world, and in practice, the MOOCs have improved digital learning innovation, the quality of e-learning, and the students' graduate and postgraduate learning outcomes (Joosten et al. 2020). MOOCs is the one strategy for e-learning innovation and students' performance in academic achievement.

Although, MOOCs have benefits for creating better chances for students of higher education, but its still a little study how e-learning strategy affected on MOOCs. Actually, MOOCs perceive as the "tool" to assist the students' capacity in online learning (Bonk and Graham 2012). MOOCs strategy has significant influence on perceived ease-of-use of computer and the students' felt better for learning (Hsu 2018).

In the digital learning era, MOOCs have become a network platform that gives a chance to millions of students, graduate and postgraduate, to access text materials for learning purposes (Chang and Wei 2016). In social theory, MOOCs have provided a way for higher education to perform better in advanced and developing countries (Clarke 2013). MOOCs have to improve learners' digital participation, develop learners' competences in e-learning, and improve their adaptation and operating technologies in learning communities, building their capabilities for their efforts to enhance their quality of life and the outcomes of their university achievement (Wu and Chen 2017).

Furthermore, MOOCs can develop students' higher education in communication with their classmates and lecturers to provide a learning environment and tools for getting their socially shared experiences and learning outcomes (Chaker, Bouchet, and Bachelet 2022). Fan et al has conducted a research also found that MOOCs are worthy of making students professional learners, preparing the textbook resources, and strengthening their own professional development resources and opportunities for strengthening their students' regulated learning skills (Fan et al. 2022). Based on literature review shows that MOOCs has not yet studied in postgraduate students, especially in Open University concerning to how its relationship with e-learning practiced environment. For this study, we explore more deeply how to create a new framework of e-learning relationships with MOOCs to create better results for students' learning motivation, engagement, and performance.

2.4. Research Frameworks

In the globalization era, the role of e-learning has significantly changed the model of students' learning in universities, especially in the Open University in Indonesia. E-learning has become the best strategy for open learning and distance learning in Indonesia. E-learning theory has had benefits for cost-effectiveness, flexibilities, improving individual and group learning aggressivity, and develop knowledge and ICT capabilities (Khademi, Kabir, and Haghshenas 2011). In formal institutions, e-learning environments should be developed in three design models, such as technical skill solutions, communication capabilities, interaction, and training processes. Then, there is a close relationship between knowledge management and e-learning practice (Judrups 2015). E-learning practice can promote knowledge management, and both attempt to support learning and knowledge transfer in organizations (R. Maier 2007; R. Maier and Schmidt 2007; Yordanova 2007). There are existing theories have used to explaining how e-learning practiced can developing the university students' performance and satisfaction for learning in University. In terms of students' satisfaction and worthiness of learning in the digital era and information technology used, the model of De Lone and McLean's proposed D&M IS success model in the information system (IS) The original theory of the D&M IS success model consists of six dimensions involved system quality, information quality, use, user satisfaction, individual

impact, and organizational impact (DeLone and McLean 2002). Adaptive e-learning environments are one theory to pursue. The e-learning practice environment will be accessible. The model developed in term of developing of students in higher education to improve their skill. learning styles, development of students' achievements (El-Sabagh 2021).

Based on the review of literature above, then, the hypothesis as follows:

Hypothesis 1: E-learning practices innovation effects on knowledge management in Open University in Indonesia.

Further, MOOC model has been acknowledged as the flatforms of many students in higher universities to develop their experience and motivation to find out their new material for learning, supporting modern knowledge, and providing a strategic solution for students of universities to learn more flexible, efficiently, and efficiently (Littlejohn et al. 2016; Hood and Littlejohn 2016). The advantages of MOOCs for students' in higher education can be divided into three dimensions, for example; improving students' academic performance, triggering students' learning skills, and making it easier to communicate with supervisors (Alhazzani 2020; Al-Rahmi et al. 2019; Hsu 2018). However, the role of MOOCs in postgraduate students has a little investigation related to its effect on academic achievement. However, in higher education, the effect of MOOCs has been massively discussed in literature and its relationship with learning management systems has not been explored enough to be applied to provide postgraduate students' performance and quality. Furthermore, MOOCs have facilitated full e-learning online for postgraduate students, improving their essential learning skills and widening the students' participation in learning actively in university (Kubincova, Dale, and Kerr 2018). In other words, MOOCs have been regarded as the "tool" in improving the outcomes of learning management systems, providing significant data for students' engagement, and giving a way to ease students' communication with their peers in or out of their campus (Al-Rahmi et al. 2019; Venugopal and Jain 2015; Li et al. 2022).

MOOCs have studied by some scholars in the postgraduate students at Open University. Deshpande and Chukhlomin conducted research to show that MOOCs determined by advanced e-learning practices and ICT supported availability in postgraduate students, which involved content of the web, navigation or students' connections with classmates, accessibility, visual design, motivation, and interactivity (Deshpande and Chukhlomin 2017). Then we provide the hypothesis as presented below:

Hypothesis 2: E-learning practised innovation effects on Massive Open Online Courses (MOOCs) in Open University in Indonesia.

In the literature, knowledge management is a systematic model that can provide the best employees for compatible work in public organizations and business sectors (Barbaroux, Attour, and Schenk 2016; Bandera et al. 2017), then, they have a critical success factor to develop the learning management system in institutional performance (R. Maier 2007; Alavi and Denford 2011). The relevant literature shows that knowledge management structure has a relationship with the Massive Open Online Courses (MOOCs) policy in improving the ability, skills, and students' satisfaction in higher education. At least 65% will provide improvement in education performance (Alhazzani 2020).

Further, MOOCs have relationships with students' psychosocial experiences such as; motivation, barriers, and attitudes for learning in postgraduate students (Shapiro et al. 2017), besides that it develops the students' communications capabilities and social media fluency (Joksimović et al. 2018). According to the previous research, which showed that knowledge management practices may ensure the acceptance of MOOCs based on cross cultural comparison (Arpaci, Al-Emran, and Al-Sharaf 2020). In an e-learning practice environment, there is a need for adaptive and cooperative models in knowledge management for MOOC performance development (Sein-Echaluze, Fidalgo-Blanco, and Garca-Pealvo 2017). MOOCs have benefits for making students' university academic experiences and learning technology through MOOCs mapping design. The results showed that students' knowledge management has improved and provides better learning ICT (Kerr, Dale, and Gyurko 2019). Next, based on literature, the hypotheses are proposed below:

Hypothesis 3: Knowledge management effects on Massive Open Online Courses (MOOCs) in Open University.

Hypothesis 4: Knowledge management effects on the postgraduate student's academic achievement in Open University.

Some studies reveal that MOOCs have a relationship with postgraduate students' academic performance. Cross and Whitelock has investigated in university students' study skills, digital literacies, self-awareness, and readiness for self-directed, independent learning, and successful students for online learning are those benefits for implementing MOOCs programs in higher education (Cross and Whitelock 2016). In the MOOCs design process, this is considered to bring innovation for e-learning in higher education, and influence the use of online learning by reducing face-to-face learning, curriculum design, innovation of learning and students' capacities for pedagogical size, knowledge level of subject performance, and learning motivation (Kerr, Dale, and Gyurko 2019; Kubincova, Dale, and Kerr 2018; Al-Rahmi et al. 2019).

The previous research conducted by other researchers found MOOCs have positive impact on the learning outcomes in disruption era and use as the strategy for finding a lifelong education for all (Holford et al. 2014). Moreover, MOOCs may provide the students' ease to access of text book through internet, then improving their learning achievement, learning flexibility, and empowering to socio-economic groups (Haggard 2013). In this literature review shows that MOOC strategies in higher education will provide better academic results for postgraduate students (Li et al. 2022; Shapiro et al. 2017; Arpaci, Al-Emran, and Al-Sharaf 2020). Based on the above description, we then build the final hypothesis as follows:

Hypothesis 5: Massive Open Online Courses (MOOCs) effects on postgraduate student academic achievement in Open University in Indonesia.

Based on the research frameworks and hypothesis, in this study we built a research model which consists of four variables, namely: (1) e-learning practice model, (2) students' knowledge management, (3) massive open online courses, and (4) postgraduate students' academic achievement. The e-learning practice model means the strategy of building postgraduate students' performance by using digital learning. E-learning Practice Model (Alvarenga et al. 2020; Alagarsamy and Vijay 2019; Dimitrios et al. 2013; Wang, Wang, and Shee 2007; Bali and Liu 2018) used to determine the dimensions of the e-learning model. In this study, the model of e-learning frameworks consisted of some dimensions such as; interactive, repetition and practice, presentation style, internet, ICT, content e-learning, accuracy, and timeliness. The success of e-learning practice may endorse the knowledge management of students for higher education, such as engaging learners actively, developing cognitive skills, using previous learners' experiences, actual problems embedded, and encouraging co-operation, using internet equipment availability, and interactive and practising (Alvarenga et al. 2020; Alagarsamy and Vijay 2019; Dimitrios et al. 2013).

Regarding the knowledge management perspective, we refer to the Nonaka et al. framework, which is called the SECI model, which consists of four dimensions such as socialization, externalization, combination, and internalization. This model explores the conversion dimensions which have an influence on creating higher knowledge management involves from tacit to tacit knowledge, tacit to explicit knowledge, explicit to explicit knowledge, and explicit to tacit knowledge (Nonaka 2005). The SECI model reveals a real development of knowledge development strategy, and also describes the process of knowledge improvement, creation, and sharing knowledge. Further, it's a kind of transformation effort among individuals or groups that connect with each other. In additions, there are five dimensions of the knowledge management process, including capturing online material, structuring capability of ICT, storing knowledge, disseminating, and implementation (Nuryasin, Prayudi, and Dirgahayu 2013).

3. Research Model

Previous research confirmed that knowledge management has a close relationship with massive open online courses (MOOCs). There is a high impact of knowledge management on the acceptance of Massive Open Online Courses (MOOCs) by engineering students in higher education (Arpaci, Al-Emran, and Al-Sharaf 2020). MOOCs may offer low-risk, formative opportunities for learners to increase their knowledge and confidence. Academic institutions can assist students by providing well-designed MOOCs on study skills (Rodriguez and Armellini 2017).

In developing MOOCs model, we combine two perspective of MOOCs such as efficacy based on Ghazali et al. frameworks such as information searching, making queries, MOOC Learning, MOOC usability (Ghazali et al. 2020) also involved media unit for production, platform digitalization, social media team, academic content, and academic development (Kerr, Dale, and Gyrko 2019).

Meanwhile, regarding postgraduate students' achievement, in this study, we use five dimensions such as cooperative learning, active learning, authentic learning, constructive learning, and intentional learning. According to the relevant literature description previously, we then provide the research frameworks as seen in the following figure:

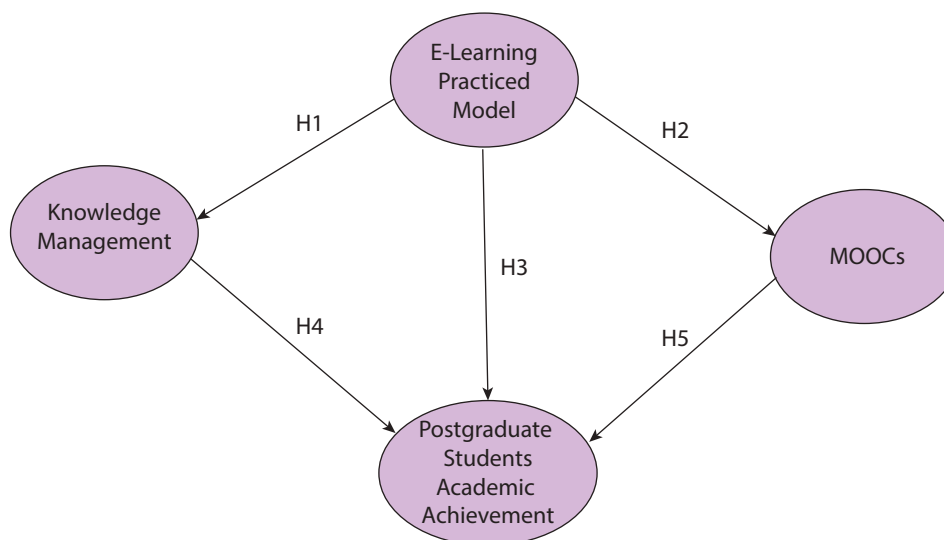


Figure 1. Theoretical Model

4. Research Method

4.1. Research

The structural equation modelling is applied through AMOS windows version 24 has had a benefit for analyzing data and measuring the five hypotheses proposed in the study. We use AMOS because AMOS is a very well-liked program that has a distinctive Graphical User Interface (GUI) for resolving structural equation modeling issues. AMOS offers a user-friendly graphical or programmatic interface for assessing the intricate connections between the components (Thakkar 2020; Hair et al. 2009; Arbuckle 2013). In the data analyze, we employed structural model which is a series of relationships between one or more independent variables (IVs), which can be continuous or discrete, and one or more dependent variables (DVs), and they can be analyzed by using a statistical technique called structural equation modeling (SEM) (Ullman and Bentler 2013).

4.2. Variable Measurement

This study will analyze four variables, namely e-learning practiced consists of proactive searching, repetition, interactive learning, presentation style, computer operation skill, content e-learning, online learning, media based learning, technology digitalization equipment availability, and video based learning (El-Sabagh 2021; Ghazali et al. 2020; Bonk and Graham 2012); knowledge management systems involved dimensions such as; ability, socialization, externalization, skill, combination, learning collaboration, pedagogical techniques, cognitive structure, and internalization (Nonaka 2005; Sein-Echaluce, Fidalgo-Blanco, and García-Peñalvo 2017; Arpaci, Al-Emran, and Al-Sharaf 2020; Alavi and Denford 2011).

Further, massive open online courses (MOOCs), based on the literature, however, there are some relevant dimensions of MOOCs such as information searching, MOOC Learning, MOOC usability, making queries, media unit for production, platform digitalization, social media infrastructure, academic content, and academic development (Haggard 2013; Holford et al. 2014; Arpaci, Al-Emran, and Al-Sharaf 2020; Kerr, Dale, and Gyrko 2019; Joksimović et al. 2018; Kubincova, Dale, and Kerr 2018; Li et al. 2022). Then, the academic achievement of Postgraduates involves some dimensions including: authentic learning, cooperative learning,

active learning, constructive learning, intentional learning, self-regulated learning, quality oriented, learning motivation, team learning, and need for higher achievement, learning outcome refocusing (Choy and Quek 2016; Poon 2020; Wai 2017).

Then, the research instruments based on those literature review for measuring the validity and reliability items previously. Before measuring the research hypotheses, we need to conduct the piloting research for measuring the validity and reliability data. We have tested the instruments by using 45% of respondents of this research. According to the piloting research, we found each dimension of this study as presented in the following table:

Table 1. *The central tendency values, reliability, and validity instrument test results*

Variable	Indicators	Codes	Min.	Max.	Mean	SD	Validity	Reliability
E-Learning Practiced (ELP)	Interactive learning	ELPM3	1	6	3.710	1.490	0.631	0.934
	Presentation style	ELPM4	1	6	3.994	1.302	0.709	0.932
	Computer operation skill	ELPM5	1	6	3.929	1.300	0.700	0.932
	Media based learning	ELPM7	1	6	3.923	1.307	0.696	0.933
	Technology digitalization equipment availability	ELPM8	1	6	3.916	1.329	0.684	0.933
Knowledge Management (KM)	Individual ability	KMS5	1	6	3.845	1.538	0.646	0.933
	Skillful	KMS6	1	6	4.381	1.397	0.530	0.935
	Learning collaboration	KMS7	1	6	4.239	1.491	0.635	0.934
	Pedagogical techniques	KMS9	1	6	4.194	1.542	0.624	0.934
	Cognitive structure	KMS10	1	6	4.148	1.566	0.574	0.935
Massive Open Online Courses (MOOCs)	MOOC Learning	MOOC3	1	6	3.639	1.454	0.633	0.934
	MOOC usability	MOOC5	1	6	3.761	1.446	0.745	0.931
	Media units for production	MOOC6	1	6	3.826	1.512	0.728	0.932
	Platform digitalization	MOOC7	1	6	3.974	1.329	0.745	0.932
	Academic content	MOOC9	1	6	3.955	1.340	0.680	0.933
Postgraduates Student Academic Achievement (PSAA)	Cooperative learning	PSAA2	1	6	4.187	1.333	0.418	0.937
	active learning	PSAA6	1	6	4.135	1.401	0.586	0.934
	constructive learning	PSAA7	1	6	4.381	1.191	0.566	0.935
	self-regulated learning	PSAA9	1	6	4.329	1.212	0.585	0.934
	learning outcome refocusing	PSAA10	1	6	4.477	1.107	0.531	0.935

Source: Authors, 2022.

The results of items measured based on SPSS analysis shows that the overall items of reliability by using the consistency analysis indicates the reliability of instruments value is above 0.91, however, the results analysis of validity instruments get value is above 0.55. Further, we analyze the instruments by using AMOS to analyze the convergent of validity and the factor loading of each item. Measuring the average of variance extracted (AVE), and composite reliability of items (CR). According to the results analysis show that all of items have no violation of assumptions, and then the CFA results analysis used structural equation modelling, we find the factor loading, AVE, and CR which describe in the Table 2.

Table 2. Standardized Loading Factor, Average of Variance Extracted, and Composite Reliability

Variable	Indicators	Codes	Standardized Factor Loading	AVE	CR
E-Learning Practiced (ELP)	Interactive learning	ELPM3	0.796	0.781	0.889
	Presentation style	ELPM4	0.794		
	Computer operation skill	ELPM5	0.990		
	Media based learning	ELPM7	0.991		
	Technology digitalization equipment availability	ELPM8	0.978		
Knowledge Management (KMS)	Individual ability	KMS5	0.809	0.723	0.836
	Skillful	KMS6	0.788		
	Learning collaboration	KMS7	0.901		
	Pedagogical techniques	KMS9	0.893		
	Cognitive structure	KMS10	0.856		
Massive Open Online Courses (MOOCs)	MOOC Learning	MOOC3	0.678	0.721	0.838
	MOOC usability	MOOC5	0.861		
	Media units for production	MOOC6	0.898		
	Platform digitalization	MOOC7	0.922		
	Academic content	MOOC9	0.864		
Postgraduates Student Academic Achievement (PSAA)	Cooperative learning	PSAA2	0.737	0.748	0.858
	Active learning	PSAA6	0.804		
	Constructive learning	PSAA7	0.914		
	Self-regulated learning	PSAA9	0.873		
	Learning outcome refocusing	PSAA10	0.976		

Source: Authors, 2022.

Table 2 shows that there are four variables has measured using structural equation modelling and we find that the four variables of research approximately have each loading factors are above ≥ 0.70 . Meanwhile, the e-learning practiced of AVE value is found 0.781, and the CR is 0.889. Further, the knowledge management has AVE value is 0.723 and the CR value has 0.838, then, the Massive Open Online Courses (MOOCs), according to the analysis shows that AVE value is 0.721 and CR value is that 0.838. Finally, the postgraduate student academic achievement has AVE value is 0.748 and CR value is 0.858. The results finding confirm that all variables have variance of each construct above 0.70 and ha have revealed to fitted to measure the research variables objectively.

Moreover, for the hypotheses measuring, we have tested the feasibility of SEM criterion or fit model such as the Chi-Square value, probability, CMIN/DF, RMSEA, GFI, AGFI, TLI, and CFI that all of them indicated the goodness of fit of the expected model that will estimate of the research population (Hair et al. 2014). We describe below goodness of fit for each construct as shown in the following table:

Table 3. The Statistical Measurements of Goodness of Fit of Structural Modelling Results

Fit Model Criteria	Cut-of Values Model	The obtained results	Labelling
X2-Chi-Square	Intended small value	235.664	Fitted
Probability	≥ 0.05	0.000	Fitted
CMIN/DF	< 2.00	1.473	Fitted
GFI	≥ 0.90	0.987	Fitted
AGFI	≥ 0.90	0.938	Fitted
TLI	≥ 0.95	0.976	Fitted
CFI	≥ 0.95	0.979	Fitted
RMSEA	≥ 0.08	0.550	Fitted

Source: Adapted from Hair et.al. (2014)

4.3. Hypotheses Measurement

Based on Table 3 tells us that the results of structural modelling have fitted model, then, it can be used for the testing of research hypotheses. There are five hypotheses have proposed for this article and we confirm that all of them have accepted and significant. It means that all the hypotheses have positive and significant to explain the postgraduate student academic achievement in the Open University in Indonesia. Here, we describe the structural model analysis in the next table:

Table 4. *The standardized regression weights result analysis*

			Estimate	S.E.	C.R.	P	Label
KSM	<---	ELP	0.313	0.078	4.002	***	Accepted
MOOC	<---	KSM	0.250	0.059	4.258	***	Accepted
MOOC	<---	ELP	0.423	0.061	6.895	***	Accepted
PSAA	<---	KSM	0.194	0.084	2.319	0.020	Accepted
PSAA	<---	MOOC	0.288	0.108	2.654	0.008	Accepted

Source: *Primary Data Analysis, 2022; S. E= Standard Error; C.R.= Critical Ratio; P= Probability*

*** = significant for $\alpha = 0.01$, or $\alpha = 0.05$

5. Results and Conclusion

Based on the data processing, which was analyzed through multivariate structural model as an approach to measure the relationship among variables using AMOS software, the results reveal that all of the hypotheses proposed for this research article have been accepted. Then, all of the variables have to be pointed out and developed, such as e-learning, practiced innovation, knowledge management, and massive open online courses (MOOCs) to accelerate the students of postgraduate open university in Indonesia.

Regarding the first hypothesis, e-learning practices innovation has a positive and significant effect on the knowledge management of postgraduate students' academic achievement at Open University in Indonesia, which can be accepted. According to the research analysis, it finds that the estimated regression value is 0.313, standard errors are 0.078, and the critical ratio (C.R) is 4.002. Then, the probability is $p = 0.001$ or significant at the level of $\alpha = 0.01$. The result verifies that e-learning practiced innovation has a positive and significant effect on students' knowledge management at Open University in Indonesia. This finding is similar to the previous research that pointed out that e-learning innovation should be practiced in higher education because e-learning may enhance students' abilities, new experiences, motivation, satisfaction with learning, ease of use, and higher outcomes (Choy and Quek 2016). Other researches confirmed that better e-learning management system because it can develop the students' engagement in education (Venugopal and Jain 2015). Besides, e-learning innovation in higher education may ensure students' access to textbooks and their references for learning, and improve their knowledge and experience of learning (Barbaroux, Attour, and Schenk 2016; Judrups 2015; Bandera et al. 2017). So that, according to the results confirm there are five critical elements in e-learning practiced innovation in creating better students' knowledge management systems, such as interactive learning, presentation style for teachers, computer operation skill availability, media based learning supports, and technology digitalization equipment prepared and enough to support the students' learning motivations.

The second hypothesis proposed in this study is that e-learning practiced innovation has a positive and significant effect on Massive Open Online Courses (MOOCs) of postgraduate student academic achievement at Open University in Indonesia is accepted. According to the result shows the standardized coefficient regression finds of 0.423, standard error is 0.061, the critical ratio (C.R) is 6.895, and the probability is $p \leq 0.001$ or significant in the level of $\alpha = 0.01$. Based on this finding, we then confirm that the hypothesis has accepted that means the e-learning practiced innovation has positive and significant effect on the Massive Open Online Courses (MOOCs).

This finding has relevance to other empirical research. For example, Shapiro et al. have found that e-learning management systems and evaluation should be developed for students because they have dramatic changes in student achievement. On the other hand, e-learning innovation has a close relationship with developing Massive Open Online Courses for student engagement (Shapiro et al. 2017). Higher education performance through MOOCs is reflected in the e-learning system (Alhazzani 2020). Then, in the era of digitalization,

e-learning innovation is the one approach that will create the success of MOOCs, such as students in higher education learning more interactively and enjoyable (Ibrahim and Abdul Rahim 2018). E-learning practiced innovation is viewed as the one strategy for developing the performance of MOOCs for university students' learning (Ghazali et al. 2020; Kerr, Dale, and Gyurko 2019).

The result analysis of the third hypothesis, which has been tested, has shown that knowledge management has a positive and significant effect on Massive Open Online Courses (MOOCs) of postgraduate student academic achievement at Open University in Indonesia. Regarding the research finding based on structural analysis, it finds the coefficient standardized regression value is 0.250, the standard error is 0.059, and the critical ratio is found at 4.258, while the probability value is $p \leq 0.001$ or significant at the level of $\alpha = 0.01$. This analysis has corroborated that knowledge management has a positive and significant effect on the MOOCs in postgraduate student academic achievement at Open University in Indonesia.

According to the literature, knowledge management has become an essential tool for all institutions or organizations to become aware of the necessity of a knowledge management system. In other words, many institutions are designed especially for developing their staff for the purpose of sharing knowledge and integrating it. Fortunately, a knowledge management system can ensure the success of MOOCs (Arpaci, Al-Emran, and Al-Sharaf 2020). Accordingly, knowledge management may impact individuals, communities, institutions, or organizations, then, knowledge management has been closely integrated with e-learning (Dalkir 2005; Yordanova 2007), developing MOOCs programs for higher education (Holford et al. 2014), more adaptive learning, and creating better MOOCs (Sein-Echaluze, Fidalgo-Blanco, and García-Peñalvo 2017; El-Sabagh 2021; Holford et al. 2014). Then, the results confirm there are five elements of knowledge management that will ensure the development of massive open online courses (MOOCs), such as individual ability, skillful, learning collaboration, pedagogical techniques involvement for students, and deliberating of students' cognitive structure in learning for open university.

Regarding the fourth hypothesis, it is proposed that knowledge management has a positive and significant effect on the postgraduate student's academic achievement at the Open University in Indonesia and is accepted for this research article. Based on the data analysis using structural equation modelling, it was shown that the standardized coefficient of regression estimate is 0.194, the standard error is 0.108, and the critical ratio is 2.319. The probability value of the result has a $p = 0.020$, which means that knowledge management has a positive and significant effect on postgraduate students' academic achievement at Open University in Indonesia at the level of significance is $\alpha = 0.05$.

This finding has amplified that knowledge management is viewed as the core approach for developing students' performance in higher universities to enhance their innovation (Barbaroux, Attour, and Schenk 2016). Knowledge management has significant roles in building information and learning outcomes, such as building the vast amounts of data that will be used by universities, ensuring students' confidence for learning, and keeping better current information. Besides, knowledge management is necessary for developing a management system of learning, and keeping up with new technologies, data security, and infrastructure requirements (Alavi and Denford 2011).

Knowledge management capabilities for students in higher education viewed as the key drivers for creating human resources available in digitalization learning or distance learning like in Open University. According to empirical research, this finding that knowledge management has several domains of benefits supports this finding that knowledge management has several domains of benefits, such as reducing activity-based costing, making it easier for individuals to volunteer knowledge and business units to share knowledge, carrying out tasks together with many people, and taking responsibility for managing knowledge for students in higher education (Bandera et al. 2017; McElroy 2003; Khademi, Kabir, and Haghshenas 2011).

The fifth hypothesis is that massive open online courses (MOOCs) have a positive and significant effect on postgraduate student academic achievement in the Open University in Indonesia, which is accepted based on the results of the structural equation model. The result analysis shows that the standardized coefficient regression estimate is 0.288, the standard error is 0.108, and the critical ratio is 2.654. Therefore, the probability value is $p = 0.008$ and the level of significance is $\alpha = 0.05$. It means that the massive online open courses (MOOCs) have a positive and significant effect on the postgraduate students' academic achievement at Open University in Indonesia.

This research finding is similar to the previous empirical research which found that massive open online courses (MOOCs) offer more students' participatory learning and interactive opportunities to develop their knowledge, experiences, and satisfaction than using other social networking sites, for example, Twitter, Facebook, Instagram, or blogs (Alhazzani 2020). MOOCs provide benefits for students in higher education gain benefits as they are taught by professional lecturers, pre-recorded, and with free access to educational materials, book text, sound, and learning and teaching videos (Waldrop 2013).

MOOCs is operated in open-source courses and based on the collaboration learning between students and their lecturers, creating programs and works, and ease access to learn. In short, MOOCs' flat form has significant potential to enhance higher education or postgraduate students' achievement. According to the analyzed data, MOOCs have five elements that allow postgraduate students to develop their academic performance, such as MOOC learning, MOOC usability, media units for production, platform digitalization, and academic content for learning. By using MOOCs for the postgraduate students at Open University, it will develop their cooperative learning skills, make them more active learners whether alone or in groups, improve their self-regulated learning motivation, and create learning outcome refocusing.

Based on the whole discussion above, we come to the conclusion that e-learning practice innovation viewed as the one approach approach in delivering the learning and teaching for higher education. In addition, Open University suggests that providing an e-learning practical environment is viewed as the critical element for developing postgraduate students' achievement. E-learning must become a platform for the Open University to offer and enlarge the students' learning outcomes. The research findings affirm that e-learning practiced innovation has a positive and significant effect on knowledge management and massive open online courses (MOOCs). However, beside e-learning, the knowledge management also has a positive and significant effect on massive open online courses and postgraduate students' academic performance in the Open University in Indonesia. Meanwhile, MOOC programs have a positive and significant effect on postgraduate students' academic achievement. We argue that the better implementation of e-learning practices innovation in Open University in Indonesia, the greater achievement of students' knowledge management system, the success of massive open online courses, and lastly, the postgraduate students' academic performance will have greater outcomes in the era of digitalization and rapid learning transformations.

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62-Al-Quds Open University Role In Enhancing Lifelong Learning Through Lunching The International Learning Program

Ibrahim Ramadan¹

Abstract

This paper aims to identify the role of al-Quds Open University role in enhancing lifelong learning through lunching the international learning program. Al-Quds Open University (QOU) has been a pioneering institution in the field of open and blended learning in Palestine for over twenty years, the university has contributed significantly to the development of the Palestinian educational system. QOU's commitment to lifelong learning has been further enhanced through the launch of its International Learning Program (ILP). The ILP was established in 2022 with the aim of providing access to education and training for learners all over the world. The program offers a variety of courses and programs in different fields of study, including business, management, sciences, and education. The program incorporates practical and hands-on learning opportunities that allow learners to apply the knowledge and skills they have gained in real-world settings. This approach not only enhances the learning experience but also ensures that learners are well-equipped to succeed in their chosen fields. The program brings together learners from diverse backgrounds and cultures, creating opportunities for them to learn from each other and develop a deeper understanding of different perspectives. This fosters a sense of global citizenship and promotes mutual respect and understanding. The ILP has also had a positive impact on QOU's students and alumni. Through the program, they have been able to connect with learners from other countries, exchange ideas and experiences, and develop a global network of contacts. This has not only enriched their learning experience but has also enhanced their career prospects and opened up new opportunities for them.

Keywords: *ILP (International Learning Program), lifelong learning, high quality learning.*

1. Introduction

The provision and management of higher education in Palestine face numerous challenges, particularly in regards to mobility, security, and difficult socio-economic conditions. Despite these formidable obstacles, universities and colleges in the region have persisted in offering a wide array of undergraduate and graduate programs throughout Palestine. A distinctive aspect of the Palestinian education system is the significant number of learners enrolled in an open university.

Presently, Al-Quds Open University (QOU) plays a vital role in Palestinian Higher Education, as it is the sole institution offering distance education courses and programs. Surprisingly, more than 33% of undergraduate students in the West Bank, Gaza Strip, and East Jerusalem are studying at QOU, with over 40,000 students benefiting from this educational opportunity. For the majority of these students, QOU represents their only avenue for pursuing higher education.

Al-Quds Open University (QOU) is a public university registered under the 1998 Palestinian Higher Education Law No. (11). QOU is represented by its President, Prof. Dr. Samir Najdi. Its headquarter is in Jerusalem but its temporary headquarter is in Ramallah. QOU launched its educational services in Palestine in 1991, opening branches and study centers in the major Palestinian cities. Hundreds of students enrolled in QOU, and the number of students grew year after year to roughly (40,000) students spread throughout 18 educational branches throughout the West Bank and Gaza Strip. In 1997, the institution graduated its first class of students.⁽¹⁾

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QOU adopts the blended learning approach, combining online educational methods with traditional classroom methods. This includes providing an integrated educational package of face-to-face lectures, textbooks, interactive online lectures, digital learning resources, self-learning, and social media learning. To enhance the teaching and learning process, QOU provides an interactive environment for communication between students themselves and between students and their instructors through the academic portal system and the discussion panels available on the e-course websites and social media.⁽²⁾

2. The Background of ILP

The ILP was established in 2022 with the aim of providing access to education and training for learners all over the world. The program offers a variety of courses and programs in different fields of study, including business, management, sciences, and education. The courses are delivered through an online platform that is accessible from anywhere in the world, providing learners with the flexibility to study at their own pace and in their own time.

The international program was created in alignment with the university's vision and core values, aiming to excel in open teaching, learning, community service, and meeting market needs. This program, offered by QOU, stands out as an exceptional educational opportunity that leverages the expertise of its practitioners to broaden access to higher education. Meticulously designed with state-of-the-art educational technologies, it emphasizes online teaching and learning methods.

Driven by its commitment to national and societal obligations, QOU has incorporated the expansion of its educational services into its development and strategic plan. Through international open education, this program seeks to provide greater accessibility to higher education for individuals residing outside Palestine, especially those aspiring to earn a bachelor's degree.

The ILP offers six programs led to bachelor degree which are: Arabic Language for Non-Native Speakers, Digital Marketing, Public Relations & Advertising, Business Administration, Arabic Language and Literature and Teaching Islamic Education.⁽³⁾

2.1. Goals and Objective

The objectives of the international program are rooted in QOU's vision, mission, and philosophy, while also taking into account the demands of the global market. The program's key aims are as follows:

Firstly, it strives to offer cutting-edge, specialized programs that cater to the needs of the regional and international market, drawing upon the best practices in open education.

Secondly, the program is dedicated to providing unwavering support to its students abroad by leveraging innovative online methods, ensuring their success and progress throughout their academic journey.

Thirdly, it is committed to equipping its students with all the necessary academic, technological, and technical resources available at QOU, ensuring they have the tools required to excel in their studies.

Moreover, the program seeks to capitalize on the vast experiences and knowledge of QOU's academic faculty, effectively sharing this wealth of expertise with its students.

Furthermore, a fundamental objective of the program is to break down barriers to higher education for individuals living outside Palestine, promoting inclusivity and access for all.

Additionally, the program endeavors to foster collaboration, communication, and interaction among students from diverse global communities, fostering a rich and diverse educational experience.

Lastly, the program is dedicated to enhancing the capacities of its students, equipping them with essential skills to effectively compete in the regional and international job market, thus empowering them for a successful future.⁽⁴⁾

2.2. E-Learning Resources and e-Learning Technologies

Student Portal: This online platform is available to all our students. After registration, students will have access to content from a variety of sources relevant to your academic studies, including instructions, email account,

and access to the Virtual Learning Environment (VLE). **Digital Content Repository:** An open-source digital repository used by the university to store, index and classify the university's digital assets such as scientific journals, research, books, digital content, and self-learning courses.

Online Open Smart Courses: Designed and published as Open Educational Resources (OER). These courses are developed in a smart learning environment that are consistent with the educational needs and with the requirements of the digital generation.

Educational Video Platform (QOU Tube): is an open-source platform for interactive educational videos produced by QOU.

Slide share Platform: An open-source platform for sharing lectures, presentations, data, and documents, in addition to any relevant digital learning resources.

Self-paced Online Courses: In line with 20th century skills, QOU is the first in the Arab world to establish this style of learning based on open educational practices. It allows students to achieve the principle of mastery learning. This learning method is built on instructional modules (mini-learning units) that are supplemented by educational videos, shapes, graphics, and infographics, as well as the use of multiple sequential and summative formative self-assessment techniques.

Virtual Classroom Technology: QOU practitioners have substantial expertise in implementing and practicing this technique for the synchronous lectures of various courses. In this online collaborative environment, educators can enhance students' engagement using the available tools for presentation, interaction, and saving the outcome as video on demand for asynchronous learning. Moreover, these platforms are available for individual online meetings between educators and students at any time for assistance and sharing ideas.⁽⁵⁾

3. The ILP Features

The International Learning Program (ILP) is a pioneering educational initiative that encompasses a wide array of distinctive features, setting it apart as a cutting-edge and transformative learning experience. With an unwavering commitment to fostering holistic development and preparing students for success in a rapidly evolving global landscape, the ILP stands at the forefront of innovative pedagogy. Among its key features, the program places a strong emphasis on experiential learning, integrating practical and hands-on opportunities that allow learners to apply their knowledge in real-world contexts. Moreover, the ILP takes pride in promoting intercultural exchange, bringing together a diverse cohort of students from various backgrounds, facilitating cross-cultural learning, and nurturing global citizenship. These core elements empower students with the skills and perspectives needed to thrive in a dynamic and interconnected world. As we delve into the unique aspects of the ILP, it becomes evident that this program transcends traditional educational boundaries and represents an exciting journey of self-discovery and growth for each participant.⁽⁶⁾

3.1. Experiential Learning

A standout feature of the ILP (International Learning Program) is its strong emphasis on experiential learning, setting it apart from conventional educational approaches. By integrating practical and hands-on learning opportunities into the curriculum, the program enables learners to go beyond theoretical concepts and actually apply their acquired knowledge and skills in real-world situations. This dynamic approach enriches the learning experience by fostering a deeper understanding and appreciation of the subject matter. Moreover, through these immersive experiences, students develop critical problem-solving abilities, adaptability, and a sense of confidence in their abilities. As a result, graduates of the ILP are well-prepared to excel in their chosen fields, having gained invaluable practical experience and a keen sense of how to navigate the challenges and complexities of their professions. The ILP's commitment to experiential learning not only shapes competent and capable professionals but also cultivates a culture of lifelong learning and continuous improvement, equipping learners with the tools to thrive in an ever-evolving global landscape.

3.2. Intercultural Exchange

In addition to its focus on experiential learning, the ILP places great significance on promoting intercultural exchange, which lies at the heart of its transformative educational experience. By attracting students from a myriad of backgrounds and cultures, the program creates a vibrant and diverse learning environment that thrives on the richness of varied perspectives. The interaction between learners from different corners of the

world not only facilitates the exchange of knowledge but also encourages a deeper appreciation of each other's traditions, beliefs, and values. Through this cross-cultural interaction, students gain valuable insights into the global community, nurturing a strong sense of global citizenship and interconnectedness.

The ILP actively encourages collaboration and mutual learning, providing a platform for individuals to broaden their horizons and challenge their preconceived notions. As learners engage in meaningful discussions and collaborate on projects, they learn to embrace diversity and develop a profound respect for cultural differences. This open and inclusive atmosphere fosters empathy, understanding, and tolerance, strengthening the fabric of international relations and fostering a more harmonious global society.

Furthermore, the program equips students with essential skills to navigate a culturally diverse world, empowering them to effectively communicate and collaborate across boundaries. As they immerse themselves in different cultures, students not only develop a sense of adaptability but also become ambassadors of cultural appreciation, bridging gaps between nations and contributing to a more united and compassionate world.

In essence, the ILP's emphasis on intercultural exchange goes beyond merely promoting diversity within the program; it instills in students a lifelong commitment to embracing and celebrating diversity wherever they go, making a positive impact on both local and global communities. As graduates of the ILP venture into their future endeavors, they carry with them a profound understanding of the interconnectedness of humanity and a determination to build bridges that unite people from all walks of life.⁽⁷⁾

3.3. Beyond its Borders

The International Learning Program (ILP) has proven to be a transformative force in the realm of lifelong learning, leaving a profound impact not only within Palestine but also reaching far beyond its borders. By embracing a progressive approach to education, the ILP has enabled the Open University of Palestine (QOU) to transcend geographical limitations and open its virtual doors to eager learners worldwide. This inclusivity and accessibility have not only expanded QOU's student base but have also reinforced its position as a prominent institution in the realm of open and distance learning on the global stage.

The success and reputation of the ILP have attracted learners from diverse backgrounds and cultures, creating a diverse and dynamic international community of students. As these learners interact and engage with the program's innovative curriculum and collaborative learning environment, they gain not only specialized knowledge and skills but also develop a global perspective and a sense of interconnectedness. This, in turn, contributes to the growth and development of the global education sector as a whole, as these students become ambassadors of modern educational practices in their respective regions.

Furthermore, the ILP's impact extends beyond individual learners and their immediate communities. Through its emphasis on openness, flexibility, and technology-driven pedagogy, the program has served as a trailblazer, inspiring other institutions and educational organizations to adopt similar approaches to broaden their educational reach. By pioneering new methods of teaching and learning, the ILP has set a benchmark for excellence, sparking innovation and fostering a spirit of continuous improvement in the wider educational landscape.

3.4. Global Alumni

The positive impact of the International Learning Program (ILP) extends not only to the global education community but also to the students and alumni of the Al-Quds Open University of Palestine (QOU). The ILP's emphasis on intercultural exchange and its diverse cohort of learners from different countries have created a unique platform for QOU students to connect with peers from around the world. This cross-cultural interaction goes beyond just academic collaboration; it fosters the exchange of ideas, experiences, and perspectives, enriching the overall learning journey for QOU's students.

As QOU students engage with their international counterparts, they gain valuable insights into different cultures, traditions, and ways of thinking. This exposure to diverse perspectives enhances their understanding of global issues and instills a sense of global citizenship. Through meaningful interactions, students develop interpersonal skills, cultural competence, and adaptability – qualities that are highly valued in an increasingly interconnected and globalized world.

Moreover, the connections formed through the ILP create a robust global network of contacts for QOU's students and alumni. These relationships extend beyond the program's duration, providing a valuable support system and professional connections throughout their careers. As graduates enter the job market, their diverse network can prove instrumental in exploring international job opportunities, collaborating on cross-border projects, and accessing global markets.

The ILP's impact on students' career prospects cannot be understated. By exposing them to a broader range of experiences and perspectives, the program equips them with a competitive edge in the job market. Employers increasingly seek professionals who possess a global mindset and can thrive in culturally diverse environments. The ILP's alumni, armed with a wealth of experiences and an expansive network, are better prepared to excel in their careers and take on leadership roles in various industries.

In essence, the ILP's positive influence on QOU's students and alumni is multifaceted. From fostering meaningful connections with peers worldwide to cultivating a global perspective and enhancing career prospects, the program provides a transformative educational experience that extends far beyond the classroom. As QOU graduates venture into their future endeavors, they carry with them the lasting impact of the ILP, shaping them into well-rounded individuals ready to make a positive difference in the global community.⁽⁸⁾

4. Discussion and Conclusion

In conclusion, the International Learning Program, spearheaded by Al-Quds Open University, has emerged as a pivotal force in advancing the ideals of lifelong learning. Its innovative and forward-looking approach to education has ushered in a new era of accessibility and excellence, empowering learners with a pathway to high-quality education and hands-on experience. By transcending geographical boundaries, the program has succeeded in creating a vibrant and diverse community of students from various corners of the world, promoting intercultural exchange and fostering a profound sense of global citizenship.

As students engage in collaborative learning, they not only gain specialized knowledge and skills but also develop a deep appreciation for the value of diversity and mutual respect. This transformative experience not only enriches their personal growth but also equips them with the tools to become influential change-makers in their respective fields. The ripple effects of the ILP's impact extend beyond the individual learners, as its success has bolstered Al-Quds Open University's reputation as a leading provider of open and distance learning on the global stage.

Furthermore, the ILP's contributions to the global education sector have been substantial. By trailblazing innovative teaching methodologies and pioneering technological advancements in education, the program has set a precedent for other institutions to follow suit. As educators and institutions worldwide take inspiration from the ILP's success, the global education landscape continues to evolve, embracing openness and inclusivity as essential cornerstones of modern pedagogy.

In conclusion, the International Learning Program has emerged as a beacon of progress, empowerment, and inclusivity, leaving an indelible mark on the concept of lifelong learning. By providing students with an unparalleled educational experience and fostering a sense of interconnectedness, the program has become a catalyst for positive change, both within Al-Quds Open University and beyond. As the world looks to the future of education, the transformative impact of the ILP serves as a guiding light, igniting the path towards a more interconnected, equitable, and innovative global education system.⁽⁹⁾

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Best Practice Award Silver Medal

66-Development of Predictive Model for Student Learning Outcomes Based on Spatial Learning Analytics of Open and Distance Learning Students

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Abstract

Learning analytics entails using data and analysis to acquire insights into how students interact with course materials, which can assist educators in making informed decisions about how to structure and deliver curriculum. The importance of spatial learning analytics in an online and remote education context is investigated in this study, with an emphasis on fulfilling United Nation's Sustainable Development Goal 4(SDG-4) which advocates for ensuring equitable and excellent education for all. The study's goal is to develop an accurate predictive model by combining location data, learning logs and academic performance data. The prediction model's effectiveness will be assessed to determine its dependability and applicability. In learning analytics for online education, a predictive model is a tool that analyses data to predict how well students succeed in their courses based on their engagement with the curriculum. A machine learning technique will be used to train the model with a substantial amount of data, and the remaining data will be utilized to evaluate its performance. The model's performance is evaluated using measures such as accuracy, precision, recall, and F1-score. Incorporating exploratory data analysis techniques like correlation and spatial autocorrelation will improve the analysis even more. Correlation analysis will aid in the identification of potential links between various parameters and student performance. However, spatial autocorrelation analysis will be essential in identifying regional patterns and clusters of student performance. As part of spatial learning analytics, the results will ensure more effective learning outcomes for students in an online and distance education.

Keywords: *learning analytics, spatial learning analytics, predictive model, distance education, machine learning*

1. Introduction

In recent years, learning analytics has emerged as a powerful field that utilizes data and analysis to gain insights into students' interactions with educational materials. As a result of technological improvement, the discipline of learning analytics, also known as data analytics in education or educational data mining, is quickly gaining footing in education management, government, and industry. The desire for technology developments in support of learning delivery is driven by the constant demand for knowledge and knowledge management (Romero & Ventura, 2007). Learning analytics is defined as "the measurement, collection, analysis, and reporting of data about learners and their contexts, for purpose of understanding and optimizing learning and the environments in which it occurs" (Long & Siemens, 2011). In short, Learning Analytics is understanding, analyzing, and converting educational data into useful actions.

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One specific area of interest within learning analytics is spatial learning analytics, which explores the role of spatial data in online and distance education settings. Current approaches to learning analytics provide insights on assessment performance and student interactions, but do not clarify the roles that location may play. (Becker, 2013) identifies location as one of three main data types required to support learning analytics: timing, location, and population. Understanding the roles of location in learner engagement can assist educators in developing high-quality courses and global learning experiences that take geographic or spatial differences into consideration and use them to achieve higher learning outcomes.

Predicting student performance assists educational institutions in improving learning and teaching approaches by identifying instructional methods that suit students based on a variety of background information (Belachew & Gobena, 2017). To achieve this objective, a large amount of student data must be examined and predicted using machine learning model. This research focuses on supervised learning, specifically predictive analytics (Nyce, 2007), which is the practice of utilizing machine learning to anticipate future outcomes. The algorithm will be trained on a large amount of the available data, with the remaining data utilized to assess the model performance. There are widely used indicators for evaluating the effectiveness of machine learning algorithms, such as precision, recall and F-measure (Powers, 2011).

The fundamental goal of this study is to develop a reliable prediction model that can anticipate students' quiz score performance based on their involvement with the course learning material by blending Moodle tracking data and Microsoft Teams data. The development of a prediction model and exploratory data analysis constitute key advances in the field of learning analytics. As technology advances and educational data mining techniques become more sophisticated, the impact of learning analytics will undoubtedly form a more inclusive and successful educational landscape, making education more accessible and useful to learners globally. With this study, we contribute to the ongoing efforts to create an environment that fosters academic accomplishment and allows students to attain their full potential.

The remainder of the paper is as follows. Section 1 details the relevant literature review. Section 2 discusses our proposed methodology. Results and discussions are presented in Section 3 while Section 4 concludes the finding of the research and provides a guideline to the future work.

2. Related Work

A study conducted to get insights into the potential of using Moodle learning data to predict student academic progress in further education. The authors discovered that trends in Moodle logs and engagement corresponded with student achievement through empirical examination of Moodle usage and student performance data. The study revealed critical elements that influenced student performance, such as login frequency, course engagement, and online activity completion. Based on these criteria, the authors created accurate prediction models, implying the possibility for institutions to employ Moodle insights for proactive assistance and interventions to improve student outcomes in further education. This strategy has the potential to improve educational quality and student success rates (Quinn & Gray, 2019).

Another study by (Xu, Moon, & Van der Schaar, 2017) investigates the use of machine learning to predict student performance in degree programs. Using demographic information, grades, and academic involvement, the authors present an innovative approach incorporating longitudinal data tracking, feature extraction, and predictive modelling. They develop accurate prediction models that identify patterns in student performance by evaluating various machine learning technologies. The findings suggest the potential for accurately forecasting student achievement, allowing institutions to provide timely assistance to at-risk students.

The study investigates various machine learning algorithms for analyzing MOOC site data, which includes demographics, engagement metrics, and course-related information. Authors create predictive models with techniques such as Decision Trees, Random Forests, and Support Vector Machines. By considering indicators such as forum participation, assessments, and time spent, these models accurately predict student success and completion. The study shows how machine learning may be used to provide timely interventions and personalized learning in online education, improving student engagement and outcomes (Al-Shabandar et al., 2017).

Brooks & Thompson (2022) explored many parts of predictive modelling, beginning with the importance of data gathering, which includes demographics, academic records, and engagement markers. They emphasize feature selection for accurate predictions using machine learning and statistical methodologies. For reliability,

model evaluation is stressed. The study emphasizes the advantages of predictive modelling in assisting timely interventions and personalized help in education. It adds to learning analytics by providing information for educators looking to improve teaching practices and student outcomes through predictive modelling.

However, a significant void remains in the available research, as previous studies focused on the potential of Moodle learning data and machine learning approaches in isolation. To close this gap, we employ a ground-breaking method, seamlessly merging Microsoft Teams monitoring data with Moodle insights. Our research goes beyond traditional exploratory data analysis to identify deeper connections between student engagement, performance measures, and academic outcomes. What distinguishes us is our dedication to holistic evaluation, which goes beyond the typical accuracy metric. While many other studies (Jayaprakash et al., 2014; Kabakchieva, 2013; Cortez & Silva, 2008) focus simply on accuracy, we investigate a wide range of evaluation measures such as precision, recall, and F1 score. This step not only enhances comparability but also reveals nuances otherwise overlooked. In this way, our study breaks new ground, providing a captivating and comprehensive perspective on predictive modeling in further education.

3. Methods

3.1. Data Collection and Preprocessing

The data collected from Microsoft Teams involves two main data which includes MS Teams device usage detail. This dataset includes information about how users access Microsoft Teams, categorizing their usage by device type. Figure 1 shows the device usage detail of students that were recorded include whether the students have used web, used iOS, used android phone, used windows, or used Linux.

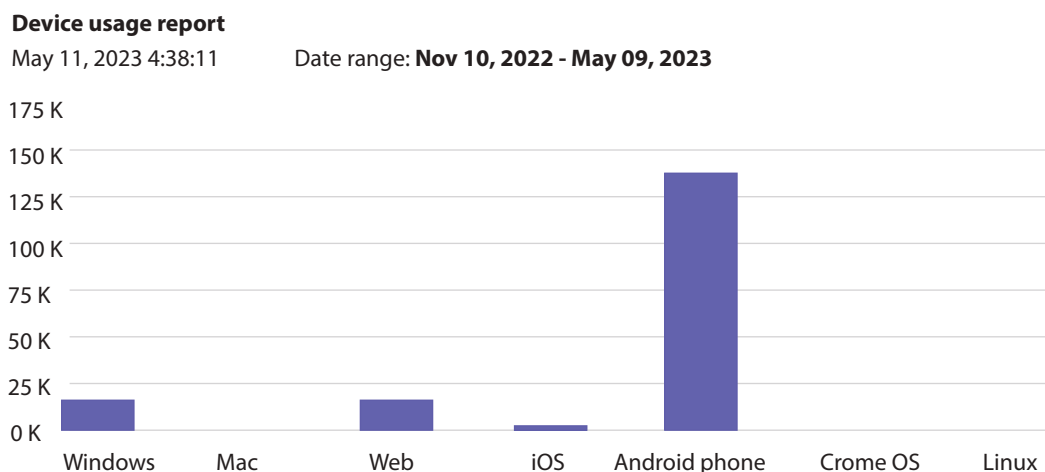


Figure 1. Microsoft Teams Device Usage Report

The team's device usage detail dataset contained 100,956 records. This shows most of the students used android phone, few of them accessed the course material by using windows, web, iOS, and none of them used mac, chrome OS and Linux.

Teams' user activity dataset provides specific metrics for each user's activity in Microsoft teams. Figure 2 provides user activity details which involves total number of meetings attended by each user, the total duration (in seconds) of audio usage during meetings, the total duration (in seconds) of video usage during meetings and the total duration (in seconds) of screen sharing.

Teams user activity report

May 11, 2023 4:10:47 PM UTC | Date range: Nov 10, 2022 - May 09, 2023

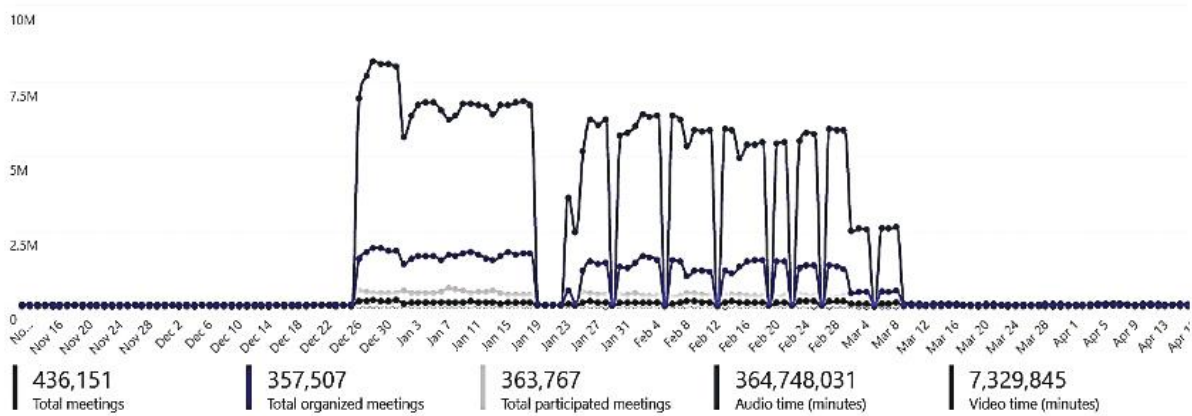


Figure 2. Microsoft Teams Overall User Activity

The team's user activity detail dataset consists of 260,606 user-specific records. The total number of meetings attended by each user measure shows how actively users participate in virtual meetings or online collaboration sessions within the Teams platform.

Course code "5403-Basics of ICT" taught at undergraduate level to open and distance learning students was selected and its quiz score data is included in the Moodle Learning Management System (LMS) data. This dataset comprises the quiz results of students enrolled in the code 5403 course. It contains information about "6362" students. It contains the forum logs (count of 4,601), which record activity on the Moodle forum and provide insights into user involvement and discussions. The H5P logs (count of 5666) record user interactions with interactive content, providing significant statistics on learning material engagement. The Resource logs (count of 3,785) include information about resource usage e.g., course book that can be used to better understand how students access learning materials in Moodle. The URL view logs (count of 5,308) track interactions with external embedded videos, allowing for study of additional learning resources accessed by students.

To visualize the distribution of quiz scores in our dataset, we used histogram. It is particularly useful for determining the frequency of various score ranges. We made use of a dataset containing quiz scores from students enrolled in the course. Figure 3 depicts how the quiz scores are distributed across different score ranges. The height of each bar in the histogram indicates the frequency or count of scores that fall within that range.

During the data preprocessing phase, the dataset containing quiz score of students underwent a thorough cleaning process to address missing values, inconsistencies, and outliers effectively. Information from Microsoft Teams data was integrated into the quiz score dataset, resulting in a comprehensive dataset of 4,557 students. The integration was conducted using common registration numbers to ensure accurate data alignment. Moreover, relevant location information was enriched in the dataset, and a subset of influential features was selected for the prediction model. These meticulous steps were taken to optimize data quality and prepare the dataset for subsequent analysis and modeling, specifically aimed at predicting quiz scores using the identified input features.

3.2. Exploratory Data Analysis

3.2.1. Correlation Matrix

A correlation matrix was generated for the dataset containing 15 variables. Using the Seaborn and Matplotlib packages in Pandas' library, it generates a heatmap of the correlation matrix. The heatmap offers information about the correlations between the variables in the dataset. The correlation matrix heatmap shows a grid of color-coded numbers, with the intensity of the color representing the strength of the correlation between two variables. Cool colors, such as blue, signify negative correlation, while warm colors, such as red, show positive correlation. When two variables have a positive correlation (closer to 1.0), they tend to rise or fall in tandem. A greater favorable association is indicated by higher positive values.

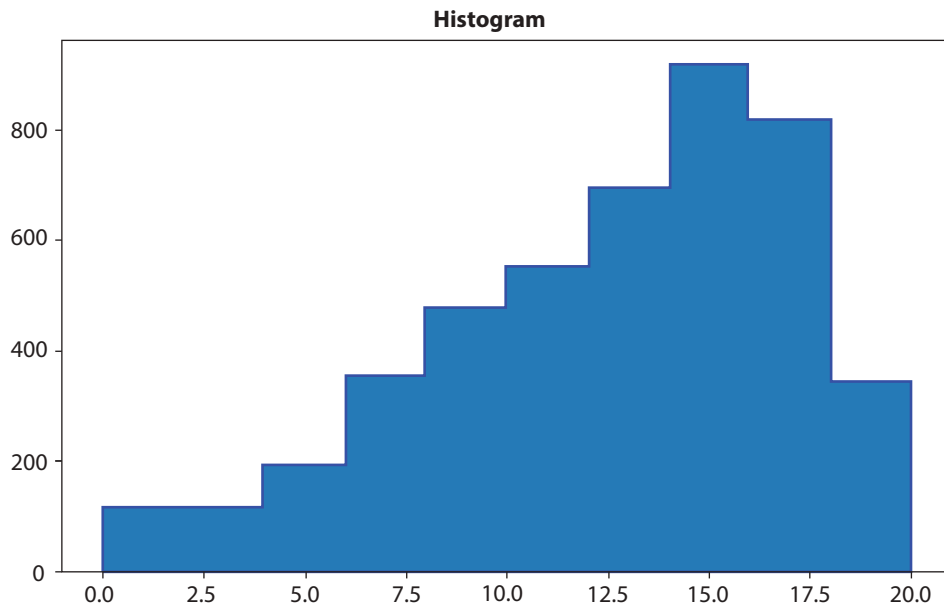


Figure 3. Quiz score distribution of students

If two variables have a negative correlation (closer to -1.0), they tend to move oppositely. A greater negative association is indicated by higher negative values. Variables with correlation values approaching 0.0 suggest that there is no meaningful linear relationship. Figure 4. heatmap’s last row and column correspond to the variable “Quiz Score,” which is the dependent variable of interest.

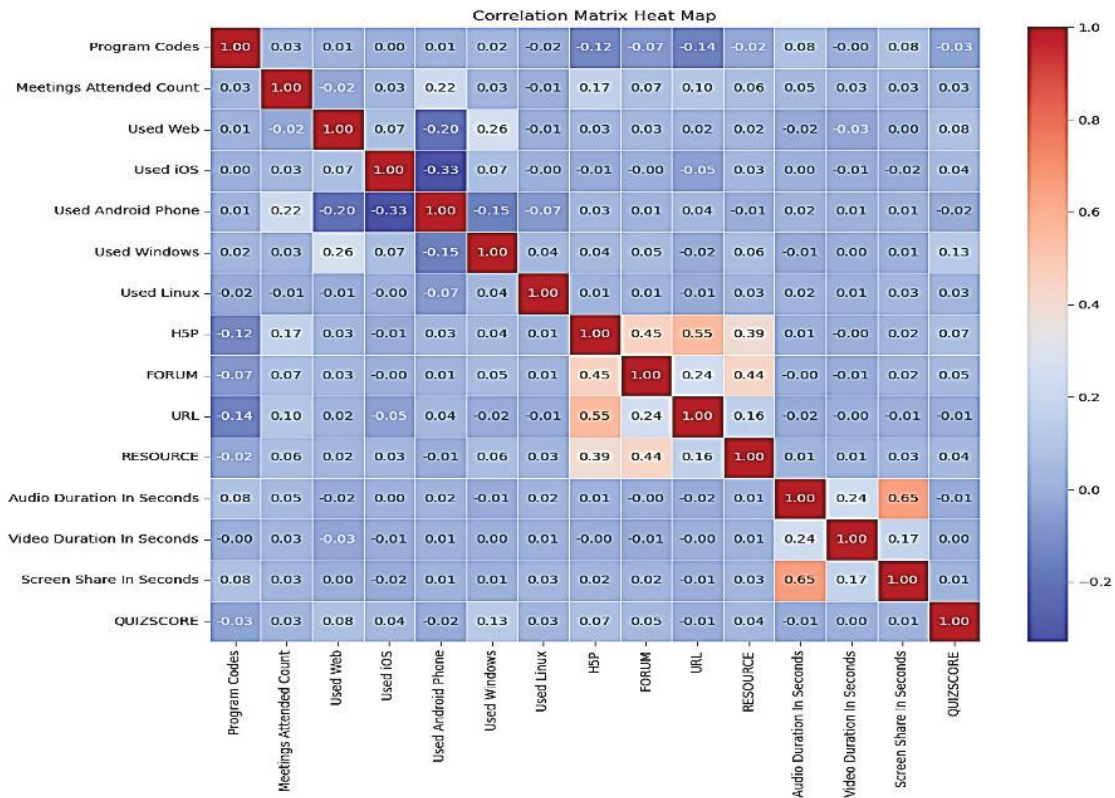


Figure 4. Correlation Matrix Heatmap: Unveiling Feature Relationships in Educational Data

The heatmap can aid in the identification of links between the dependent variable (Quiz Score) and the independent variables (other columns in the dataset). Even though the correlation matrix heatmap indicates only weak positive relationships between variables, which does not mean those characteristics are not useful

for predicting the target variable (quiz score) in machine learning algorithms. Weak correlations show that the variables are associated, but not strongly enough to indicate a linear connection between them.

Algorithms for machine learning are not limited to linear connections between features and the goal variable. They can capture complex patterns, such as non-linear correlations. As a result, even weak correlations might contribute to the model's predictive power. Ensemble approaches, such as Random Forest, can handle both linear and non-linear interactions and make use of all features information, regardless of the strength of their individual correlations. By utilizing proper algorithms and approaches, these features can still be useful contributors to predict the goal variable (quiz score) and should be studied further in the modelling process.

3.2.2. Spatial Autocorrelation Analysis

The Moran's I scatterplot, a commonly used spatial statistics method, allows us to visually assess the spatial distribution of the variable of interest and explore whether similar values tend to cluster together or exhibit spatial patterns. We utilized a Python script to analyze spatial autocorrelation using a spatial dataset and the Moran's I statistic. We imported the necessary libraries, including matplotlib, seaborn, geopandas, libpysal, and esda (exploratory spatial data analysis). The `read_csv` function in pandas is then used to load the spatial dataset from a CSV file. The DataFrame that was previously loaded is then used to generate a GeoDataFrame. The spatial dataset is represented using geopandas, and point geometries are produced using geometry data from the 'Longitude' and 'Latitude' columns. The script provides independent variables to be utilised in the analysis and defines the dependent variable as "Quiz score."

K-nearest neighbours (KNN) with $k=5$ are used to generate a spatial weights matrix. Based on the data points' geographic proximity, the spatial weights matrix defines the spatial interactions between them. Then, using the GeoDataFrame, constructs the dependent variable array (y) and independent variable array (X). The Moran's I computation will make use of these arrays. The dependent variable (Quiz score)'s spatial autocorrelation is calculated using the Moran's I statistic. It assesses if similar quiz results have a propensity to spatially cluster. The computed Moran's I value and accompanying p-value are then printed. The p-value is a statistical test used to determine if the observed spatial autocorrelation was caused by chance or was statistically significant.

The dependent variable array (y) and the spatial weights matrix are then multiplied to generate the spatial lag values for the dependent variable (y_{lag}). Table 1 shows the Moran's I computed value. The results are as follows:

Table 1. Spatial Autocorrelation Metrics

Moran's I	0.04251863912834886
Moran's I p-value	0.001

Based on the computed Moran's I value of about 0.0425, we can describe the spatial auto correlation is weak. Moran's I has a magnitude ranging from -1 to 1, with negative values near to -1 indicating negative spatial autocorrelation, which means that similar values are spread and dissimilar values are grouped. Values near to zero indicate that there is no significant spatial autocorrelation, reflecting a random spatial pattern. Positive values near 1 indicate positive spatial autocorrelation, which means that similar values are clustered together and different values are dispersed. In this situation, a positive but close to zero Moran's I value of 0.0425 indicates as weak spatial autocorrelation. While similar quiz scores have a tendency to cluster spatially, the strength of this association is not very strong. It means that, while the distribution of quiz scores among students is spatially dependent, the clustering impact is quite moderate. Furthermore, the analysis yielded a p-value of roughly 0.001. The amount of statistical significance of the computed Moran's I value is represented by a p-value. The low p-value in this example suggests that the observed spatial autocorrelation is statistically significant.

The association between the geographical lag of the quiz score and the actual quiz score is then visualised using Matplotlib. Figure 5 shows the scatterplot enlightening the association between the spatially lagged Quiz score and the Quiz score.

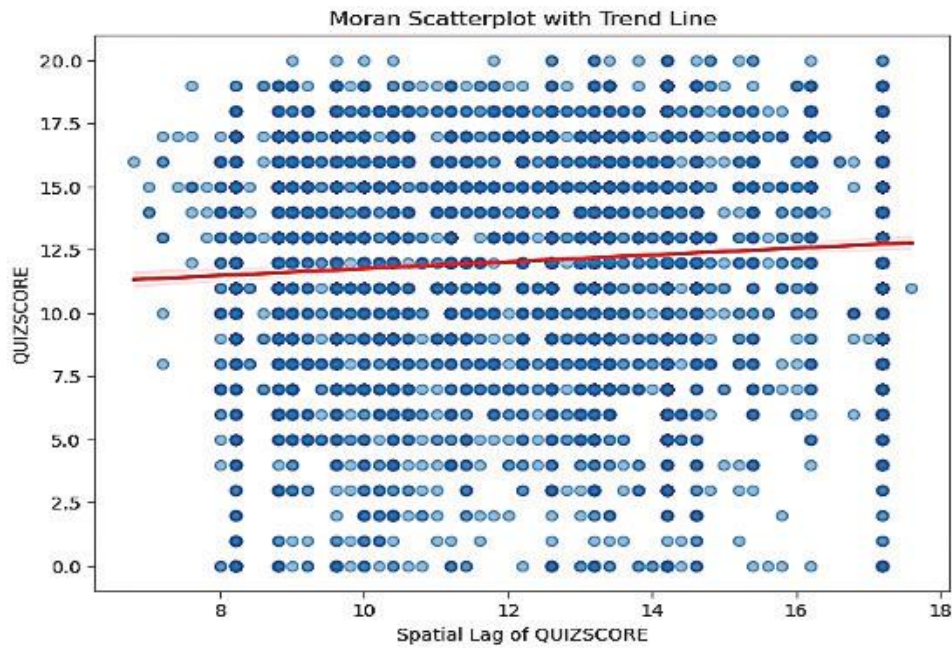


Figure 5. *Morans Scatterplot with Trendline*

The data points are dispersed around the plot, and each one represents a student's quiz score as well as the average quiz scores of their classmates. The scatterplot includes a red trend line that represents the general link between spatially lagged Quiz score and Quiz score. The trend line slopes higher from left to right, showing that the two variables have a positive connection. The upward slope of the trend line indicates that students with higher quiz scores are more likely to be accompanied by students with higher quiz scores, and vice versa.

This pattern suggests weak positive spatial autocorrelation, in which students with similar quiz results are spatially clustered together. The trend line implies a positive link, but the data points are not completely aligned along it. Due to variability in quiz scores for students with similar spatially lagged quiz scores, resulting in a scatter of points around the trend line. The density of the scatterplot around specific places may suggest areas with a larger or lower concentration of quiz scores. Clusters of points closer to the trend line indicate more spatial autocorrelation, whereas more dispersed points indicate lower spatial autocorrelation. Overall, the scatterplot shows the presence of weak positive spatial autocorrelation in the students' quiz scores.

3.3. Feature Engineering & Selection

The technique of selecting or developing features (variables) in a data set to improve machine learning outcomes is known as feature engineering (Domingos, 2012, p. 78). The selected features, namely programme codes, meetings attended count, used web, used iOS, used android phone, used windows, used linux, h5p, forum, url, resource, audio duration in seconds, video duration in seconds, and screen share in seconds, used to predict the target variable "Quiz score" in the feature engineering step.

3.4. Predictive Model Development

Predictive analytics is the act of predicting future occurrences and behaviours in previously unseen data using a model developed from similar prior data (Nyce, 2007; Shmueli & Koppius, 2011, p. 553). There are numerous algorithms to create a prediction model. This research uses algorithm such as Random Forest.

3.4.1. Random Forest

A random forest is a collection of decision trees that have some aspect of random choice (Ulinnuha, Sa'Dyah, 2017). The Random Forest Classifier was used to predict "Quiz score" based on a number of independent characteristics. The dataset is read from a csv file and loaded into a pandas DataFrame, which includes features and the goal variable (Quiz score). The DataFrame is used to extract the independent variables (features) and the target variable (Quiz score). Additional preprocessing was performed to remove missing values, outliers, and inconsistencies. Using a test size of 30% and a train size of 70%, the data is divided into training

and an evaluation set. This facilitates model training and evaluation. The StandardScaler is used to apply standardisation to the features in order to ensure consistent scaling across different features. For reproducibility, a Random Forest Classifier model is built with default hyperparameters and a random seed. On the training set, the model is trained, and the training time is recorded. The trained model is then used to predict “Quiz score” on the evaluation set, and the time it takes to forecast is recorded. Based on a threshold of 10, a binary classification is done on the projected “Quiz score” and the actual “Quiz score,” classifying them as pass or fail.

4. Results and Discussions

To analyse the Random Forest model’s performance, evaluation metrics including accuracy, precision, recall, and F1 score are generated. Table 2 shows output obtained from model.

Table 2. Random Forest Evaluation Metrics

Model training time:	1.7073 seconds
Model predicting time:	0.0758 seconds
Accuracy:	0.6966
Precision:	0.7560
Recall:	0.8729
F1 Score:	0.8102

Model Training Time: 1.7073 seconds represents the time it took the Random Forest Classifier to train on the training set. Training time is a significant consideration, particularly for large datasets or sophisticated models, because it influences the overall efficiency of the machine learning process.

Model Predicting Time: The trained Random Forest Classifier makes predictions on the evaluation set in 0.0758 seconds. It assesses the model’s ability to handle fresh input and deliver predictions in a timely manner, which is critical for real-time applications.

Accuracy: Accuracy is defined as the model’s fraction of correct predictions over the entire number of predictions. In this situation, the model had an accuracy of about 69.66%, which means that the model accurately predicted around 69.66% of the quiz scores.

Precision: Precision is the model’s ability to accurately identify positive samples (correctly predicted positive quiz scores) among all samples anticipated to be positive. With a precision of 0.7560, this means that 75.60% of the quiz results predicted as positive were correct.

Recall: Recall is the model’s capacity to properly identify positive samples among all actual positive samples. It is also known as sensitivity or true positive rate. With a recall of 0.8729, the model captured approximately 87.29% of the real positive quiz results.

F1 score: The F1 score is the harmonic mean of precision and recall, and it is used to balance the trade-off between the two. It delivers a single score that takes precision and recall into account. With an F1 score of 0.8102, the model has a fair combination of precision and recall, capturing the trade-off between true positive predictions and minimizing false negatives.

4.1. Feature Importance Graph:

Figure 6 shows the feature importance graph of random forest classifier. The random forest feature importance graph illustrates the significance of each feature (independent variable) utilised in the random forest classifier to make predictions. The graph demonstrates which features have the greatest influence on the model’s performance and predictive capability. Each bar in the graph shows the significance of a certain trait. The height of the bar represents the significance score, which is a measure of how much a feature adds to the model’s ability to forecast accurately. Using the graph, we may identify the most relevant aspects for the goal variable (Quiz score) from a given set of features.

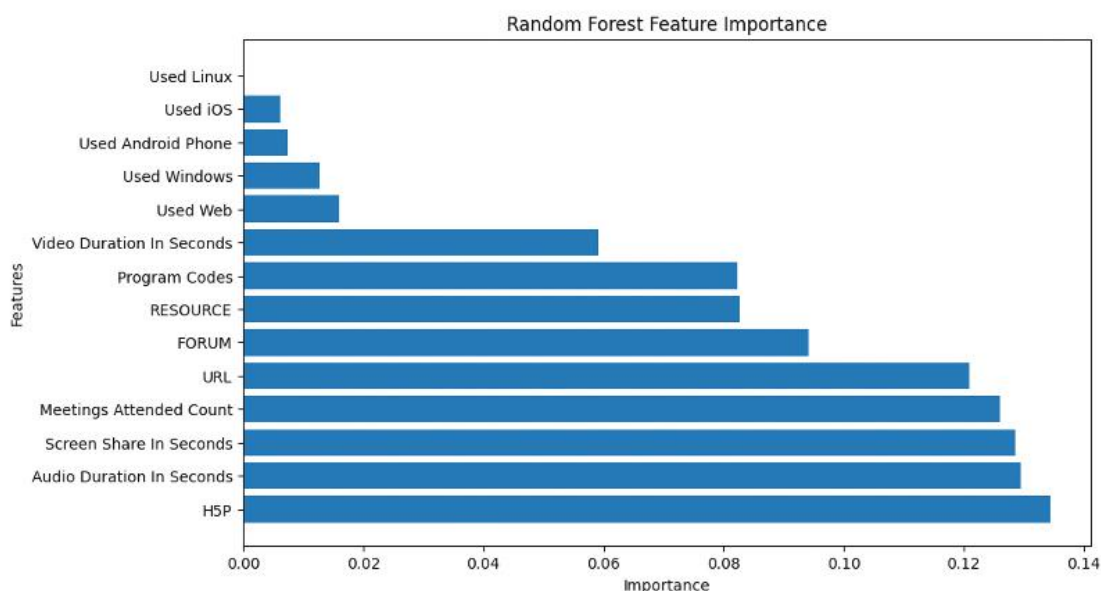


Figure 6. Random Forest Feature Importance Graph

The names of the features are displayed on the graph's y-axis. The random forest feature importance graph shows that using devices such as Windows, Android phone, web, and iOS has the least impact on predicting quiz scores. These characteristics are thought to be less relevant in the prediction process. Furthermore, using Linux as a gadget has no effect, showing that it has no observable effect on students' quiz performance. The graph, on the other hand, shows that, aside from devices usage, all of the remaining characteristics play a major role in predicting students' quiz scores. These characteristics are important in the prediction model and are good predictors of students' achievement in learning tests. The random forest model's feature importance results provide useful insights into the relative value of different factors in predicting quiz scores.

4.2. Discussions

For machine learning algorithms to be successful in predicting student performance, both data and machine learning algorithms must be used effectively. To achieve the greatest outcomes, the appropriate machine learning approach must be chosen for this particular situation. The algorithm, on the other hand, cannot deliver the best predictions on its own. The act of changing data for machine learning, known as feature engineering, is also critical for getting the best expected outcomes. The purpose of this research was to develop predictive model. The data set was analysed using random forest machine learning algorithm, and the outcomes were evaluated using four assessment measures. We evaluated model's performance using common evaluation criteria such as accuracy, precision, recall, and F1 score, as well as training and prediction timeframes.

Random Forest demonstrated balanced accuracy, precision, memory, and F1 score. Most other research (Jayaprakash et al., 2014; Kabakchieva, 2013; Cortez & Silva, 2008) do not include recall metrics and only concentrate on accuracy. These metrics have been demonstrated to be the most reliable predictors of student achievement (Richardson et al., 2012; Dollinger et al., 2008). We must prioritize interpretability and efficiency when considering the context of predicting students' learning outcomes.

5. Conclusion and Future Work

Our study's thorough examination of predictive modelling in the context of education has revealed the possibility for leveraging Moodle and Microsoft Teams data to improve student results. We have highlighted the relevance of holistic analysis by bridging gaps in current literature and adopting a multi-dimensional evaluation strategy comprising accuracy, precision, recall, and F1 score. Furthermore, our research into spatial statistics has expanded our understanding of student performance. This study not only advances academic understanding of predictive modelling, but it also has practical implications for educators and institutions seeking to improve student success. Our findings advocate for continuing developments in predictive modelling methods, encouraging the integration of varied data sources, advanced evaluation criteria, and geographical

analytic techniques as we move forward. By embracing these expanding methodologies, education has the potential to gather predictive insights that will eventually design a more effective and personalized learning experience for students all around the world.

One of the study's noteworthy shortcomings is the very limited features of the available dataset employed for predictive modelling. The lack of association between the characteristics utilised in the predictive models may have hampered their performance. Strong feature correlations frequently contribute to more accurate predictions in predictive modelling. Model may struggle to recognise meaningful patterns when feature correlations are weak, resulting in lower predictive power. The model overall accuracy and efficacy in identifying key predictors of students' learning outcomes may have suffered as a result of the lack of strong correlations. The lack of supervision and ease of access to external resources in online learning settings may have altered the association between certain course aspects and actual quiz scores.

Future study should concentrate on broadening the dataset by integrating information from several semesters, courses, or educational institutions. Researchers should look into new methods of engineering or combining features to better capture students' learning behaviours. It is necessary to create methods for identifying and assessing academic dishonesty or cheating in online quizzes and exams. Integrating cheating behaviour factors into prediction models can help them become more resilient and accurate. Incorporate spatial characteristics into the predictive models to get insight into how students' learning outcomes may be influenced by their geographic location.

We can create more accurate and trustworthy predictive models for students' learning outcomes in online learning environments by addressing these limitations and exploring future research initiatives. These developments have the potential to transform educational support systems and assist educators and policymakers in making informed decisions to improve students' learning experiences.

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69-Blended Learning: Distilling Innovation in Higher Education

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Abstract

Innovation diffuses knowledge in the growth process. The skill to think and to innovate is a desirable 21st century skill for the global learners. Innovation in education encourages learners and stresses teachers to be proactive to research, explore, and use multiple strategies and uncover something new. One such innovation that has emerged champion in the higher education is the Blended Learning (BL). The interest in BL can also be attributed to its potential to open the possibility of creating and sustaining a community of learners beyond the formal education milieu. Blended learning does not have pedagogy of its own, but it draws its strength from the three basic theoretical perspectives on learning: behaviorism, cognitivism, and constructivism. However, Community of Inquiry (CoI) is identified as one of the relevant theoretical frameworks to describe BL. This systematic review focuses BL as an important and rapidly developing education form in the higher education, with an emphasis on the benefits it offers to both educators and learners. It includes greater flexibility, convenience, potential learner creativity and independence. The pivot on which BL rests is that learning is not merely the addition of some technological element into an educational process but rather is an integrated plan utilising the best of what both face-to-face and online learning have to offer. This desktop review further unfolds that given the collaboration, communication, and co-creation as rooted tenets in the community of enquiry, BL engenders innovative learning environments and fosters cross fertilisation of sustainable ideas. From multiple perspectives, BL evolves as a significant innovation in higher education context as occurring at the convergence of three presences: cognitive, teaching, and social. It rejuvenates with capabilities of adapting instructional designs and technology that can support and create global communities of distributed learners.

Keywords: *Blended Learning, Innovation, Higher Education, 21st century learning skills, Community of Inquiry*

1. Introduction

It is not easy to segregate the notion of accepting any new technology that aims to generate a silver lining for education from formal point of view. The witness to this claim proposes the fact whether time-specific technology, e.g. radio or television etc. in the past, as a teaching-learning aid had radically supplemented or improved education. The outcomes have always been debatable. It is evident that technology is not a saviour nor a panacea that can fix all problems of higher education. Lest, the technology in education can identify the gaps and alleviate the issues like resource provision, teachers' capacities and motivation, and students' readiness for institution etc.

We know that technology is a broad term used for all types of tools, methods, and processes created by human beings to improve their lives. The evolution of Information (Education),

Communication (disseminating/transacting) and Technology (Industry; tools, methods, and processes thereby) have compelled and distilled the idea of ICT in education. The need to have a digital pedagogy is imperative and it should be introduced thoughtfully with right and feasible blends. These blends may be technology and non-technology components, a mix of instructional strategies, facilitation techniques, competencies smitten with instructional designs.

The three potential terms of the acronym ICT, viz., information (education), dissemination (communication) and technology (industry) have influenced each other in the historical timeline (if we consider the stages to be 1.0, 2.0, 3.0, 4.0) and as a result the roles have translated with the transformation of the needs and aspirations of the society. This evolutionary concept has been described vividly below:

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Evolution	1.0	2.0	3.0	4.0
Information (Education)	Education 1.0 3Rs Receive Respond Regurgitate	Education 2.0 3Cs Communicating Contributing Collaborating	Education 3.0 3Cs Connectors Creators Constructivists	Education 4.0 Co-creation and innovation Collaborative & personalized learning
Communication (Dissemination)	Web 1.0 Syntactic Web Read only web	Web 2.0 Social Web Read-write web	Web 3.0 Semantic Web Read-write-execute	Web 4.0 Symbiotic Web Intelligent Web
Technology (Industry)	Industry 1.0 Mechanization, steam power, wWeaving loom	Industry 2.0 Mass production, assembly line, electrical energy	Industry 3.0 Automation, computers and electronics	Industry 4.0 Cyber Physical Systems, internet of things, networks

Figure 1. Evolutionary transformations

1.1. Genesis of Blended Learning

Bridging the gaps in educational access, created by geographical and socio-economic barriers, is of utmost importance to emerge as an educational superpower in the 21st century. To achieve targets of universal educational access, application of appropriate technology is the call of the day. Educational Institutions can utilize technology-driven instruction modes and technology-based learning resources to reach students of remote areas. Also, making such technology-centered educational targets low-cost and easily accessible would allow students from disadvantaged backgrounds as well as remote areas to explore the educational landscape with ease.

The changing nature of students and the context of teaching learning are very important. The need to develop skills and competence in digital technologies and outline the expected learning outcomes takes the center stage. The requisite psychosocial and functional competencies can bring about the best test of reconfiguring the digital-enabled pedagogies in the higher education. The relevance and benefits of e-resources aligned to the digital pedagogy will reshape the neo-knowledge dissemination in the 21st century education aims for-

- Creative Thinking
- Critical Thinking
- Decision Making
- Problem Solving
- Collaboration
- Effective communication
- Relationship development

1.2. Concept of Blended Learning

The ICT and technology in and of education fosters a judicious mix, called Blending. Blended learning (BL) is a teaching and learning approach that combines traditional classroom methods with computer-mediated activities. This pedagogical approach combines face-to-face and online activities, as well as synchronous and asynchronous learning tools, allowing for the most effective learning processes (Cleveland-Innes & Wilton, 2018). Blended learning is the practice of combining digital learning tools with traditional classroom teaching. In a true blended learning environment, both student and teacher should be present. Regardless, students should be able to use the digital tools to control the pace and topics of their learning. The flipped classroom model is a similar programme that aims to use technology to rearrange the learning experience and maximize valuable classroom time. In a flipped classroom, students are encouraged to access digital learning materials on their own time via a cloud-based learning platform.

BL Models: Blended learning models are a type of instructional design that promotes hybrid learning. Institutions and teachers design experiences and opportunities that incorporate both face-to-face and online learning (Cleveland-Innes & Wilton, 2018). There are various diverse models, but they all share several critical characteristics –

Station Rotation – This model permits students to rotate through stations on a fixed schedule. Here at least one of the stations is an online learning station.

Lab Rotation - The Lab Rotation model, like a Station Rotation, allows students to rotate through stations on a fixed schedule. However, in this case, online learning occurs in a dedicated computer lab. This model allows for flexible scheduling arrangements with teachers and other paraprofessionals, and enables Institutions to make use of existing computer labs.

Individual Rotation – This model permits students to rotate through stations, but on individual schedules set by a teacher or software algorithm. In this model, students do not compulsorily rotate to every station; rather they rotate only to the activities programmed on their playlists.

Flipped Classroom – As the name evokes, this model flips the so called traditional relationship between class time and homework. Students learn at home via online coursework and lectures, and teachers use class time for teacher-guided practice or projects.

Flex Model - The Flex model lets students move on flexible schedules among learning activities as per their needs. Here, online learning is the mainstay of student learning thereby ensuring high degree of control over their learning.

The A-La-Carte Model - The A La Carte model enables students to take an online course with an online teacher of record, in addition to other face-to-face courses, which often provides students with more flexibility over their schedules

Enriched Virtual Model - The Enriched Virtual model is an alternative to full-time online class. This allows students to complete most of the coursework online at home or outside of institution, but attend for needed face-to-face learning sessions with a teacher. The Enriched Virtual programs usually do not require daily F2F attendance.

Blended MOOC Model - An online course is supplemented by in-person class meets in a mixed MOOC. If the course is openly accessible, students can read MOOC materials outside the class and then come to class for discussions or activities.

Flexible Mode Courses - Flexible-mode courses allow students to select between in-person and online education.

2. Method

This work is a review-based study reinforced by related literature evidence.

Objectives of the paper: The paper is a document of exploration and review of the idea that blended learning distills innovation in higher education through the following objectives-

1. To reinstate the tenets and attributes of BL in Higher Education
2. To retrospect and reconnect the Instructional Design theories with attributes of blended learning.
3. To connect the framework of Community of Inquiry with Blended learning
4. To establish the role of BL in creating inclusive learning environments

2.1. Analysis pertaining to the above objectives

Reviewing existing literature, researches conducted, policy documents, surveys and available information, the objective-wise analyses are sequenced in the subsequent section of the paper-

2.1.2. Objective-1: Attributes of BL in Higher Education

Blended Learning is characterized by the following features:

- Increased student engagement in learning.
- Enhanced teacher and student interaction.
- Responsibility for learning
- Time management and flexibility
- Improved student learning outcomes
- Enhanced institutional reputation.
- More flexible teaching and learning environment
- More amenable to self and continuous learning
- Better opportunities for experiential learning

ICT Tools of Blended Learning

There are various ICT Tools for Explaining Concept (e.g., Padlet, Popplet, Canva, Freemind, Edmodo, Piktocart etc.), Gamification (Kahoot, GoogleForms for escape rooms, etc.), Quizzing and Concept Evaluation (Socrative, Quizizz, Mentimeter etc.) and Sharing Resources/ Content (Bookcreator, Wakelet etc.).

Non-technology components include facilitation strategies, embedding instructional designs, skills and competence of the teachers and learners and the context of teaching learning.

2.1.3 Objective-2: To retrospect and reconnect the Instructional Design theories with attributes of blended learning

Based on the theories of learning, viz., behaviourism, cognitivism and constructivism, the Instructional Design may be considered as the integral blueprint for guiding the Facilitation process in pedagogy (Mukhopadhyay, 2022). It is a well-established fact that theories are the precursors of practical applications. Hence it is necessary to highlight the Instructional Design Theories that play an instrumental role in configuring the learning process (Sengupta & Roy, n.d.). Some of the pertinent instructional designs those resonates with BL are enumerated in the table below:

Table 1. Functional applications of some of the instructional design theories

Instructional Design Theories	Functional Application
1. Bloom's Taxonomy & Revised Taxonomy by Krathwohl & Anderson	Facilitates the Educators in understanding the different levels of cognitive competency in a sequential pattern
2. Discovery Learning & Inquiry-based Teaching model by Jerome Bruner	Following this theory, the Educators conduct "Inquiry-Based Teaching" and facilitate the learners in exploring and manifesting their pent-up creative potential, insight, and analytical acumen
3. ARCS MODEL by John Keller	Facilitates the Educators to comprehend the importance of <ul style="list-style-type: none"> • drawing the attention of the learners toward instructional inputs • establishing the relevance of instructional inputs in the life of the learners • triggering self-confidence within the learners to construe and apply the instructional inputs • satisfying the learners with the instructional inputs
4. Nine steps of Instruction by Robert Gagne	Facilitates the Educators in understanding the logic behind the sequential implementation of nine steps of instruction which will gradually enable the learners in understanding, applying, and retaining the academic/curricular inputs
5. Edgar Dale's Cone of Learning Experience	Facilitates the Educators in comprehending a comparative analysis of different instructional strategies for enabling the learners in retaining the learned inputs Facilitates the Educators to place emphasis on mechanisms like Peer to Peer Teaching, Demonstration by Learners, Documentation of learned inputs and narration of the documented topics, etc. for maximizing the retention capacity of the learners
6. Elaboration Theory by Charles Reigeluth	<ul style="list-style-type: none"> • Facilitates the Educators in understanding the rationale of establishing the sequence of instructional inputs from the simplest category to the most complex category • Facilitates the target audience to understand the logic of presenting the generalized version of a concept at first and then into the details of the concept
7. Cognitive Load Theory by John Sweller	Facilitates the Educators in understanding the logic of presenting a small volume of Instructional inputs at each of multiple steps of Instruction.
8. Cognitive Flexibility Theory by Spiro, Feltovich, and Coulson	Facilitates the Educators to give multifarious examples of a theoretical concept. The examples should be from diversified contextual frameworks. Each of the examples should be highly relevant to the theoretical concept
9. Generative Learning Theory by Merlin Wittrock	Adhering to this theory, an Educator facilitates the learners in the process of linking new ideas to old/existing ideas. As a consequence, the learners can achieve a better understanding of instructed concepts
10. SAM (Success Approximation Model by Dr. Michael Allen)	This model motivates Educators in designing and developing learner-friendly, conducive instructional inputs in an iterative manner
11. Keller Pan (by Fred Keller)	Facilitates the Educators in understanding the logic of individualized approach in the arena of learning and shaping instructional inputs on the basis of the need, capability, and learning style of individual learners.
12. Honey & Mumford's Theory on Learning Styles	Facilitates the Educators to understand that every learner has a unique learning style. Facilitates the Educator to design and implement a Blended Pedagogy covering diversified instructional methods conducive to each of the different learning styles for a group of heterogeneous learners characterized by the heterogeneity in learning styles

2.1.4. Objective-3: To connect the framework of Community of Inquiry with Blended learning

The Community of Inquiry (CoI) framework: Garrison, Anderson, and Archer (1999) were the first to bring forth a CoI model for educational developers in order to support organisation of online and blended educational experiences. It is a theoretical framework for the optimal design of online learning environments. It supplements for critical thinking, critical inquiry and discourses among students and teachers.

This model elucidates that learning occurs for a group of individual learners through the educational experience. This experience occurs at the commonality points of social, cognitive and teaching presence. According to Garrison et al. (1999), it is through the skillful marshalling of these forms of presence that online academic staff and students, in collaboration, develop a productive online learning environment through which knowledge is constructed.

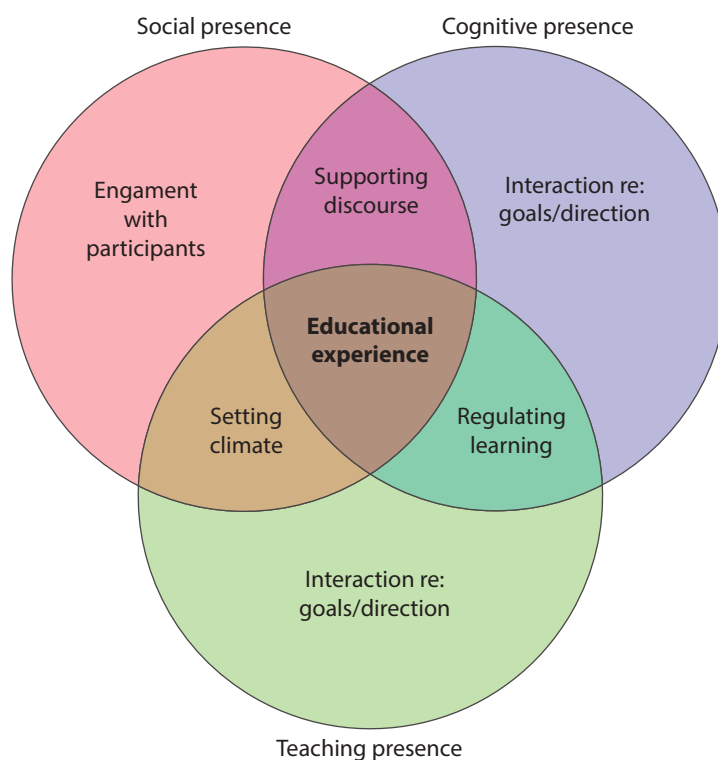


Figure 2. CoI elements of (Adopted from Garrison, Anderson & Archer, 2010)

Social Presence: This element deals with the ability of participants to identify with the community who communicate purposefully in a trusting environment, and thereby results into interpersonal relationships as a result of showcasing their individual personalities (Garrison et al., 1999).

Cognitive Presence: This element focuses on the learner's ability to construct and confirm meaning through sustained reflection and discourse in a critical Community of Inquiry (Garrison et al., 1999).

Teaching Presence: Here, the design, facilitation and direction of cognitive and social processes for the intent of determining personally meaningful and educationally worthwhile learning outcomes (Garrison et al., 1999).

This framework furnishes a dynamic platform/model towards an institutional approach. It emphasises teaching-learning from a passive lecture. It is characterised by educational experience based on thinking and learning collaboratively (Garrison, 2018). The distilling of technology and optimal implementation of it in online learning is a paradigm shift of the education process. Needless to mention that technology can support the elements of the CoI framework for online learners (Bektashi, 2018). The Community of Inquiry (CoI) framework has been one of the most used and researched educational frameworks and its principles are evoked in BL practices in higher education.

2.1.5 Objective-4: To establish the role of BL in creating inclusive learning environments

Some of the points may be considered here:

- The outreach must be enhanced in higher education followed by improving the transition rate of students.
- Improve the quality of higher education in the country.
- Increase the graduation rate and thereby the percentage of the graduate population in the country.
- Improve student engagement in learning activities, thereby improving learning outcomes.
- Help students take the onus of learning on themselves and evolve as lifelong self-learners.
- Help students achieve higher-order learning and emerge as knowledge creators.
- Help teachers and students align with the global trend of technology mediated teaching-learning.
- Embedding inclusive technologies to create a level playfield

According to recent researches, the key beneficial features of Blended Learning reverberate with the social constructivist theory of learning, CoI and several Instructional Designs discussed. The resonating points are as follows:

- **Opportunity for collaboration in distance mode:** There is a widened scope for individual students working together on a virtual environment assumed in a learning practice.
- **Increased flexibility:** Technology-enabled learning allows for learning anytime and anywhere, letting students learn without the barriers of time and location but with the possible support of in-person engagement. (Any speed, any mode, any language)
- **Increased interaction:** BL espouses a platform to mentor increased interactivity between students, and also among students and teachers.
- **Upgrading and enhancing learning:** Various supplementary learning activities enhance engagement and assist students in achieving greater learning outcomes and more meaningful levels of learning.
- **Supporting learning to become virtual citizens:** Learners practice the ability to place and exhibit themselves socially and academically in an online community of inquiry. In this context, digital learning skills are becoming imperative to be a lifelong learner. Blended courses are a big saviour to higher education teachers acquire the skills and competence for using a variety of contemporary technologies.
- It is significant to note that BL provides the provisions of experiencing and making learning resources repeatable, reliable, and reproducible.

3. Discussion & conclusion

This desktop review thus unfolds that given the collaboration, communication, and co-creation as rooted tenets in the community of enquiry, BL engenders innovative learning environments and fosters cross fertilisation of sustainable ideas. From multiple perspectives, BL evolves as a significant innovation in higher education context as occurring at the convergence of three presences: cognitive, teaching, and social. It rejuvenates with capabilities of adapting instructional designs and technology that can support and create global communities of distributed learners.

Apart from considering Blended Learning as a highly beneficial instructional methodology, it also highlights the transformation in the role of teachers in the Blended Learning Framework. It has been specifically surfaced through studies conducted that Blended Learning shifts the teacher's role from knowledge provider to coach and mentor.

Traditionally, classroom instruction has largely been teacher-directed, top-down, and one-size-fits-all, with a bit of differentiation thrown in, but with BL, it now becomes more student-driven, bottom-up, and customized, with differentiation as a main feature.

It is reinstated and strongly believed that BL capitulates frequent and increased personal teacher interaction with each student. Teachers can deepen and strengthen student-teacher relationships. The trust that comes with close relationships can give teachers insights into students' struggles and needs. Also, insights that empower teachers to comfort and coach students through challenges that often serve as obstacles to learning.

In the present scenario it is felt in order to successfully practice BL the concerns like-

- Proper understanding of blended learning
- Knowledge about instructional design and competencies
- Skills and competence about ICT tools

- Knowledge and use of OERs (Guidelines for Open Educational Resources (OER) in Higher Education, 2011; Moist, 2017; Munro, Omassi, & Yano, 2016)
- Implications about learning interventions

are very much imperative among teachers and students in recognising the power of BL in distilling innovations in higher education and rejuvenating 21st century skills for global learners.

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70-Quality Assurance in Distance Education in India: A Paradigm Shift

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Abstract

Quality assurance in education means the practice of managing the way education is provided to make sure that it always maintains a high standard and meets social needs. Quality has become the defining element of education in the 21st Century in the context of new social realities. The Millennium Development Goals of the United Nations (MDGs, 2002) consider knowledge as the prime mover of development in the new millennium. The Sustainable Development Goals-4 (SDG-4, 2015) is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. The National Education Policy 2020 of India gives due importance to Lifelong Learning (Ch. 21) which is aligned with SDG-4. The NEP document also includes the provisions for digital learning (Ch.23) and technology in education (Ch. 24). Digital learning and the use of technology in education actually promote lifelong learning. The open and distance learning (ODL) system with its inherent features addresses the issue of accessibility in higher education. To make our society a knowledge society or to transform the young people of India into a demographic dividend, the distance education system plays a pivotal role in the country. Currently, the enrolment in the ODL system in the country is about 11.1% of total enrolment in higher education. The share of distance education in the GER in India is about 22-23%. The open and Distance Learning system in the country's higher education sector plays a pivotal role because of its major contribution to enhancing the gross enrolment ratio and democratization of education to the large population to meet the demands of lifelong learning. How to provide quality education to large numbers at affordable costs is the primary concern for all higher education institutions. Quality becomes the defining element of education and the acquisition of quality and excellence is the great challenge of today's higher education institutions.

To address the concern of quality in higher education, several countries have developed assessment and accreditation systems. Accreditation ensures the HEI for its credibility and ensures the quality of education and services they provide. The National Assessment and Accreditation Council (NAAC) of India introduced an assessment and accreditation framework for open universities and dual-mode universities in 2019. The paper intends to describe the quality assurance system applicable to ODL institutions in India and the challenges faced by them to be accredited to achieve the quality benchmark set by the NAAC.

Keywords: *Open and Distance Learning, quality assurance, excellence, accreditation, NAAC.*

1. Introduction

The primary objective of establishing the open and distance learning institutions in India was to make available an opportunity for higher education to every part of the society who have been deprived of higher education, may be because of family constraints, poor economic conditions etc. Open universities have been a remarkable development of the 20th century that have introduced the learner-centric approach as opposed to the century-old traditional teacher-centric approach in the education system. Over the period, different state governments of the country established Open Universities in their respective states to impart higher education in their regional language with the objective to reach the unreached at affordable costs. OUs are known for their openness or flexibility regarding entry in terms of eligibility criteria as well as choice of courses. Thus, they can cater to large numbers and reduce social exclusion by widening participation. Distance learning as a mode of education has seen phenomenal growth over the years, especially during the last decade. While increasing demand for education, population growth, and competitive dynamics are important factors fuelling this growth of ODL system. ODL is indeed a necessity considering the massive requirements of education and bridging

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skill gaps. Distance learning has successfully addressed the requirements of imparting education to a great extent. However, there have been serious challenges as well. The biggest drawback of distance education is that it does not offer the learning experience and environment which is made available to students in a conventional University.

Quality assurance in education means the practice of managing the way education is provided to make sure that it always maintains a standard that fulfils the needs of all the stakeholders and society as a whole. Quality has become the defining element of education in the 21st Century in the context of new social realities. The Millennium Development Goals of the United Nations (MDGs, 2002) consider knowledge as the prime mover of development in the new millennium. How to provide quality education to large numbers at affordable costs is the primary concern of developing countries. The Sustainable Development Goal-4 (UNESCO, 2015) is to ensure inclusive and equitable quality education and promote lifelong learning opportunities for all. In this context quality and excellence should be the vision of every higher education institution. Acquisition of quality and excellence is the great challenge faced by all higher education institutions nowadays.

It is important for an institution to set its own quality parameters which can integrate the requirements of external scrutiny with internal review processes to maintain a focus on quality benchmarks and to address future development and the enhancement of quality as an ongoing process. It is essential that quality assurance is embedded in the quality framework within which the institution's core activities are carried out. An efficient academic and administrative management is necessary i) to frame the syllabus of a subject suited to meet the demands of society, ii) to have the academic content prepared by the faculties, iii) to impart them through different media, iv) to assure the students of jobs, v) to conduct examinations through an efficient mechanism, vi) to publish the error-free results in time and vii) to analyze the feedback from the stakeholders for making improvement in the system.

Quality is simply fitness for purpose at minimum cost to the society i.e., it means customers satisfaction with a product or its fitness for its particular purpose. Quality assurance is a continuing process for maintaining and improving quality. Again, quality in Distance Education is both visible and invisible. The criteria for a quality product and quality service are distinct in their objectives because service is often invisible and cannot be stored. Since we are dealing with the ODL system, both the product and service are involved in this system of education. The product is visible. e.g., Self-Learning Materials (SLM), etc. Again, the students can be taken as the product as the marketability of a product depends upon quality. Therefore, maintenance of quality is a major requirement in ODL systems. At this stage, we must ensure better quality at each of the academic-related services like Course curriculum, Quality of teacher, Teaching Methodology, and Evaluation process and ICT-driven services. The non-academic support services include the distribution of SLMs, home assignments, timely holding of examinations, and publication of results etc.

The quality can be seen to meet the stakeholder's expectations. In the ODL system the stakeholders can be the learners, counselors, or employers, e.g., a well-prepared course material and well-designed student support services may meet the learner's expectation whereas for an employer the emphasis may be on skills learned which are to be used by the pass out learners (product) at the workplace.

The success of the open universities in India lies in their unique features like flexibility regarding eligibility criteria, choice of courses, selection of subject combination, and the duration of the completion of the programme. The phenomenal growth in terms of enrolment has made open universities the fastest-growing educational system in the country. The system has not only democratized higher education among larger segments of the population but also facilitated inclusive growth by including the excluded, particularly the disadvantaged people. As highlighted in the National Education Policy 2020, the need for continuous and lifelong education and the challenges in the diversification of education through flexible modes of delivery also led to the popularity of ODL as a preferred mode of education in India.

2. Method/Approach

The present study is a descriptive one that shows how the operational aspects including the teaching-learning system have been improved after the introduction of the system of NAAC assessment and accreditation in the ODLs. The role of the regulatory authority i.e., the University Grants Commission (UGC) and the accreditation agency i.e., the National Assessment & Accreditation Council (NAAC) of India in the light of National Education Policy 2020 to enhance the quality of the educational services of the open universities in India has been discussed.

3. Open Universities in India

India is one of the earliest countries to introduce an open university system. In 1962, correspondence courses were introduced at the University of Delhi through the School of Open Learning. The first open university was established in Andhra Pradesh namely Dr. B.R. Ambedkar Open University in 1982. The national open university, Indira Gandhi National Open University (IGNOU) was established in 1985. Currently, the enrolment in the ODL system in the country is about 11.1% of total enrolment in higher education of which 44.5% are female students (Annual Report 2021-22, Ministry of Education, [MoE], Govt. of India [GoI]). The share of distance education in the GER in India is about 22-23%. Open and distance learning system plays a pivotal role in the higher education system in India because of their major contribution to enhancing the gross enrolment ratio and democratization of education to large sections of the Indian population particularly to reach out to the unreached and to meet the demands of lifelong learning. The success of ODL in the country is due to its flexibility and accessibility. The New Education Policy 2020 has set a target to achieve 50% GER by 2035. This mammoth task can only be accomplished through an open and distance learning system. The other aspect of open universities is that all such universities offer courses in their regional languages. The Open and Distance Learning (ODL) system is perhaps the only system that has been planned in such a way that it is able to cater to all those who desire to seek Higher Education although they are in a disadvantageous position due to social, economic, and other reasons. Also, to cater to the increasing demand for Higher Education, flexibilities in terms of age, qualification, location, time, etc., have been introduced to make the ODL system learner-friendly. Currently, there are sixteen open universities, and over one-hundred dual-mode universities are offering academic programmes through open and distance learning mode.

Several factors are responsible for increasing concern for quality in higher education. The growing mobility of students, ever-increasing competition among educational institutions, and increasing demand for transparency are the major factors that influence HEIs to devise quality assurance mechanisms for their sustenance. Accreditation certifies the HEI for its credibility and builds public confidence. The main aim of accreditation is the improvement of the quality and accountability of the institution.

To address the concern of quality in higher education, several countries have developed assessment and accreditation systems. The parameters of the quality assurance mechanism are identified to facilitate academic mobility at the national level and at the international level. Accreditation ensures the HEI for its credibility and helps prospective students to choose the programs of their choice. Though the programmes have been offered under the ODL system in India since 1982, there was no quality assurance system or mechanism for monitoring the ODL programmes as well as to ensure the quality of services that the ODLIs provide. The National Assessment and Accreditation Council (NAAC) of India introduced an assessment and accreditation framework for open universities and dual-mode universities in 2019.

4. Assessment and Accreditation System of ODLIs

The NAAC was established by UGC in 1994 as an autonomous body with the mandate to assess and accredit higher education institutions in the country. The NAAC conducts assessment and accreditation (A & A) of Higher Educational Institutions (HEIs) such as colleges, universities, or other recognized institutions to derive an understanding of the 'Quality Status' of the institution. It evaluates the institutions for their conformance to the standards of quality in terms of their performance related to the educational processes and outcomes, curriculum coverage, teaching-learning processes, faculty, research, infrastructure, learning resources, governance, financial well-being, and student services. The system of assessment is based on qualitative and quantitative indicators. The NAAC methodology for Assessment and Accreditation is very much like that followed by Quality Assurance (QA) agencies across the world and consists of self-assessment by the institution along with external peer assessment. Accordingly, in order to ensure external and internal validity and credibility, the QA process of NAAC is grounded within a value framework that is suitable and appropriate to the National context. The criteria-based assessment on both quantity and quality parameters forms the backbone of the A & A process of NAAC. In accordance with the University Grants Commission (Open and Distance Learning Programmes and Online Programmes) Regulations, 2020, it is mandatory for universities offering programmes in ODL mode to comply with University Grants Commission (Mandatory Assessment and Accreditation of Higher Educational Institutions) Regulations, 2012 and apply for assessment and accreditation of the programmes offered by it in Open and Distance Learning (ODL) mode.

The seven criteria for A&A of conventional HEIs have been adopted for the ODL Institutions by NAAC. The Key Indicators under each criterion focus on ODL system and its multifarious activities. The weightage for the seven criteria of the conventional HEIs has been modified to represent the ODL system without changing the overall score in order to maintain parity with the conventional system. The seven criteria represent the core functions and activities of an open university. In the framework, not only the academic and administrative aspects of institutional functioning but also the emerging issues have been included. The Criteria to serve as the basis for the assessment of open universities, identified by the NAAC are:

i) Curricular Aspects, ii) Teaching-Learning and Evaluation, iii) Research, Innovations and Extension, iv) Infrastructure and Learning Resources, v) Learner Support and Progression, vi) Governance, Leadership, and Management and vii) Institutional Values and Best Practices.

The self-study report (SSR) is designed in such a way to cover these areas. The validation of the self-study report and subsequent assessment leads to an overall institutional grade and detailed qualitative report highlighting the strengths and weaknesses of the institution under various criteria. The assessment criteria also include feedback from different stakeholders viz. students, alumni, faculties, subject experts, employers, parents etc. The feedback from the students carries maximum weightage.

Under each Criterion, Key Indicators (KIs) are identified. These KIs are further delineated as Metrics, which elicit responses from the HEIs. The role of HEIs is significant in human resource development and capacity building of individuals, to cater to the needs of the economy, society, and the country thereby, contributing to the development of the Nation. Serving the cause of social justice, ensuring equity, and increasing access to higher education are a few ways by which HEIs can contribute to national development. It is therefore appropriate that the Assessment and Accreditation (A&A) process of NAAC looks into the ways HEIs have been responding to and contributing towards national development. NAAC's accreditation process has helped the ODLIs to know their strength, weakness and opportunities, and challenges. The NAAC has been taking nationwide initiatives for performance evaluation, accreditation, and quality upgradation, of higher education institutions including open universities. As per UGC (ODL & OL Programmes) Regulations 2020, every open university must be accredited within a time frame as stipulated by the UGC and the institution should have been in existence for at least five years or at least two batches should have passed out from the university.

5. Present Status

It is realized that unless we open the educational opportunities to the deprived unless we remove the structural rigidities in our educational system, and unless we integrate communication technology with the education system, we cannot make available education to the mass as well as to cater to the diverse needs of the education that the present and modern society demands. To overcome the deficiencies of the conventional system as stated and to increase the accessibility of higher education, the open university system for imparting higher education has been popularized significantly in India. Over the period, different State Governments established the Open University in their respective states to impart higher education in India. This step no doubt has increased the GER in the country. In addition to that, the open and distance have a major role in capacity building rather than just awarding degrees. The OU system also gives the person an opportunity to earn the degree while working without disturbing his/ her workplace.

Presently, open universities in India have to follow the guidelines as laid down by the UGC (ODL Programmes and Online Programmes) Regulations 2020 and the NAAC quality framework. Since 2019, after the implementation of the NAAC-A & A system, all the open universities took the necessary steps to be assessed by NAAC. The academic and administrative audit of the institution is based on self-assessment and site visits. It focuses on the key areas of teaching and learning, research, governance, infrastructure, finance, and the adequacy of the institution's quality assurance mechanism, etc.

After completion of NAAC A & A process, it has been observed that all the open universities have improved their services including the teaching-learning system significantly. They have incorporated the ICT components in the university system and judiciously used the ICT component to scale up their academic and administrative activities with quality benchmarks. Out of total of sixteen Open Universities in India, eleven universities are already accredited and for three universities, the process is going on. The other two state-open universities are not eligible now (Table 1).

Sl. No.	Name of the University	Year of establishment	NAAC Grade
1	Indira Gandhi National Open University	1985 (Central university)	A++
2	Dr. B.R. Ambedkar Open University	1982 (Andhra Pradesh)	B++
3	Nalanda Open University	1987 (Bihar)	#
4	Vardhaman Mahavir Open University	1987 (Rajasthan)	#
5	Yashwantrao Chavan Maharashtra Open University	1989 (Maharashtra)	A
6	MP Bhoj Open University	1991 (Madhya Pradesh)	#
7	Dr. Babasaheb Ambedkar Open University	1994 (Gujarat)	A++
8	Karnataka State Open University	1996 (Karnataka)	A+
9	Netaji Subhas Open University	1997 (West Bengal)	A
10	UP Rajarshi Tandon Open University	1999 (Uttar Pradesh)	B+
11	Tamil Nadu Open University	2002 (Tamil Nadu)	A+
12	Pandit Sundarlal Saharma Open University	2005 (Chhattisgarh)	A+
13	Uttarakhand Open University	2005 (Uttarakhand)	B++
14	Krishna Kaanta Handiqui State Open University	2006 (Assam)	B+
15	Jagat Guru Nanak Dev Punjab State Open University	2019 (Punjab)	NA
16	Sreenarayanaguru Open University	2020 (Kerala)	NA

#Assessment and accreditation are under process.

Table 1: Open Universities in India

6. Conclusion

The assessment and accreditation process were a learning experience for all the open universities as there was no such system of audit mechanism prior to 2019. The NAAC manual and Self Study Report (SSR), published by the NAAC were the comprehensive documents to follow for A & A process. As per the mandate of UGC, all the open universities (OUs) had to be accredited within one year from the date of publication of these documents, naturally, the assessment period was five years prior to the date of their publication, and the OUs were not prepared for such gigantic task of documentation and other related activities. All the OUs had to prepare the documentary evidence to claim the weightage in respect of quantitative and qualitative parameters as per SSR. Most of the universities did not have sufficient faculties, IT-related infrastructure, and other resources. Due to the implementation of quality assessment parameters, the universities had to take various initiatives to meet the quality benchmark as set by NAAC. Table 1 shows that the OUs in India have sufficient infrastructure to provide quality education and services to all stakeholders so far as the grade is concerned. Overall improvement has been witnessed in all the criteria as delineated in the SSR viz. i) Curricular Aspects, ii) Teaching-Learning and Evaluation, iii) Research, Innovations and Extension, iv) Infrastructure and Learning Resources, v) Learner Support and Progression, vi) Governance, Leadership, and Management and vii) Institutional Values and Best Practices which are nothing but the indicators of the quality status of an organization. The OUs in India have maintained both the qualitative and quantitative parameters to reach the benchmark as set by the accreditation agency.

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73-Systematic Literature Review on Effectivity of Online Mathematics Learning in Indonesia

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Abstract

Online mathematics learning has many advantages and can be a solution to improve the quality of mathematics learning for students. Therefore, research is needed to implement practical and effective online mathematics learning for students and teachers. This study describes the research results regarding the effectiveness of learning mathematics online. During the Covid-19 Pandemic, learning was online, including mathematics. Various journal articles report on the effectiveness of online mathematics learning. This study examines the effectiveness of online mathematics learning in Indonesia, published in national journals. The method used in this research is Systematic Literature Review (SLR) by applying the PRISMA (Preferred Reporting Items for Systematic Review) model. The search results obtained 34 articles about the effectiveness of online mathematics learning. After being selected, the results obtained were 21 articles published in SINTA-indexed journals, and these articles discussed topics that followed the objectives of this study. Furthermore, the article is reviewed according to the effectiveness of learning mathematics online. The effectiveness reported in the journal was classified based on three effectiveness groups: High, Medium, and Low. The quantification was based on the focus group discussions among the researchers about the percentage of sample units or information sources (students or teachers) who identified that the learning was practical. The standard for classification, the report results, namely: higher than 60% as high effectiveness, between 40% and 60% as medium effectiveness, and below 40% as low effectiveness. The data obtained were analyzed by descriptive qualitative. The results of the analysis show that online learning in Indonesia (1) 33,3% of research online mathematics learning reports were classified as high effectiveness, (2) 38,1% of the reports were classified as medium effectivity, and (3) 28.6% of the research reported as low effectiveness of learning. Recommendations for further research are the need to examine the factors that cause online mathematics learning. The effectiveness reported in the journal is classified based on three groups of effectiveness: High, Medium, and Low. Quantification is based on focus group discussions among researchers about the percentage of sample units or sources of information (students or teachers) identifying that learning is practical. The classification and report results standards are higher than 60% as high effectiveness, between 40% and 60% as medium effectiveness, and below 40% as low effectiveness. The data obtained were analyzed in a qualitative descriptive manner. The results of the analysis showed that online learning in Indonesia (1) 28.5% of research online mathematics learning reports were classified as high effectiveness, (2) 43% of reports were classified as medium effectiveness, and (3) 28.5% of studies reported low learning effectiveness. A recommendation for further research is the need to examine the factors that lead to the effectiveness of online mathematics learning.

Keywords: *Learning mathematics, learning effectiveness, SLR, PRISMA.*

1. Introduction

Online learning is a learning system carried out through the internet. It has risen since 1990, with higher education institutions investing considerable resources in e-learning technology (Deng & Tavares, 2013; Moore, 2013). Rapid technological developments have made distance education easy (McBrien et al., 2009). Where the rapid development of the internet due to globalization makes it easier to adopt learning from electronic devices (Mohammed et al., 2020). Innovations in artificial intelligence (Jain & Jain, 2019) and big data analytics make learning personalized and diverse, enabling learning beyond the traditional classroom and

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broadening students' horizons (Wong, 2020). In this digital era, online learning is very important because it helps expand the accessibility of learning for students and facilitates the teaching and learning process. In this case, online mathematics learning is one solution to improve students' mathematics learning quality (Hastuti, 2019).

It is undeniable that the world of education in all places began to recognize and implement the online learning process during the pandemic. Therefore, several existing studies on student experience during the pandemic have highlighted several advantages of online learning, such as flexible learning access (Dost, Hossain, Shehab, Abdelwahed, & Al-Nusair, 2020; Mulrooney & Kelly, 2020), reduced travel time and academic independence (Abu et al., 2021), flexible final assessments (Petillion & McNeil, 2020), and opportunities for students to explore new perspectives and ways of connecting (Mucci-Ferris, Grabsch, & Bobo, 2021). So that online mathematics learning has several advantages, including (1) Providing wider learning accessibility for students because they can learn anytime and anywhere (Cojocariu et al., 2014; Gems, 2020), (2) Improve interaction between students and teachers because they can communicate in real-time via chat or video call (McBrien et al., 2009; Singh & Thurman, 2019; Permata, 2020), (3) Increase student creativity and initiative because they can learn independently and have the flexibility to work on assignments and repeat material according to their needs, and (4) Simplify the monitoring and evaluation process because teachers can easily monitor student progress and provide feedback quickly (Permata, 2020).

Overall, online mathematics learning has many advantages and can be a solution to improve the quality of mathematics learning for students. Therefore, there is a need for a good and effective implementation of online mathematics learning for students and teachers. This study aims to describe the research results on the effectiveness of online mathematics learning in Indonesia. In the context of this study, a systematic review can be defined as an examination of formulated questions that use systematic and explicit methods to identify, select, and critically assess relevant research studies and analyze their data (Higgins et al., 2011). Systematic reviews also seek to investigate secondary data by logically, clearly, and analytically obtaining, synthesizing, and evaluating information present on a subject (Martin et al., 2020). The methods implemented in this review make it possible to identify the level of effectiveness that occurs based on several aspects, see gaps and determine the direction for future research related to the effectiveness of online mathematics learning. Based on the analysis in SLR and meta-analysis can show trends, identify gaps, and results from comparisons (Mengist et al., 2020; Del Amo, 2018). The systematic review also allows researchers to identify patterns in previous studies and help them understand related issues that can provide insight into the range of online mathematics learning in Indonesia.

2. Method

This research is a systematic review of research reports in accredited national journals. Systematic Literature Review (SLR) using PRISMA is a method used to systematically review existing literature and sources in a field of research. PRISMA stands for Preferred Reporting Items for Systematic Reviews and Meta-Analyses, a widely accepted standard for reporting SLR results. PRISMA helps ensure that the SLR process is carried out with a consistent and transparent methodology, making it easier for other researchers to evaluate SLR results.

PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) is a framework or checklist that helps ensure that Systematic Literature Review (SLR) reports meet generally accepted standards of quality and transparency. PRISMA has 27 items that should be covered in the SLR results report, such as a description of the methodology, how the database is searched, inclusion/exclusion criteria, the number and type of sources used, and final results. Using PRISMA helps ensure that SLR results are trustworthy and reproducible to other researchers.

Technological advancements have brought significant changes in how education is delivered, with online learning becoming an increasingly popular option. This systematic literature review examines the current state of research on online mathematics education using Prism guidelines (the preferred reporting item for systematic review and meta-analysis). The PRISMA framework has four categorical areas that any researcher will go through systematically. Each section will undergo a rigorous downsizing in which the researcher can analyze the depth of the research he or she is following. Four category areas include Identification, screening, eligibility, and included (Moher et al., 2009).

2.1. Identification

Identification is a procedure used to increase the significance of the keywords used. Identification is important because the identification procedure increases the likelihood of receiving more relevant articles for review (Moher et al., 2009). This systematic literature review uses the familiar database identity Google Scholar. Google Scholar is a database that allows independent and extensive research in various fields; easy access is also easy. According to Halevi et al. (2017), Google Scholar has expanded its scope over the years, making it a powerful database of scholarly literature. Although online education is growing globally, our focus is to explore insights into the effectiveness of online mathematics learning in Indonesia because education patterns differ from one country to another and from different geographical regions; hence, in the search process through search engines using Indonesian keywords such as “The effectiveness of online mathematics learning” or “The effectiveness of online mathematics learning”, or “The effectiveness of distance mathematics learning” obtained as many as 22,300 articles.

2.2. Screening

In this phase, 22,300 articles were netted from the Google Scholar database. The article is taken to the next stage of this systematic literature review, i.e., it is examined in detail to meet the criteria set by the researcher. The selected article must pass criteria set by the researcher, such as relevance and period. The study used a two-year timeframe (i.e., publications published between 2020 and 2022) as it offered many articles discussing the state of online mathematics learning at the time of Covid-19. So it gets 578 articles netted. In addition, we set an updated timeframe for obtaining the latest data and research on online maths learning. Further discussion is summarized in Table 2.

2.3. Eligibility

The second screening stage checks that all articles that pass the first screening stage conform to the standard. The article is re-evaluated for review throughout this stage based on the title and abstract. If the author still needs clarification about the content, they decide to explore the content of the selected article. At this stage, only articles that pass all requirements in two stages and meet the eligibility criteria are selected by the researcher. Aspects of exceptions include books, book series, chapters within books, systematic review articles, conference proceedings, and those published other than the 2020-2022 range included to obtain accurate and quality data. The exceptions helped us eliminate several irrelevant articles and found that only 34 articles met the criteria.

2.4. Included

Based on the researcher’s focus is to explore insights into the effectiveness of online mathematics learning in Indonesia; therefore, the factor considered for Inclusion only involves national journals indexed by SINTA. By being indexed in the SINTA Journal, scientific journals will get recognition and trust from the academic community and can be accessed by researchers and practitioners throughout Indonesia. The index in SINTA indicates the journal’s reputation from S-1 to S-6. Articles published in journals not SINTA accredited were not further included in this study. The selection of articles resulted in 21 articles.

The remaining articles are then evaluated and analyzed. The researchers were asked to extract all relevant data from selected articles before analysis, with the study’s research questions guiding the procedure. Since the review focused on primary and empirical data from selected previous studies, we first searched three relevant areas of the paper, namely abstracts, findings, and discussion, before moving on to other sections to search for related material. Following the review sheet, the required data are compiled to facilitate the synthesis process. In determining the effectiveness score, researchers use the results of written reports directly in the article (in the form of percentages) or interpretations based on predetermined intervals by researchers, as in Table.1. For some cases where there is more than 1 cycle in the research results, the effectiveness calculation is generated from the average.

Table 1. Interval skor efektivitas

No	Interval	Category
1	< 40%	Ineffective
2	> 40% & < 60%	Quite Effective
3	> 60%	Effective

3. Findings

After going through four stages of identifying articles worthy of this systematic literature review analysis, 21 publications related to online mathematics learning were found. Based on the systematic literature review protocol, data were collected as described in Table 2. Table 2 outlines categories of effectiveness in mathematics online learning.

Table 2. Summary of the articles included.

No	Authors/Year	Journal/Indeks SINTA	Title	Conclusion	Category
1	Kusumaningrum, B. & Wijayanto, Z. (2020)	Kreano/S-2	Is Online Maths Learning Effective? (Case Study on Learning During the Covid-19 Pandemic)	Research subjects in general (almost 75% of research subjects) were not able to understand the lecture material well (p. 138)	Ineffective
2	Agustini, W. T., & Salayan, M. (2021)	MAJU/S-5	The Effectiveness of Online Learning in Mathematics Subjects During the Covid-19 Pandemic at Mts. Private Nurul Amaliyah Tanjung Morawa	From the calculation of the percentage of student response to online learning in mathematics subjects is 52.91% with the qualification criterion "less effective". This happens because students are not motivated to participate in online learning (p.417)	Quite Effective
3	Nurfaizah et.al. (2021)	ARITMATIK: Jurnal Riset Pendidikan Matematika/S-5	The effectiveness of WhatsApp-based mathematics learning is seen from student learning outcomes (during the Covid 19 pandemic)	However, when viewed from the response of WhatsApp students, it is considered less effective if used for online mathematics learning. When viewed from student learning outcomes, the results also tend to decrease due to students' limitations in asking questions and lack of delivery of material delivered by teachers. (p. 113)	Ineffective
4	Krisna, E. D., & Suryati, N. K. (2022)	PENDIPA Journal of Science Education/S-4	The Effectiveness of Online Mathematics Learning at SMK TI Bali Global Denpasar During the Covid-19 Pandemic	These policies and strategies are good enough so that online learning at SMK TI Global Denpasar is quite effective and can run well. (p. 216)	Quite Effective
5	Effendi, A. et.al. (2021)	Teorema: Teori dan Riset Matematika/S-3	Analysis of the Effectiveness of Online Mathematics Learning during the Covid-19 Pandemic	Online learning in the Mathematics Education Study Program of FKIP Galuh University is still ineffective because lecturers and students have not maximally prepared themselves in the online learning process (p. 257)	Quite Effective
6	Putry, K. P. et.al. (2021)	Jurnal Serunai Matematika/S-5	The effectiveness of online mathematics learning during the Covid-19 pandemic on the ability to think creatively in mathematics of elementary school students	Thus, it can be concluded that mathematics learning carried out using online learning on the creative thinking ability of elementary school students is effective (p. 21)	Effective
7	Sugandi, A. I. et.al. (2020)	AKSIOMA: Jurnal Program Studi Pendidikan Matematika/S-2	The effectiveness of Geogebra-assisted problem-based online learning on mathematical reasoning skills in the Covid-19 era	Learning using a problem-based model assisted by Geogebra in online learning is more effective than using a problem-based model or ordinary learning on the mathematical reasoning ability of vocational students (p. 1002)	Effective
8	Humalangi, A. et.al. (2022)	Jambura Journal of Mathematics Education/S-3	The Effectiveness of Online Learning of the Mathematics Education Study Program, Gorontalo State University	It can be concluded that the effectiveness of online learning in the mathematics education study program of Gorontalo State University is classified as effective based on three aspects, namely aspects of online learning planning, aspects of online learning activities and aspects of online learning media and facilities. (p. 144)	Effective

No	Authors/Year	Journal/Indeks SINTA	Title	Conclusion	Category
9	Aminullah (2021)	Jurnal Ganec Swara/S-5	The Effectiveness of Mathematics Learning Using Online Systems	The effectiveness of mathematics learning using an online system after being carried out for 1 semester or 14 meetings obtained an average student score of 75.50 with a specified target of 70. This means that it is effective when viewed classically. (p. 1003)	Effective
10	Arifin, M., & Chotimah, S. (2021)	Jurnal Cendekia: Jurnal Pendidikan Matematika/S-3	Analysis of the Effectiveness of Online Mathematics Learning for Junior High School Students in Bekasi Regency During the Covid-19 Pandemic	Based on figure 3, as many as 57.1% of students answered less effectively, 35.7% of students answered effectively and 7.1% of students answered ineffectively. Judging from the answer above that online mathematics learning is less effective. (p. 2456)	Ineffective
11	Ghasya, D. A. V. et.al. (2021)	Jurnal Numeracy/S-4	Analysis of the Implementation of Distance Learning in Mathematics Subjects in Higher Grades of Elementary Schools During the Covid-19 Pandemic	The difficulty of grade IV, V and VI elementary school students in participating in distance learning in Mathematics subjects is that sometimes it is difficult to understand abstract material and is bored with learning patterns from home (p. 54)	Ineffective
12	Irmayanti (2022)	Tarbiyah wa Ta'lim: Jurnal Penelitian Pendidikan dan Pembelajaran/S-4	Improving Mathematics Learning Outcomes with Online Methods in Distance Learning	The test results showed completeness in achieving KKM 78 only in 89 students (49.2%), meaning that there were 92 students (50.8%) who did not reach KKM. (p.66) Learning outcomes test at the end of cycle II, as many as 58.56% (106 out of 181 students) achieved a score of ≥ 78 which means reaching KKM. (p. 71)	Quite Effective
13	Melisa & Zulkarnaen, R. (2022)	Jurnal Pembelajaran Matematika Inovatif/S-3	The Impact of Distance Learning on the Conception of Class XII Vocational Students on Statistics Material	The percentage of difficulty of students as many as 68 subjects in solving statistical problems with a high category, namely in the second indicator of 73%. (p. 551)	Ineffective
14	Herzamaz, D. A. (2021)	Edukatif: Jurnal Ilmu Pendidikan/S-4	Distance Learning using the Zoom Application in the Mathematics Education Course of SD 1	Research data showed that as many as 27 respondents showed that (1) as many as 3 students' answers admitted that it was difficult to understand when learning online using zoom, (2) as many as 2 understood only part of the learning and 22 understood and were able to apply the material well learning, this was seen from the exposure of students during presentations and discussion of practice questions in everyday life in mathematics. (p. 2671)	Effective
15	Tute, K. J., & Suryani, L. (2021)	AKSIOMA: Jurnal Program Studi Pendidikan Matematika/S-2	The Effectiveness of Distance Learning during the Covid 19 Pandemic in Mathematics Education Students of the University of Flores	The current learning process is quite effective although there are still some obstacles in distance learning such as problems of social interaction between lecturers and students and student economics is not ready (p. 2845)	Quite Effective
16	Djeni, D., & Nasikhah, J. (2022)	Al-Fikru: Jurnal Pendidikan Dan Sains/S-4	The Effectiveness of Online Learning with Google Education's Integrated E-Module in Class VIII Mathematics Subjects	The results showed that the implementation of google education integrated e book is effective with interest Mathematics subject increasing 55,6% on the first meet, the second meet to be 83% (p.44)	Effective

No	Authors/Year	Journal/Indeks SINTA	Title	Conclusion	Category
17	Harahap, M. S. et.al. (2022)	JURNAL MathEdu (Mathematic Education Journal)/S-5	The Effectiveness of Youtube-Based Online Learning on Mathematical Problem Solving Ability	The application of YouTube-based online learning is effective for student KPMM as seen from the average n-gain score of 0.90 which is in the "High" category and the completeness of student learning is proven by the completion of 17 students with an average score of 94.3. Based on the results of the study above, researchers concluded that the effectiveness of YouTube-Based Online Learning Implementation can Increase Student KPMM at SMP Negeri 4 Padangsidempuan. (p.77)	Effective
18	Rahma, N. A., & Pujiastuti, H. (2021)	JOHME: Journal of Holistic Mathematics Education/S-3	The Effectiveness of Mathematics Online Learning During the Covid-19 Pandemic in Cilegon City	It was found that the results showed an average of 60.6365% or fell into the category of quite effective (p.10)	Quite Effective
19	Yustitia, V., & Kusmaharti, D. (2021)	Elementary School: Jurnal Pendidikan Dan Pembelajaran Ke Sd-An/S-4	The Effectiveness of Online Mathematics Learning: A Case Study on PGSD Students During the Covid-19 Pandemic	The test result data is in line with the results of the questionnaire which stated that 74% of research subjects did not understand the material studied. (p. 255)	Ineffective
20	Zahrah, N. A., & Pujiastuti, H. (2021)	AKSIOMA: Jurnal Matematika dan Pendidikan Matematika/S-4	The Effectiveness of Online Learning Using GoogleClassroom in High School Mathematics Subjects	After calculating the average of the three indicators, it was concluded that the use of Google Classroom in online learning in high school subjects was categorized as quite effective, with an average result of 44.23% (p.284-285)	Quite Effective
21	Sudiarta, I. W. et.al. (2021)	Suluh Pendidikan (Jurnal Ilmu-Ilmu Pendidikan)/S-6	The Effectiveness of Online Mathematics Learning During the Covid-19 Pandemic on Students' Critical Thinking Skills	Online mathematics learning is still quite effective to foster students' critical thinking skills during the COVID-19 pandemic (p.42)	Quite Effective

This review shows that online mathematics learning in Indonesia is considered effective, with a percentage achievement more likely to lead to effective and quite effective results (figure 1). Many things become a reference in measuring the effectiveness of mathematics online learning obtained in the results of the study process, namely: 1) Student understanding (Kusumaningrum & Wijayanto, 2020; Zahrah & Pujiastuti, 2021; Irmayanti, 2022; Melisa & Zulkarnaen, 2022), 2) Student Satisfaction (Agustini & Salayan, 2021), 3) Learning Completeness (Sinambela, 2006, Putry et al., 2021; Mardiaty, & Panjaitan, 2021; Aminullah, 2021), 4) Mathematical Reasoning Ability (Sugandi et al., 2020), 5) Online Learning Planning (Ghasya et al., 2021), Online Learning Activities, Media and Online Learning Facilities (Sinambela, 2006; Humalangi et al., 2022), 6) Learning Outcomes (Aminullah, 2021), 7) Aspects of Facilities used, Human Resources and Student Economic Life (Sinambela, 2006; Tute & Suryani, 2021), 8) Attitudes / Responses to Online Learning (Sinambela, 2006; Zahrah & Pujiastuti, 2021), and 9) Critical Thinking (Sudiarta et al., 2021).

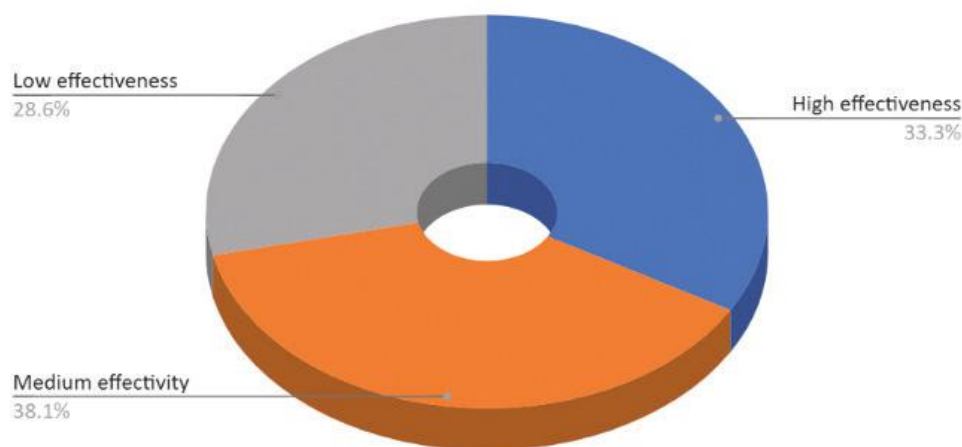


Figure 1. Results of the effectiveness of online learning in Indonesia

Research samples that fall into the effective category use various interesting online learning support applications and video conferencing. So that students can do assignments by enjoying and maximizing the work on their assignments and assessments (Djeni & Nasikhah, 2022). Online learning platforms that can be widely accessed have various facilities that support online learning and are integrated with various applications in the same ecosystem is great support for online learning activities (Zahrah & Pujiastuti, 2021).

However, it is undeniable that limited space that forces students who are not mentally prepared to do online learning is an additional trigger for the difficulty of learning mathematics online, apart from the type of mathematics material itself, which, through face-to-face learning alone, is not easy to understand. Various obstacles in online learning that are felt by both teachers/lecturers and students trigger online learning to be less effective. External factors related to economic conditions and geographical conditions, such as the availability of online learning devices, internet quota and network stability (Kusumaningrum, & Wijayanto, 2020; Agustini & Salayan, 2021; Krisna & Suryati, 2021; Effendi et al., 2021; Tute & Syriac, 2021; Arifin, & Chotimah, 2021; Ghasya, et.al., 2021; Yustitia & Kusmaharti, 2021) causes students to have difficulty understanding the mathematics material provided online. However, external factors are not the only triggers for the lack of effectiveness of online mathematics learning. Internal factors such as readiness, discipline and student learning independence are also causes (Effendi et al., 2021; Ghasya et al., 2021; Irmayanti, 2022). Students who feel unprepared will continue to feel that face-to-face learning is more enjoyable because of direct interaction with their friends and teachers/lecturers (Krisna & Suryati, 2021; Tute & Syriac, 2021). At the same time, students who need to be more disciplined in managing time with the tasks given will feel burdened with the demands of various online assignments. That is exacerbated by the condition of students' need for more independence in understanding mathematics learning material in asynchronous sessions (Irmayanti, 2022; Rahma & Pujiastuti, 2021; Melisa & Zulkarnaen, 2022)

Therefore, the skills of teachers and lecturers in using learning media innovations are expected to increase student learning motivation. Teachers/lecturers must also be skilled in maintaining students' enthusiasm for learning with intensive motivation efforts at the beginning of each lesson. Interaction design must be well planned, such as discussion session opportunities and repetition efforts with repeated question exercises (Kusumaningrum & Wijayanto, 2020; Irmayanti, 2022). Due to students' limitations in asking questions and lack of material delivery can result in ineffective online learning in mathematics (Nurfaizah et al., 2021; Melisa & Zulkarnaen, 2022). Important communication efforts are especially necessary for students who need more learning independence and constant direction (Irmayanti, 2022). In addition, students prefer learning materials that can be played back repeatedly to facilitate their understanding of the newly delivered material (Kusumaningrum & Wijayanto, 2020; Herzamzam, 2021; Yustitia & Kusmaharti, 2021). Of course, to prepare for this, lecturers and teachers must have good planning and supportive and adequate media and facilities (Humalangi et al., 2022). Even though this study has proven its effectiveness in classical mathematics online learning, the online system for mathematics learning has yet to be effective when viewed individually (Aminullah, 2021).

4. Discussion and Conclusion

The systematic literature review provides a comprehensive overview of current research on online mathematics learning in Indonesia. These findings suggest that online maths learning has the potential to offer several benefits, with the increasing aspect of technology integration most prominent, encouraging the use of digital tools, simulations, and interactive resources that enhance student engagement and understanding. However, some challenges must be addressed to ensure that online math education is effective and accessible to all students. Limited face-to-face interaction, technical difficulties, spirit of self-motivation and discipline, assessment and supervision, and lack of direct manipulatives. Therefore, effective strategies are needed to carry out mathematics learning remotely. Teachers and lecturers are expected to design engaging online content to increase student engagement and understanding, provide clear communication spaces, create collaborative learning, utilize synchronous sessions to interact directly, provide formative assessments to monitor student progress and utilize digital manipulatives or interactive tools to simulate live experiences and facilitate understanding of abstract mathematical concepts.

In conclusion, systematic literature reviews have shown that online mathematics education is a promising approach to teaching mathematics. However, much remains to be done to improve technology support, teacher training, and course design. This review highlights areas for future research, including the need to explore the suitability of online mathematics education for different types of students and the impact of online mathematics education on student learning outcomes.

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76-Effectiveness of Online Learning: Sri Lankan School Experience Amid Covid-19 and Economic Crisis

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Abstract

One of the learning applications which have become widespread with the opportunities provided by the internet is online learning. Online learning can be defined as acquisition of knowledge and skills through both synchronous and asynchronous learning applications which are written, communicated, active, supported and managed with the use of the Internet technology (Morrison, 2003). Online learning is a remedy for continuing learning activities in the education system during unusual circumstances in the world. COVID - 19 pandemic was a major threat to this world. Therefore, Sri Lanka was not an exception to this pandemic situation. After this pandemic situation, Sri Lankan economic conditions faced many challenges. Though there were various reasons for the economic downfall of the country, the effect of COVID-19 was the main reason for the economic crisis. COVID-19 Pandemic and Economic crisis affected various sectors of the country. Among them, the education system was one of the heavily affected sectors in the country. As many other countries, when Sri Lanka was hit by COVID-19 and following the economic crisis, teaching and learning was converted to online. At a time of COVID-19 and Economic crisis, Sri Lankan experience on online learning has not made many changes in teaching and learning due to various reasons. Individual factors and life attributes are two main aspects that influence students' online learning. Individual attributes relate to Help seeking, Persistence, Procrastination, Time management, and Locus of control while life factors resist on Time, Place, Reason, Resources, and Skills. Sri Lankan schools in different areas of the country have an unbalanced situation in acquiring the facility for online learning at school level. Schools in backward areas lack online facilities, whereas schools in cities go forward with the facility to access online education. Based on individual attributes and life factors of students in online learning, the main purpose speaks about explaining the state of the experience of Sri Lankan schools in online learning and how the state of experience can help to go forward in accommodating online teaching and learning in the Sri Lankan education system.

Keywords: *Online learning, School education, Individual attributes, Life Factors*

1. Introduction

Sri Lanka is heavily affected by Covid -19 pandemic and following the Economic Crisis since both situations started to affect all over the world. After COVID-19, Economic crisis was an inevitable situation in developing countries, because most of the developing countries were unable to develop their economy during COVID-19 Pandemic. As a result, they were heavily affected by economic downfall. Despite all sectors in the development of a country, education is one sector heavily affected by COVID-19 and Economic crisis in the world. The Sri Lankan education system was also affected by both situations. The COVID-19 viral pandemic is an unprecedented global phenomenon that is also a highly personal experience with wide-ranging effects in various sectors. Since the viral outbreak of COVID-19 Pandemic started in the world at the end of the year 2019, the highest level of health emergency evolved into a global economic crisis.

According to congressional Research Service Report (2021), the emergency evolved into a global public health and economic crisis that affected the \$90 trillion global economy beyond anything experienced in nearly a century. Like many other countries, the heaviest impacts of COVID-19 on the Sri Lankan economy have affected many of the developments of the country in various fields. The country level planning activities to develop the economy rate ended in failure. The reasons like an acute foreign currency shortage, looming debt

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repayments, high inflation and food fuel and medicine shortages due to that Island wide protests and unstable political system have caused the economic recession in Sri Lanka. School education system in Sri Lanka was heavily affected due to various reasons in the country Sri Lanka. One best solution for continuing education system in Sri Lanka was Online Education activity. All school children were engaged in online education. Though online education faced challenges during Covid-19 and Economic crisis in Sri Lanka, it was a way to continue the education system.

2. Online Learning amid Covid-19 and Economic crisis

Online learning has become the prima donna in the world of education amid the COVID-19 pandemic. With this increasing popularity, students' perceptions of the application of online learning have become a top priority for education. Conventional learning methods are no longer sufficient to meet the needs of the learning process. COVID-19 has resulted in schools shutting across the world. Globally, over 1.2 billion children are out of the classroom. As a result, education has changed dramatically, with the distinctive rise of e-learning, whereby teaching is undertaken remotely and on digital platforms. Research suggests that online learning has been shown to increase retention of information, and take less time, meaning the changes coronavirus have caused might be here to stay (World Economic Forum, 2020). One of the learning applications which have become widespread with the opportunities provided by the internet is online learning. Online learning can be defined as acquisition of knowledge and skills through both synchronous and asynchronous learning applications which are written, communicated, active, supported and managed with the use of the Internet technology (Morrison, 2003).

Online learning is like being the prima donna in the world of education amid the COVID19 pandemic. With this increasing popularity, students' perceptions of implementing online learning have become a top priority for their education. Online learning development is linked to development, technical improvements, and better computer affordability. In the late 80s and 90s, for the first time, online education and training was carried out Computer-Based Training (CBT) (Eger in (Hubackova, 2015).

3. Sri Lankan School Experience in Online Learning

This crisis would create a new generation for learning, allowing individuals to consider the positive aspects of e-learning technology. As a result, this worldwide pandemic has provided chances for countries to improve their education delivery system and shift their focus to create better technologies to help education (Khashunika, J.A.L, et.al 2023). Based on Sri Lankan school experience of Online Learning amid COVID-19 and Economic Crisis, it has made positive and negative effects towards students' learning. The effectiveness of Sri Lankan school experience in online learning decided by both aspects, such as Individual attributes and Life factors.

Schools should help students to develop a social presence and improve their capacity to reflect their personal qualities in the learning environment, eventually leading to their successful learning. But Online learning have advantages such as providing adequate education to even a thousand students at once, mobile learning, the possibility of watching past lectures, getting instant feedback from students, and easy arrangement of assignments.

Online learning in a school context provides a fantastic opportunity for educational technology start-ups to disrupt the conventional education industry through technical innovation. In addition, the further advantages of online learning at school level were reducing the time and costs for education, flexibility to access many courses conveniently, opening new opportunities to join with experts worldwide, and for easy adjustments to contents delivery of the subjects whenever in need. Moreover, privacy setting facility of online learning gives access to the students learn freely without taking part in face -to-face activities.

Moreover, like opportunities in online learning there are challenges in school experience of Sri Lanka's education system. online learning might cause confidentiality issues. On the other hand, the biggest drawback in online learning is the lack of co-curricular activities among students. This was a challenge in Sri Lankan school experience of online education amid COVID-19 and Economic crisis. Furthermore, lack of appropriate learning facility for online learning is another challenge amid COVID-19 and Economic crisis in Sri Lanka. According to a study during COVID-19 pandemic time, in Sri Lanka, 70% of Sri Lanka's students have no access to online study. Instability of network facility was another issue in acquiring the online education properly. Like this there were many challenges in Sri Lanka's School experience of Online learning.

4. Effectiveness of Online Learning in Sri Lankan Schools

The effectiveness of Online learning in Sri Lankan Schools determine by Individual attributes and life factors of school education. These two factors play a major role in online education of students. Individual attributes relate to Help seeking, Persistence, Procrastination, Time management, and Locus of control while life factors resist on Time, Place, Reason, Resources, and Skills. Help seeking is the first factor under individual attributes. This means how students get support from the school environment for the success of online learning. When students are helped properly, online learning systems would be successful. The second factor of individual attributes is persistence. Student persistence in online learning environments has typically been studied at the macro-level (e.g., completion of an online course, number of academic terms completed, etc.). The current examines student persistence in an adaptive learning environment, ALEKS (Assessment and LEarning in Knowledge Spaces) (Ying Fang, Et.al). The third factor is procrastination that means Procrastination represents a breakdown in self-regulation and it is one of the biggest drivers of failing to complete an online course. This is very important factor of the effectiveness of online learning in Sri Lankan school education system.

Time management and Locus of Control are the other two factors of online learning in the school education system. For online learning time management is important, because the schedule of online teaching and learning is determined by time management. Moreover, in education, locus of control typically refers to how students perceive the causes of their academic success or failure in school. In online learning, locus of control determines the success and failure of online school education of students. The second major factor of the effectiveness of online learning is life factors. Under life factors, Time, Place, Reason, Resources, and Skills come for the success of online learning. Resources and skills are the two main factors that come under the life factors. Resources are the facilities for online learning and skills are capabilities to implement online learning at school level. Therefore, in the effectiveness of Online learning at school level, individual attributes and Life factors are the two main aspects of determining the effectiveness of online learning.

5. Conclusion

Although online learning was a lifeline during the COVID19 pandemic and Economic crisis in Sri Lanka, it has become an unavoidable component of school education's teaching-learning activities. To make online learning effective, as we mentioned the two main factors, such as individual attributes and Life factors play a major role. In a nutshell, COVID-19 Pandemic and Economic crisis have made number of challenges in online school education in Sri Lanka, the number of opportunities that gained from the experience still improvise online learning in school context of Sri Lanka.

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80-Unearthing the Intention to Adopt Innovation Culture Among Employees in Online Distance Learning Higher Education Institutions

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Abstract

The objective of the study is to evaluate both relationships, which are direct and indirect, among organisational culture, attitude, intention, and adoption of the innovation culture in Malaysian ODL higher education institutions. The findings of this study are crucial for ODL institutions to maximise employee performance through adopting an innovation culture, which is essential for their survival and sustainability. The research framework includes two independent variables: organisational culture, attitude, intention as a mediator, and adoption as a dependent variable. The collection of primary data was conducted through the utilisation of a survey questionnaire that was modified from previous studies. The distribution of this questionnaire was carried out via electronic mail. The utilisation of non-probability purposive sampling was chosen as a result of the lack of a sample frame. This study analysed 316 clean questionnaires out of the 333 received, representing an 86.5% response rate. The results support the proposed hypotheses, confirming the significant influence of organisational culture and attitude on intention. However, only attitude significantly influences adoption, and organisational culture does not significantly influence adoption. Intention was found to be a critical mediator between independent and dependent variables. The model proposed in this study demonstrates high predictive relevance based on statistical analysis using PLS prediction and the Cross-Validated Predictive Ability Test (CVPAT). Only one direct relationship hypothesis was not supported, while the six direct and two indirect relationship hypotheses were supported. Overall, this study provides valuable insights into maximising the adoption of an innovation culture in ODL higher education institutions.

Keywords: *Organisational culture, Attitude, Intention, Adoption, Innovation Culture*

1. Introduction

According to Osman (2018), there is intense competition among higher education institutions in Malaysia that offer online distance learning (ODL) services to students. To ensure their survival, improve student services' efficiency, effectiveness, and cost-effectiveness (Osman et al., 2020). This requires innovative approaches from the leadership of ODL institutions to bring positive changes and increase their competitiveness in the market, ultimately attracting more students to study online. Innovation involves introducing something new as the most important term to define innovation (Singh & Aggarwal, 2021) or changing how things are done or perceived (Rubio, 2012; Kodirova, 2022). This can include ideas, attitudes, knowledge, skills, products, or services (Roffeei, Yusop, & Kamarulzaman, 2018; Roffeei, Kamarulzaman, & Yusop, 2017). In light of the ever-evolving landscape of technology, the imperative for innovation becomes dominant for institutions of higher education, particularly those that heavily depend on technological capacities, such as within Open and Distance Learning (ODL) institutions. Implementing innovation activities within Open and Distance Learning (ODL) institutions can be a viable strategy for attaining the predetermined organisational objectives. Hence, it is imperative for institutions offering Open and Distance Learning (ODL) to adopt proactive measures aimed at cultivating innovation, thereby ensuring their competitiveness within the higher education sector. This may entail the investigation of new technologies or methodologies, the modification of current practices to better align with the requirements of online students or the development of new services or programs that cater to the evolving needs of students. By adopting innovative approaches, Open and Distance Learning (ODL), institutions can effectively secure their achievements and deliver exceptional educational experiences to an

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expanding population of online students. To foster innovation within organisations that operate in Open and Distance Learning (ODL), it is imperative to establish and enhance a culture that prioritises and encourages innovative practices. Despite the extensive research on innovation culture within the management discipline, there is a shortage within educational institutions (Fuad, Musa, & Hashim, 2022), especially in studies focusing on higher education, specifically Open and Distance Learning (ODL) institutions. While the precise definition of innovation culture is ambiguous (Juceviius, 2007), it is widely recognised as an essential component of both organisational culture and management theories. Culture includes various elements, such as values, norms, beliefs, and fundamental assumptions, all influenced by the social environment and historical context, shaping individual attitudes. Implementing an innovation culture in Open and Distance Learning (ODL) higher education institutions can be difficult because new ideas or innovations can potentially disrupt traditional working methods.

Nonetheless, developing an innovative culture necessitates leadership prioritising effective communication and collaboration over a hierarchical team structure. To foster an environment conducive to innovation, providing ample support to employees through training and learning opportunities tailored to their specific areas of expertise is critical. The significance of long-term investment returns is recognised by organisations that emphasise creativity within the realm of Open and Distance Learning (ODL), as Hashim et al. (2019) underscored. This highlights the necessity of ongoing efforts to promote innovation and create a favourable atmosphere that supports and encourages innovative methods.

In conclusion, fostering a culture of innovation within Open and Distance Learning (ODL) higher education institutions can serve as a means to maintain competitiveness, enhance student enrollment, and deliver exceptional educational experiences amidst the dynamic and ever-evolving technological milieu. In order to foster creativity within higher education institutions that offer Open and Distance Learning (ODL), it is imperative to ensure that both academic and non-academic personnel are equipped with sufficient resources, time, and tools to engage in innovative practices. Incentives such as rewards for valuable ideas are essential to encourage a culture of innovation among employees (Osman et al., 2020). Although innovation is crucial for the success of higher education institutions, the culture of innovation in Malaysia's ODL institutions is not yet at the desired level, and there is a need for improvement (Osman, Mohamad, & Mohamad, 2021). The findings of this study can benefit several stakeholders, including policymakers, particularly Malaysia's Ministry of Higher Education (MoHE), in making policies for ODL institutions in the country. The study can also assist ODL higher education institutions in Malaysia in formulating strategies to strengthen their innovation culture adoption, ultimately leading to improved organisational culture.

2. Literature Review

2.1. Organisational Culture

Organisational culture is regarded as one of the most important factors in stimulating innovative behaviour among employees. A strong organisational culture will be more crisis-resistant (Scaliza et al., 2022). According to Qi and Chau (2018), organisational culture is a critical innovation indicator for assessing an organisation's overall innovation culture because the organisational factors that promote innovation are the organisational strategy, structures, and working culture (Spännäri, Juntunen, Pessi, & Sthle, 2023). According to M. Hazem and Zehou, 2019, organisational culture determinants that foster innovation and creativity are support mechanisms, strategy, structure, and behaviour. In recent years, organisational culture has remained a critical factor in the adoption of an innovation culture. Recent research has demonstrated the significance of a positive and supportive culture in fostering innovation adoption. Shahzad, Xiu, and Shahbaz (2017) discovered a positive and statistically significant correlation between organisational culture and innovation adoption. A survey in the United States found that perceived organisational innovativeness and cohesiveness influenced physician adoption of electronic health records and increased individual adoption (Heinze & Heinze, 2018). As a result, it can be concluded that organisational culture positively influences the adoption of an innovation culture (Schuldt & Gomes, 2020).

2.2. Attitude

Attitude and intention have been identified as influential predictors of the adoption of an innovation culture, according to recent studies. Recent studies show that organisations need to foster a positive attitude towards innovation to encourage people to embrace a culture of innovation. Positive attitudes will influence the decision

to adopt an innovation culture. It will promote creative thinking and practices. According to the literature, for employees to come up with new ideas, they should be creative, well-prepared, leaders, and willing to take risks. It has also been determined that managers who supported and guided their employees were more innovative. Hence, manager support is critical in developing an innovation culture (Ayvaz, Akyol, & Demiral, 2019). In addition, a study of consumer attitudes and behavioural intentions in the United States, France, and China found that positive attitudes toward mobile marketing are related to positive behavioural intentions to use mobile marketing (Wells, Kleshinski, & Lau, 2012).

2.3. Intention

In creating an organisation’s innovation culture, intention is very important. The word “intention” refers to a person’s mental and emotional attitude towards a particular behaviour and how ready they are to participate. Research findings indicate a significant positive correlation between intent and innovation culture adoption. The intention to use electronic health records (EHRs) has been discovered as one of the most important factors influencing physicians’ adoption patterns (Iqbal et al., 2013). According to a study by Nassar, Othman, and Nizah in 2019 on the Palestinian MoHE staff, they highly intend to incorporate ICT into their daily work and are willing to accept change. It demonstrates that behavioural intention positively mediates the effect of social influence on ICT adoption. The results of recent studies indicate that individuals who are more inclined to embrace an innovation culture are more inclined to implement such a culture within their respective organisations. In summary, the role of intention holds significant influence over the adoption of an innovation culture within organisational contexts. Hence, organisations should develop a positive attitude toward innovation and foster a culture that encourages employees’ intention to adopt new and creative ideas and practices.

2.4. Research Model

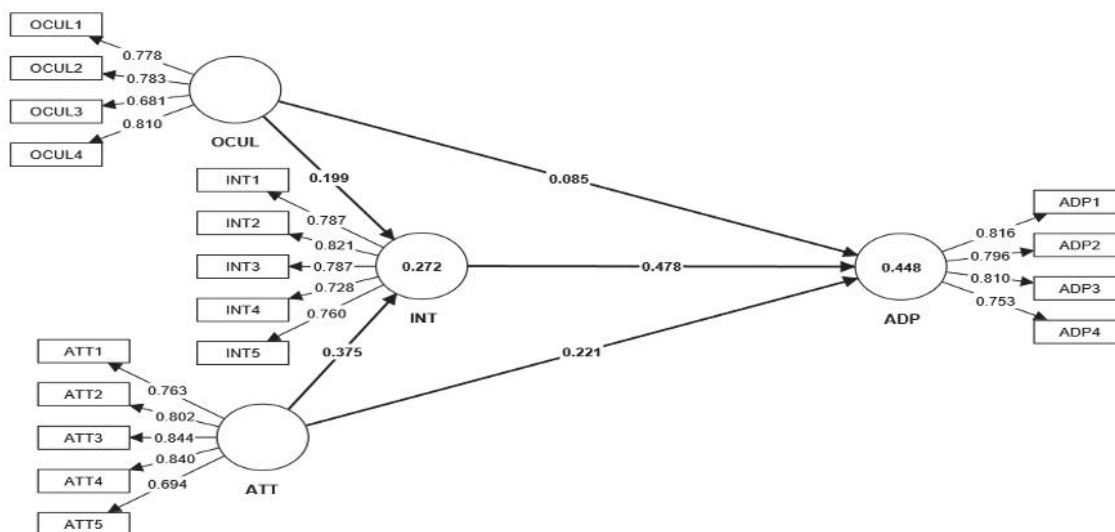


Figure 1. Research Model

3. Methodology

This study examined Malaysian higher education online distance learning employees. Primary data were collected using a survey instrument designed after a comprehensive analysis of previous studies. The survey questionnaire contained measurement items that were frequently employed and had strong reliability and validity. The selected respondents were emailed the survey questionnaires. Due to a lack of a sample frame, purposeful sampling, a non-probability sampling technique, was used to collect the data. This study had 18 observed variables, including independent and dependent variable measurement items. Four constructs were measured in the study, including organisational culture with four measurement items, attitude with five measurement items, intention with five measurement items, and adoption with four measurement items. The organisational culture construct comprised four measurement items, while the attitude and intention constructs consisted of five measurement items each. The adoption constructs also had five measurement items. The measurement of all constructs in this study was conducted with a 5-point Likert scale that ranged from strongly

disagree to strongly agree. A total of 385 questionnaires were disseminated, of which 333 were successfully collected, with a response rate of 86.5%. The response rate achieved in this study is considered adequate for performing data analysis employing SEM, the structural equation modelling technique.

Following data screening and outlier removal, 316 questionnaires were deemed suitable for analysis. This study employs PLS-SEM to test the proposed model's relationship. This method allows the evaluation of how strongly a construct influences the target construct in the path model (Hair, Hult, Ringle, & Sarstedt, 2022). This methodology supports explanatory and predictive goals while also assisting in developing new and existing theories (Richter, Cepeda, Roldán, & Ringle, 2016). PLS-SEM is a flexible method for estimating intricate structural and measurement models that are both formative and reflective (Hair, Risher, Sarstedt, & Ringle, 2019). It can manage complex models with many variables and allows for modelling latent variables and their relationships. A variety of social science research fields, including information systems (Chin et al., 2020), higher education (Ghasemy, Teeroovengadam, Becker, & Ringle, 2020), human resource management (Ringle, Sarstedt, Mitchell, & Gudergan, 2018), and marketing (Liu et al., 2022), have successfully used the adaptable and popular PLS-SEM method. Finally, as suggested by Ringle et al. (2022), SmartPLS4 is used to estimate and model the evaluation results in this study.

In this study, 59% of respondents identified as male, compared to 41% as female. Regarding age, the largest age group, comprising 42% of respondents, was 31-40 years old, followed by 41-50 years old at 35%. 69% of respondents were classified as academics, while 31% were classified as non-academics, according to the distribution of respondents by job category. The distribution of years of service revealed that 30% of respondents fell within the 11-15 years range, followed by 27% in the 6-10 years range. The highest percentage of respondents with a doctorate degree was 31%, followed by those with a master's degree at 26%. 86% of respondents responded positively when asked about their recommendation, while 14% responded negatively.

4. Findings

4.1. Common Method Bias

The presence of common method biases, in which the variability observed in the data is attributed to the measurement method rather than the underlying constructs, is a common challenge in management research. In order to address this issue, this study used Harman's one-factor test to detect the presence of such biases. The test results revealed that the main factor explained only 37.4% of the variance, indicating that method bias played no significant role in this investigation. As a result, the potential impact of common method biases in this study can be concluded to be minimal. The result supports Podsakoff and Organ's (1986) claim that biases are unimportant when the principal components account for less than 50% of the variance.

4.2. Measurement Model

According to Hair, Hult & Ringle (2017), the constructs' validity and reliability were evaluated in this study using the PLS-SEM algorithm. Two essential PLS-SEM components were the outer goodness model's validity and dependability. The model was evaluated to establish the reliability and validity of the outer loadings. Table 1 demonstrates that all constructs exceeded the minimum threshold of 0.5 for average variance extracted (AVE), with the lowest AVE being 0.584 and the highest AVE being 0.631. This indicated that convergent validity for all constructs was established. Additionally, the composite reliability values for the constructs ranged from 0.848 to 0.893, exceeding the threshold of 0.7 recommended by Hair, Hult & Ringle (2017).

Moreover, Cronbach's alpha coefficients for all constructs ranged from 0.761 to 0.836, thereby confirming the reliability of the measures. In evaluating discriminant validity, it is crucial to analyse if the indicators of a specific construct demonstrate greater loadings on their respective construct when compared to other constructs. Table 2 displays the diagonal elements, which signify the loadings of indicators on their corresponding constructs. Overall, based on the cross-loadings observed in Table 2, it can be concluded that discriminant validity has been established. The indicators primarily exhibit stronger loadings on their respective constructs as opposed to other constructs, indicating that the constructs are distinct and can be distinguished from one another. Table 3 utilises the Heterotrait-Monotrait (HTMT) ratio to evaluate discriminant validity. This ratio compares the correlations between different constructs (heterotrait) to the correlations within the same construct (monotrait). When the HTMT ratio is below 0.9, it signifies that discriminant validity is attained, indicating that the constructs are distinguishable from one another. Upon examination of the HTMT ratio values presented in Table 3, it is

evident that all the values are below 0.9. Therefore, this suggests that discriminant validity is achieved among the ADP (Adoption), ATT (Attitude), and INT (Intention) constructs, aligning with the findings proposed by Henseler, Ringle and Sarstedt (2015).

Table 1. Construct Reliability and Validity

	CA	CR	AVE
ADP	0.806 (0.765, 0.840)	0.872 (0.849, 0.892)	0.631 (0.585, 0.674)
ATT	0.850 (0.815, 0.880)	0.893 (0.870, 0.912)	0.625 (0.574, 0.675)
INT	0.836 (0.799, 0.866)	0.884 (0.861, 0.903)	0.604 (0.554, 0.651)
OCUL	0.761 (0.705, 0.805)	0.848 (0.818, 0.873)	0.584 (0.529, 0.633)

Notes: CA=Cronbach Alpha CR=Composite Reliability AVE=Average Variance Extracted

Table 2. Cross Loadings

	ADP	ATT	INT	OCUL
ADP1	0.816	0.481	0.568	0.406
ADP2	0.796	0.412	0.447	0.340
ADP3	0.810	0.425	0.480	0.350
ADP4	0.753	0.281	0.476	0.237
ATT1	0.302	0.763	0.318	0.476
ATT2	0.406	0.802	0.376	0.417
ATT3	0.506	0.844	0.507	0.596
ATT4	0.420	0.840	0.400	0.465
ATT5	0.340	0.694	0.318	0.459
INT1	0.553	0.433	0.787	0.390
INT2	0.494	0.403	0.821	0.352
INT3	0.442	0.325	0.787	0.318
INT4	0.469	0.362	0.728	0.289
INT5	0.453	0.397	0.760	0.306
OCUL1	0.335	0.442	0.331	0.778
OCUL2	0.315	0.381	0.254	0.783
OCUL3	0.294	0.475	0.356	0.681
OCUL4	0.354	0.561	0.357	0.810

Table 3. Hetrotrait-Monotrait (HTMT) Ratio

	ADP	ATT	INT
ATT	0.593 (0.484, 0.692)		
INT	0.751 (0.653, 0.827)	0.572 (0.450, 0.672)	
OCUL	0.534 (0.388, 0.662)	0.750 (0.651, 0.835)	0.529 (0.394, 0.647)

Note: A two-tailed percentile bootstrap test was performed using 5,000 subsamples, with a confidence interval of 5% (ranging from 2.5% to 97.5%).

4.3. Structural Model

To assess the structural model, this study employed a methodology inspired by Hair, Hult and Ringle (2017), which involved the simultaneous analysis of pathway coefficients (β) and also coefficients of determination (R^2). The analysis used the partial least squares (PLS) method and 5000 subsamples to determine the significance level of the path coefficients. Table 4 displays the findings of the confidence interval hypothesis tests, including the path coefficients (beta), t-statistics, p-values, and their corresponding interpretations. Hypothesis 1 (OCUL \rightarrow INT) exhibits a beta coefficient of 0.199, a t statistic of 3.181, and a p-value of 0.001. The findings support the hypothesis by demonstrating a significant positive relationship between organisational culture (OCUL) and

intention (INT). Hypothesis 2 (ATT → INT) has a beta coefficient of 0.375, a t statistic of 6.180, and a p-value of 0.000. This signifies a significant positive relationship between attitudes (ATT) and intention (INT), supporting the hypothesis. Hypothesis 3 (OCUL → ADP) has a beta coefficient of 0.085, a t statistic of 1.388, and a p-value of 0.165. The findings indicate that there is no significant relationship between organisational culture (OCUL) and adoption (ADP); thus, the hypothesis is not supported. Hypothesis 4 (ATT → ADP) displays a beta coefficient of 0.221, a t statistic of 3.674, and a p-value of 0.000. The findings of this study demonstrate a significant positive relationship between attitudes (ATT) and adoption (ADP), thereby lending support to the proposed hypothesis. Hypothesis 5 (INT → ADP) exhibits a beta coefficient of 0.478, a t statistic of 9.123, and a p-value of 0.000. The findings demonstrate that there is a significant positive relationship between intention (INT) and adoption (ADP), supporting the hypothesis. Hypothesis 6 (OCUL → INT → ADP) has a beta coefficient of 0.095, a t statistic of 2.977, and a p-value of 0.003. This shows that organisational culture (OCUL), intention (INT), and adoption (ADP) have a significant positive mediating relationship, which supports the hypothesis. The beta coefficient for Hypothesis 7 (ATT → INT → ADP) is 0.179, the t statistic is 4.845, and the p-value is 0.000. This supports the hypothesis by showing a significant positive mediating relationship between attitudes (ATT), intention (INT), and adoption (ADP). According to the analysis, Hypotheses 1, 2, 4, 5, 6, and 7 are supported, proving meaningful relationships between the various variables. Although there is no conclusive evidence linking organisational culture and adoption, hypothesis 3 is not supported.

Table 4 summarises the findings of the hypothesis testing, including information on effect sizes. Regardless of the sample size, the effect size is a measurement that captures the magnitude of an effect. This study used Cohen's criteria (1992), which categorises effect sizes as small (ranging from 0.020 to 0.150), medium (ranging from 0.150 to 0.350), or large (greater than or equal to 0.350), to evaluate the effect sizes. This study's observed effect sizes ranged from small (0.008) to large (0.120). The inflation rate of intrinsic value (VIF) values, as shown in Table 5, were all below the less strict threshold of 5. The highest VIF value recorded was 1.801. This level of collinearity enables meaningful comparisons of sizes and facilitates the interpretation of coefficients in the structural model. The recruitment process resulted in significant explained variance for the endogenous construct, as evidenced by an R² value of 0.448 (see Figure 1). As indicated by an R² value of 0.272, the model explained approximately 27.2% of the variance in the structure in terms of the mediator.

The assessment of the model's capacity to draw inferences and offer management suggestions was of particular significance and was conducted using out-of-sample predictive analysis. For this purpose, the PLSpredict method, as outlined by Shmueli, Ray, Velasquez Estrada, and Chatla, 2016; and Shmueli et al., 2019, was utilised. As displayed in Table 6, Q² predictions exceeding 0 indicated that the predictions made by PLS-SEM outperformed the standard naive mean predictions. Furthermore, across all nine cases, the PLS-SEM predictions' root means square error (RMSE) values were found to be lower compared to the linear model (LM) prediction benchmark. This outcome indicates that the proposed model possesses predictive capability (refer to Table 6). In addition, Liengard et al., 2021 conducted a Cross-Validated Predictive Ability Test (CVPAT) and PLS prediction analysis to evaluate and validate their model's predictive capabilities. The CVPAT utilised an out-of-sample prediction approach to assess the model's prediction error by quantifying the average loss value. To evaluate the model's predictions, this average loss value was compared to two benchmarks: the average loss value of predictions using indicator averages (IA) as a naive benchmark and the average loss value of a linear model (LM) forecast as a more conservative benchmark. In order to demonstrate the superior predictive capabilities of the model compared to the prediction benchmarks, it was anticipated that the average loss value of PLS-SEM would be lower, leading to a negative disparity in the average loss values. The CVPAT assessed whether the disparity in average loss values between PLS-SEM and the benchmarks was significantly below zero. A significantly negative difference would prove the model's superior predictive capabilities. The results of the CVPAT are displayed in Table 7, demonstrating that the average loss value of PLS-SEM was indeed lower compared to the benchmarks, as evidenced by the negative discrepancy in the average loss values.

Ringle and Sarstedt (2016) and Hair, Hult & Ringle (2017) suggest utilising Importance Performance Analysis (IPMA) to evaluate the significance and effectiveness of latent variables in explaining acceptance. The outcomes of this analysis are presented in Table 7. Regarding overall impact, intention had the strongest influence on adoption, with a value of 0.478, followed by attitude (0.400) and organisational culture (0.180). These values represent the relative significance of each latent variable within the context of recruitment. On a scale from 0 to 100, organisational culture received the highest performance score of 66.569, while intention received the lowest score of 60.650. This indicates that social norms performed relatively well, whereas intention had the lowest value of achievement.

Consequently, despite being the most important factor in recruitment, intention demonstrated the lowest level of performance. On the basis of these findings, it is suggested that top management in ODL higher education institutions prioritise and emphasise activities to enhance employees' intentions. By concentrating on enhancing intent, it is possible to boost overall performance.

Table 4. Hypotheses Testing Results & f^2

	Beta	T statistics	P values	f^2	2.50%	97.50%	Decision
H1: OCUL -> INT	0.199	3.181	0.001	0.034	0.069	0.317	Supported
H2: ATT -> INT	0.375	6.180	0.000	0.120	0.249	0.488	Supported
H3: OCUL -> ADP	0.085	1.388	0.165	0.008	-0.039	0.200	Not Supported
H4: ATT -> ADP	0.221	3.674	0.000	0.049	0.101	0.337	Supported
H5: INT -> ADP	0.478	9.123	0.000	0.301	0.373	0.578	Supported
H6: OCUL -> INT -> ADP	0.095	2.977	0.003		0.034	0.158	Supported
H7: ATT -> INT -> ADP	0.179	4.845	0.000		0.111	0.256	Supported

Table 5. Collinearity Statistics – Inner VIF

	ADP	INT
ATT	1.801	1.608
INT	1.373	
OCUL	1.662	1.608

Table 6. Collinearity Statistics – Inner VIF

	Q^2 predict	PLS-SEM_RMSE	LM_RMSE	PLS-LM
ADP1	0.237	0.637	0.643	-0.006
ADP2	0.172	0.634	0.645	-0.011
ADP3	0.184	0.692	0.692	0.000
ADP4	0.063	0.757	0.762	-0.005
INT1	0.200	0.632	0.636	-0.004
INT2	0.171	0.639	0.647	-0.008
INT3	0.112	0.681	0.688	-0.007
INT4	0.128	0.696	0.708	-0.012
INT5	0.152	0.631	0.636	-0.005

Table 7. Cross-Validated Predictive Ability test (CVPAT)

	Average loss difference	t value	p-value
ADP	-0.089	4.467	0.000
INT	-0.077	3.904	0.000
Overall	-0.082	4.789	0.000

Table 8. Importance-Performance Map Analysis (IPMA)

	Total Effect	Performance
ATT	0.400	66.491
INT	0.478	60.650
OCUL	0.180	66.569

5. Discussion and Conclusion

This study assessed both direct and indirect relationship associations among organisational culture, attitude, intention, and the adoption of innovation culture in Malaysian Online Distance Learning (ODL) institutions of higher education. Despite being identified as the most critical factor, intention exhibited the lowest level of effectiveness. To tackle this issue, strategies should enhance employees' intention to adopt an innovation culture. Targeted training programs, workshops, and incentives that highlight the value and advantages of innovation can be implemented to achieve this goal. ODL higher education institutions should provide resources, support, and training to boost individuals' perceived capability to embrace and implement innovative practices. This can include offering technological infrastructure, opportunities for professional development, and mentorship programs to enhance individuals' confidence and proficiency in utilising new technologies and innovative approaches. Organisational culture plays a vital role in fostering innovation. Institutions should establish a culture that promotes and values experimentation, creativity, and risk-taking. Leadership styles influence employees and organisations to improve innovation (Alblooshi, Shamsuzzaman, & Haridy, 2020; Weintraub & McKee, 2018) through strategy, evaluation, and rewards (Villaluz & Hechanova, 2019). To foster such a culture, leadership support, effective communication of innovation goals, recognition of innovative practises, and creation of collaborative platforms that facilitate knowledge sharing and idea generation can be used.

Institutions should raise awareness and cultivate a positive attitude toward innovation among faculty, staff, and students. Communication campaigns showcasing successful innovation initiatives and emphasising the benefits of embracing new ideas and practices can be utilised to accomplish this. Social norms also shape individuals' behaviour. ODL higher education institutions should encourage and facilitate social interactions that support and foster an innovation culture. Creating communities of practice, organising innovation-focused events and workshops, and promoting collaboration and knowledge sharing among stakeholders are effective approaches in this regard. One approach to fostering innovation within the institution involves identifying and empowering individuals with a strong passion for innovation. These individuals, including faculty members, administrators, and students, can be designated innovation champions. These exemplary individuals can be influential figures and proponents for fostering a culture of innovation, setting a positive precedent through their actions, disseminating tales of triumph, and actively endorsing and implementing innovative methodologies. It is imperative to establish and maintain the essential resources and support systems required to foster the adoption of an innovation culture effectively. This entails allocating adequate financial resources and time for research and development activities.

Additionally, it involves granting individuals access to cutting-edge technologies and tools and establishing innovation laboratories or spaces that facilitate experimentation and collaboration. Promote interdisciplinary collaborations and facilitate the exchange of ideas and perspectives among diverse academic departments and faculties. Institutions can harness diverse expertise and generate innovative solutions that cater to various needs by advocating for interdisciplinary approaches to problem-solving and innovation. Promote the establishment of a milieu that emphasises the importance of perpetual learning and advancement through the endorsement of continuous professional development, facilitation of engagement in pertinent educational innovation conferences and workshops, and provision of support for research and scholarly endeavours in online distance learning and innovation. Regularly seek feedback from faculty, staff, and students to understand their experiences and gather suggestions for nurturing an innovation culture. Conduct assessments or surveys to evaluate the progress and impact of the implemented strategies and utilise the findings to refine and adapt the approaches as needed over time.

5.1. Theoretical and Practical Implication

This study has significant theoretical implications for our understanding of the factors that shape the intention to embrace an innovation culture in the specific context under study. It emphasises the significance of organisational culture and attitude in facilitating the adoption of new practices. It is the need for resources, assistance, and training to improve people's perceived ability to innovate. The study also emphasises the importance of organisational culture in creating a supportive environment that encourages experimentation, creativity, and risk-taking. It also demonstrates the impact of social norms on individuals' behaviour when implementing an innovation culture, emphasising the importance of encouraging social interactions, communities of practice, and collaboration. These theoretical implications apply to online distance education institutions and can help you develop strategies and initiatives to foster an innovation culture. They provide valuable data for developing

strategies and initiatives to foster an innovation culture. The research contributes to the body of knowledge by providing a more comprehensive understanding of the factors influencing academicians' adoption of an innovation culture at online, distance-learning universities. It also includes practical suggestions for institutions looking to foster innovation within their organisations.

The study has practical implications for various strategies and actions that can be implemented to foster an innovation culture within online distance learning institutions. Institutions must prioritise allocating resources, providing support, and implementing organisational development training programs. These initiatives increase people's confidence and competence in implementing new practices. It is critical to recognise the impact of organisational culture and attitude on this process. This entails allocating adequate financial resources as well as time for R&D activities. It also entails making cutting-edge technologies and tools available and establishing specialised spaces or laboratories that encourage innovation.

Furthermore, institutions must actively cultivate a corporate culture that values and encourages experimentation, creativity, and risk-taking. This can be accomplished through a supportive leadership style, effectively communicating innovation goals, recognising and rewarding innovative practices, and implementing collaborative platforms that allow for knowledge exchange and idea generation. Third, encouraging cross-departmental collaboration and idea exchange can help to leverage diverse expertise and foster innovative solutions. Supporting participation in relevant conferences and workshops, as well as promoting research and scholarship in the field of online distance learning and innovation, are also critical for sustaining an innovation culture. Seeking feedback from faculty, staff, and students regularly, conducting assessments or surveys to assess progress, and using the results to refine and adapt strategies are critical for fostering an innovation culture. By implementing these practical implications, online distance learning institutions can foster innovation while effectively responding to the changing needs of the education landscape.

5.2. Recommendation for Future Study

For future studies, firstly, further investigation could delve into the strategies and interventions most effective in enhancing adoption and fostering an innovation culture in online distance learning institutions. This could involve conducting experimental studies or implementing intervention programs to assess the impact of different approaches on individuals' confidence and competence in adopting innovative practices. Secondly, future studies could examine an innovation culture's long-term effects and sustainability in online distance learning institutions. This may entail conducting longitudinal studies that observe the progression and transformation of an innovation culture over an extended period while investigating the factors contributing to its durability and ability to withstand challenges. Furthermore, it would be advantageous to investigate the influence of innovation culture on various aspects of student outcomes, including levels of engagement, satisfaction, and academic achievement. Finally, it is possible to conduct comparative studies to analyse the similarities and differences in promoting an innovation culture between online distance learning institutions and traditional brick-and-mortar institutions. This analysis would offer valuable perspectives on the distinct obstacles and prospects that online distance learning institutions encounter in fostering innovation. By examining these specific areas of investigation, future research endeavours can enhance our comprehension of the most effective strategies for fostering and maintaining a culture of innovation within higher education institutions that provide online distance learning.

5.3. Conclusion

This study offers valuable insights into the various factors influencing the intention of academicians working in higher education institutions offering online distance learning to adopt an innovation culture. The findings highlight the significance of organisational culture and attitudes toward innovation in influencing the implementation of innovative practices. The study's findings yield practical implications that can guide institutions in cultivating an innovation culture. These implications include the provision of resources and support, the cultivation of a supportive organisational environment, the promotion of interdisciplinary collaborations, and the fostering of a culture of continuous learning. As mentioned above, the findings significantly contribute to the current body of knowledge regarding facilitating innovation within online distance learning institutions. Moreover, they offer valuable insights and recommendations for institutions that aspire to foster a culture of innovation. By implementing these strategies, educational institutions can create an atmosphere that cultivates innovation and efficiently addresses the changing requirements of online education.

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87-A Literature Review on the Use of Web 2.0 Tools in Distance Foreign Language Education

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Abstract

The aim of this study is to conduct a systematic review of academic studies conducted between 2013 and 2023 regarding the use of Web 2.0 tools in distance foreign language education. For this purpose, Scopus, TR Dizin, Google Scholar, and Web of Science databases were utilized. This research employed a literature review method with a descriptive design, through which academic studies related to the use of Web 2.0 tools in distance foreign language education were accessed. In the Google Scholar database, a total of 3,370 studies were accessed regarding the use of Web 2.0 tools in distance foreign language education between 2013 and 2023, with the highest number of studies 329 occurring in 2013. In the Scopus database, a total of 1,463 documents were found, with the highest number of publications 227 in 2022. TR Dizin provided access to 11 studies, with the highest number of documents 4 in 2017. In the Web of Science database, a total of 74 studies were accessed, with the highest number of documents 11 in 2014. In terms of document types, Google Scholar database provided access to 3,360 documents. In the Scopus database, 836 articles, 6 encyclopedias, 249 book chapters, 84 conference papers, and 147 other sources were found. TR Dizin provided access to 11 articles, and in the Web of Science database, 30 articles and 24 conference papers were accessed. When examining the distribution of scientific resources between 2013 and 2023, it was found that in the Web of Science database, the highest number of 11 documents were published in academic sources serving the field of IATED-Technology Education.

Keywords: *Open and Distance Education, Web 2.0 tools, Foreign Language Education, Literature Review, Online Education.*

1. Introduction

The concept of education can be defined as “helping new generations to have the necessary knowledge, skills and understanding to take their place in social life and to develop their personalities”. Education has a dynamic structure thanks to the developments in information technologies.

In this context, internet technologies can be expressed as “the environment or platform that is determined to look like according to the end user”. In other words, the internet is an environment that can develop and change in line with the needs of users. Technological developments have not only facilitated the educational life but have also offered great opportunities to learners and teachers.

Distance learning is one of those opportunities. Distance education is defined as all teaching activities that provide flexibility in time and space. It also brings together learners and teachers with technological infrastructure and they are carried out simultaneously or asynchronously (Karakaya and Aksoy, 2005).

Web 2.0 technology was first used by O'Reilly Media in 2004, replacing Web 1.0. Web 2.0 is defined as “a web technology that aims to improve creativity, information sharing and collaboration among users”. Tools based on this technology are called Web 2.0 tools. In this context, Web 2.0 technology have been used effectively in the field of foreign language education because of the fact that Web 2.0 technology enables two-way interaction, communication and cooperation, allowing the creation of personalized information and content. It is easy to use and flexible. Web 2.0 offers options that facilitate and even gamify language learning among students by

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integrating English into daily life (Horzum, 2010). Another contribution of Web 2.0 tools to learning processes is that they provide a permanent learning environment by interacting with learning content and environments and reducing the distance between learner-teacher, learner-learner, learner-content and learner-environment in distance education (Gündüzalp, 2021).

The integration and effective use of Web 2.0 tools, especially in language education, is the result of technological progress experienced. Every student's interests and needs are different and in order to maximize interaction and communication in the learning environment, support can be obtained from Web 2.0 tools especially in distance education. In this context, the trainer should prepare the necessary basis for the distance education environment and make the lessons effective by integrating Web 2.0 tools into the course in order to ensure permanent learning and ensure active participation by activating the curiosity of the student towards the lesson. Especially during the pandemic period in 2020, while the concept of distance education is rapidly entering our lives and even exams are held online, it is known that Web 2.0 tools will have undeniable benefits to the learning process in a very important subject such as language learning.

1.1. Problem

When the historical process is looked, human beings have resorted to various ways to express themselves, share their feelings and thoughts and communicate. Among these paths, the most important element that provides communication between people is language. Today, all social, political, economic and technological developments make their effects felt in all areas of life. In parallel with these changes, language and language education are also developing.

Learning a second language has become a necessity in order to respond to the needs of the globalizing and digitalizing world to follow scientific, artistic, commercial and social changes. Student engagement is one of the essential elements of the learning environment. Attracting and maintaining the interest of students who have grown up in the age of technology and social media is a challenge in face-to-face education. It is becoming more and more difficult to ensure the participation of students in distance education where they are not physically present in the classroom environment. In this context, Web 2.0 technology has inevitably entered the educational life.

Although English is taught as a foreign language from kindergarten to higher education in our country, the vast majority of learners cannot speak English fluently. They cannot understand or respond what is said in English. Their writing skills are limited and they cannot comprehend what they read at a basic level. This picture shows that the current system in language education needs to be changed. Effective use of Web 2.0 tools in distance education may be the right address to meet the needs in foreign language education.

1.2. Purpose

The purpose of this research is to present up-to-date information in this field by examining the scientific studies conducted between 2013-2023 for the use of Web 2.0 tools in foreign language education starting from the concept of distance education, the importance of which many people better understand in the pandemic process that occurred in 2020, and to direct the studies on the use of Web 2.0 tools in distance foreign language education.

Within the scope of this study, the following research questions were identified:

- 1- What is the distribution of the studies on the use of Web 2.0 tools in distance foreign language education between 2013-2023?
- 2- What is the distribution of academic studies according to document types?
- 3- How is the distribution according to the scientific sources they publish?
- 4- What is the distribution of academic studies in the context of the institutions where they are carried out?
- 5- What is their distribution in the context of the countries in which they perform?

1.3. Importance of the Study

In the 21st century, knowing a foreign language has become a necessity. Thanks to internet technologies, the process of learning a foreign language has become easier for both the learner and the teacher and it has been understood that the language is better learned and taught if these opportunities based on Web 2.0 tools are used. Because these opportunities allow students to actively participate in the learning process, diversity and vitality

in teaching, students to learn at their own pace and to repeat the subject as many times as they want. It gave the teacher the flexibility of planning and the opportunity to give feedback at any time. (Karahana, 2001).

In distance foreign language education, the use of Web 2.0 technologies and constructivist approach together will improve the current situation and make foreign language teaching more fun, permanent, collaborative, individual and easier to learn. Web 2.0 tools put learners active and knowledge-producing, enabling learners to communicate among peers. Smartphones equipped with these tools help learners practice, learn new words and improve their pronunciation in distance English education (Health and Stars, 2021). Considering the difficulties experienced in learning foreign languages in our country, it is evaluated that Web 2.0 tools will support foreign language education as a relatively new breath. Therefore, the use of these tools in distance education can be considered as an important and undeniable component in distance English education.

This study is important in terms of being a noteworthy study in the relevant literature as it identifies the trends related to the use of Web 2.0 tools in the distance foreign language education process in the last decade. By identifying these trends, it is aimed to obtain a general information about whether there has been any change in the use of Web 2.0 tools in distance language education in the given time period and about the document types of studies on Web 2.0 tools in distance foreign language education.

2. Method

In this study, articles on the use of Web 2.0 tools in distance English education were systematically scanned by using descriptive design from quantitative research methods. Systematic literature review enables new inferences to be made by evaluating all the results of different studies on a subject and analyzing these different results (Çarkungöz and Ediz, 2009). First, the research question is determined in the systematic literature review and the researches to be included in the review and the criteria related to these researches are determined in order to reach possible solutions (Söz, 2018). The presence of systematically collected resources, the organization and analysis of information plays an important role. Therefore, especially in the last few decades, there has been a great increase in the number of academic studies published in various disciplines. The fact that systematic literature review allows academic research to re-evaluate once again emphasizes its importance in academic life (Olkin, 1999).

2.1. Data Collection Tools and Process

In this study, TR Index, Google Scholar, Scopus and Web of Science were used to select data sources and to reach the articles to be examined. TR Index is a national citation index containing national, scientific and refereed articles, including TÜBİTAK projects, which can be searched through the web page. Google Scholar is the world-famous search engine that provides comprehensive scientific literature search. Scopus is the academic database that indexes the most scientific articles worldwide. Web of Science is a bibliographic database that provides access to multiple databases, providing comprehensive citations for a large number of articles published across different disciplines. Within the scope of the study, the period between 2013-2023 (last decade) was selected as the publication year. The studies examined were reached 11 articles by typing the keywords 'foreign language Web 2.0 tools' into the TR Dizin platform, the studies involved the period between 2015-2022 and 1 English study was reached. In the Google Scholar database, 3,950 studies on 'the use of web 2.0 tools in distance foreign language education' were reached, and when the years 2013-2023 were written in the special range section, 3,360 documents were reached. While accessing the Scopus database, the word 'the use of web 2.0 tools in distance foreign language education', which is the English equivalent of the study, was written in the 'advanced' section and the period 2013-2023 was selected as the date range and 1,463 documents were reached. In the Web of Science database, 74 documents were reached when Web of Science was found from the databases in the 'e-resources' section of the Anadolu University Library site, entered with the university mail and password, the 'all fields' field was selected in the 'documents' section and the keyword 'the use of web 2.0 tools in foreign language education' was typed and scanned. When the years 2013-2023 were selected for the 'publication years' section of the researches, 54 studies were reached.

2.2. Data Analysis

Defining a research problem is the first step in starting a systematic literature review (Çarkungöz & Ediz, 2009). The next stage is to determine the selection criteria for the studies to be included in the study. While the keywords 'distance education', 'distance foreign language education', 'Web 2.0 tools in foreign language

education' and 'Web 2.0 tools in distance foreign language education' were taken into consideration for TR Dizin and Google Scholar databases while the keywords 'distance foreign education', 'Web 2.0 tools in foreign education' and 'distance education' for Scopus and Web of Science databases were taken into consideration in the research. For this study, it was tried to reach information about the use of Web 2.0 tools in distance foreign language education in order to analyze documents, articles and papers in the determined criteria. When the researcher had a dilemma about the inclusion of the studies in the systematic literature, she wanted to increase the reliability of the study by consulting an expert. The criteria for the inclusion of the documents obtained at the end of the research in the systematic literature are as follows:

- ✓ Being a study for foreign language teaching.
- ✓ The document must contain at least one Web 2.0 tool.
- ✓ To be aimed at using Web 2.0 tools in distance foreign language education.
- ✓ Be accessible.
- ✓ It must have been published between 2013 and 2023.

3. Findings

In the findings section, the research questions within the scope of the study were answered in the light of the findings reached.

The scope of the research is aimed to determine the distribution of the use of Web 2.0 tools in distance foreign language education according to the years between 2013-2023. The findings from the TR Dizin, Google Scholar, Scopus and Web of Science database are shown in Figure 1.

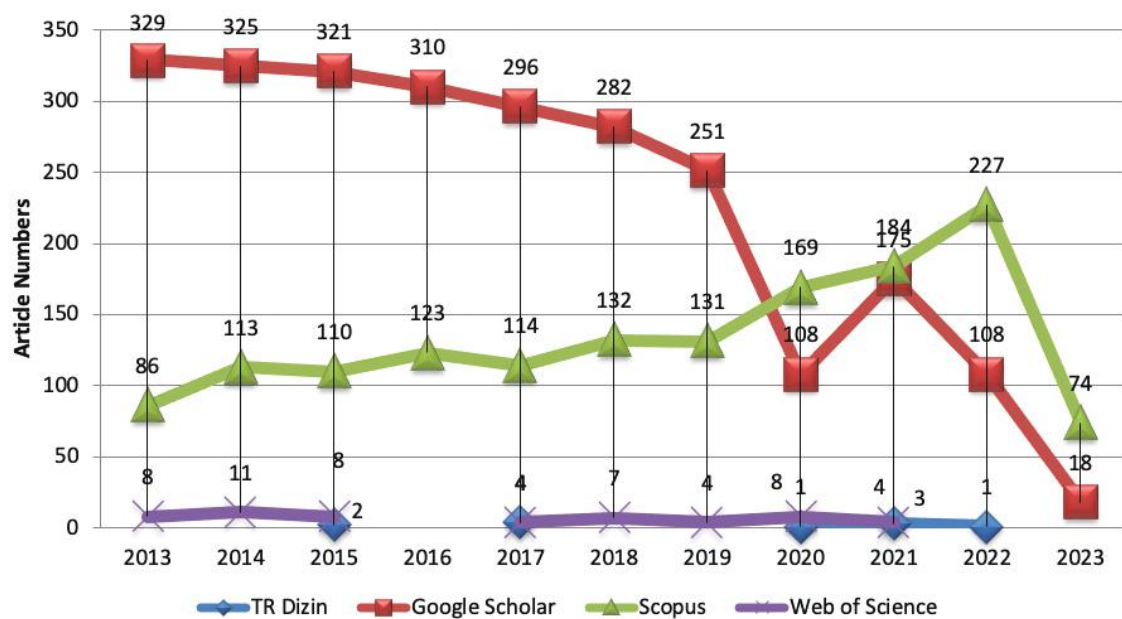


Figure 1. Change in the number of articles by year

In the light of the findings obtained in the TR Dizin database on the use of Web 2.0 tools in distance foreign language education between 2013-2023, 11 studies were reached and these studies cover the years between 2015-2022. It was observed that the studies for the years 2013-2014-2016-2018-2019 could not be accessed in the TR Dizin database. Accordingly, with access to 2 studies since 2015, 4 studies were reached in 2017, 1 in 2020, 3 in 2021 and 1 in 2022. In the TR Dizin database, the publication year range is limited to five years. As a result of the findings in the Google Scholar database, 3,370 studies were reached within the scope of 2013-2023, 329 in 2013, 325 in 2014, 321 in 2015, 310 in 2016, 296 in 2017, 282 in 2018, 251 in 2019, 108 in 2020, 175 in 2021, 108 in 2022 and 18 in 2023. When the Scopus database was examined, with a total of 1,463

documents; 86 academic studies were reached in 2013, 113 in 2014, 110 in 2015, 123 in 2016, 114 in 2017, 132 in 2018, 131 in 2019, 169 in 2020, 184 in 2021, 227 in 2022 and 74 in 2023. When the Web of Science database is searched, no publications were reached in 2016-2022-2023 but 8 researches were accessed in 2013, 11 in 2014, 8 in 2015, 4 in 2017, 7 in 2018, 4 in 2019, 8 in 2020 and 4 in 2021. As a result of the findings obtained in all databases, it has been revealed that the Covid pandemic that emerged in 2019 caused an upward trend in the number of academic studies on the use of distance education foreign language Web 2.0 tools.

3.1. Distribution of Academic Studies on the Use of Web 2.0 Tools in Distance Foreign Language Education According to Document Types

The last research question determined within the scope of the research is between the years 2013-2023 (in the last decade), academic scientific studies on the use of Web 2.0 tools in distance foreign language education were aimed at the distribution of document types. The findings were obtained at the end of the research are shown in Figure 2.

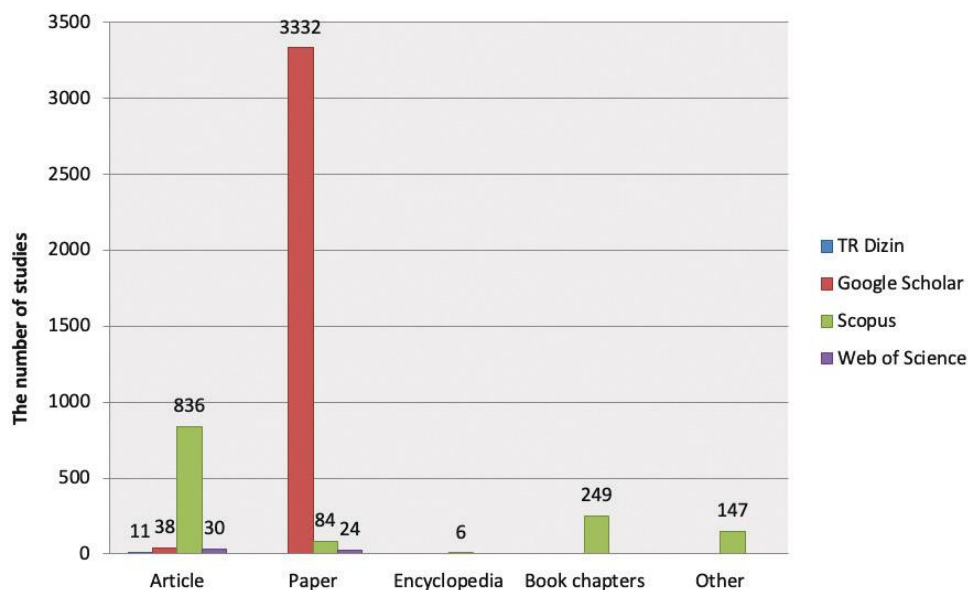


Figure 2. Distribution of studies by document type

When Figure 2 is examined, it is seen that there are 11 articles in the TR Dizin database on the use of Web 2.0 tools in distance foreign language education between 2013-2023 and all of them are open to access. When the Google Scholar database is examined, it is observed that there are 38 articles and 3,332 papers. A look at the Scopus database yielded 836 articles, 84 papers, 6 encyclopedias, 249 book chapters, and 147 other sources. Thanks to the Scopus database, it has been seen that access to different resources other than articles and papers is provided, thus it is possible to access information that a wide range of researches have been carried out on the use of Web 2.0 tools in distance foreign language education. In the Web of Science database, 30 articles and 24 papers are accessed. It is possible to say that Google Scholar is the database that provides the most research on document types.

3.2. Distribution According to the Scientific Sources They Published

When Figure 3 is examined, the scientific resource distributions related to the use of Web 2.0 tools in distance foreign language education between 2013-2023 are not included in the figure because the source distributions are not separated in the TR Dizin and Google Scholar databases. Research in the Scopus database over the last decade has focused on 41 Computer Assisted Language Learnings; In the Web of Science database, it is seen that 11 Iated- Technology Education & Development resources have been published. However, in order to ensure readability, not all of the sources published by a total of 1,517 studies were included.

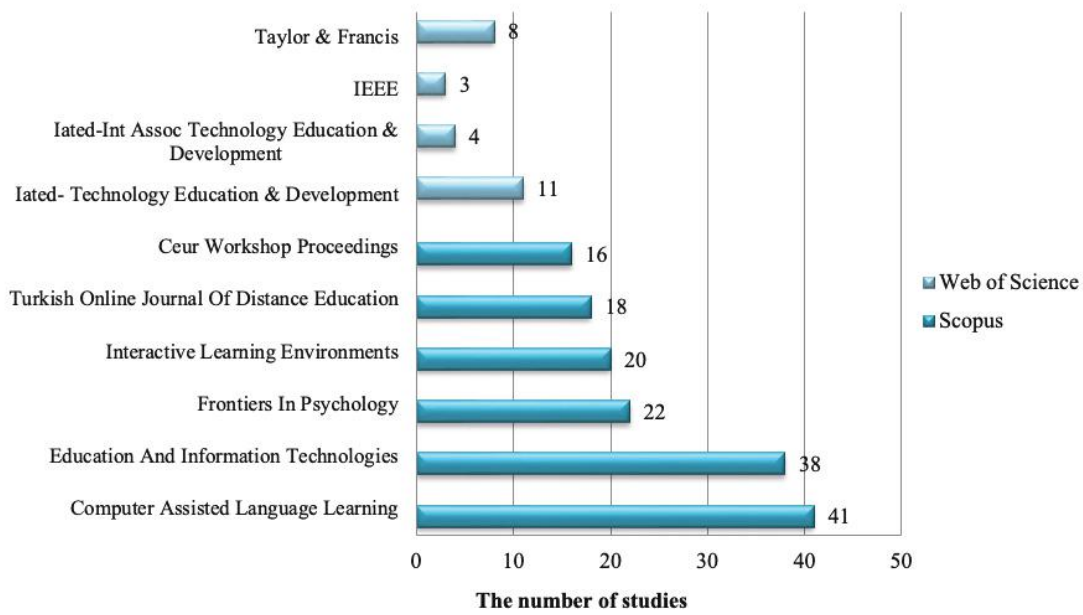


Figure 3. Distribution of studies according to published scientific sources

3.3. Distribution of Academic Studies in the Context of the Institutions Where they are Carried Out

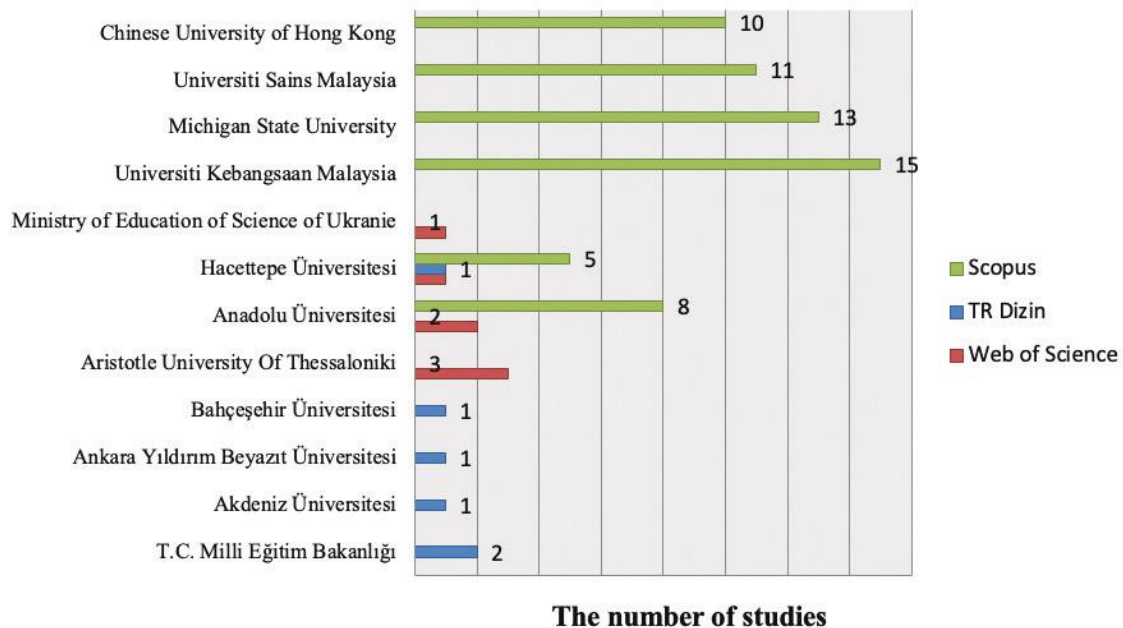


Figure 4. Distribution of studies according to the institutions they publish

In Figure 4. academic studies covering the last ten years on the use of Web 2.0 tools in distance foreign language education were published in the TR Index database within the body of the Ministry of National Education of the Republic of Türkiye; When the Web of Science database is considered, it is found that studies have been published in 3 Aristotle University of Thessaloniki Institutions. In the Scopus database, 15 academic studies of Universiti Kebangsaan Malaysia have been published. In the Google Scholar database, the visual could not be shown because there was no data on the distribution of institutions. In order to ensure readability, the distribution of all institutions where a total of 1,528 academic studies were published is not included.

3.4 Distribution of the Academic Studies on the Use of Web 2.0 Tools in Distance Foreign Language Education in the Context of the Countries they Carry Out

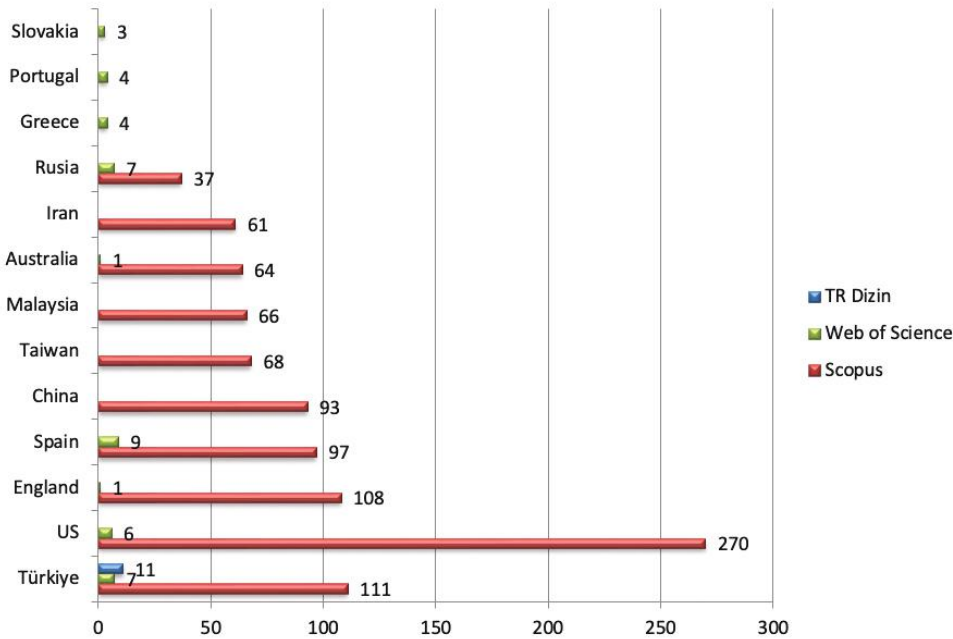


Figure 5. Distribution of studies according to the countries in which they are published

When Figure 5 is examined, the country with the most studies on the use of Web 2.0 tools in distance foreign language education between 2013-2023 is Türkiye with 11 in the TR Dizin, the country with the most studies in the Scopus database is the USA with 270 studies, and the country with the most studies in the Web of Science database is Russia and Türkiye with 7 studies. It is noteworthy that Türkiye is at the top of all three databases among the countries. In the Google Scholar database, data on the country distribution could not be parsed because it could not be shared. Not all countries are included in this section to ensure readability of the figure given.

4. Discussion and Conclusion

In this research, academic studies on the use of Web 2.0 tools in distance foreign language education between the years 2013-2023 (last decade) are discussed. As a result of the researches conducted by examining the TR Dizin, Google Academy, Scopus and Web of Science databases, trends were determined regarding the use of Web 2.0 tools in distance foreign language education for systematic literature review. Within the scope of the study, five questions were tried to be answered.

As a result of the findings reached in the Google Scholar database on the use of Web 2.0 tools in distance foreign language education within the scope of 2013-2023, a total of 3,370 studies were reached, 329 in 2013, 325 in 2014, 321 in 2015, 310 in 2016, 296 in 2017, 282 in 2018, 251 in 2019, 108 in 2020, 175 in 2021, 108 in 2022 and 18 in 2023. The 2013 year had the highest number of documents in the Google Scholar database. When the Scopus database was examined, a total of 1,463 documents were reached: 86 academic studies were reached in 2013, 113 in 2014, 110 in 2015, 123 in 2016, 114 in 2017, 132 in 2018, 131 in 2019, 169 in 2020, 184 in 2021, 227 in 2022 and 74 in 2023. In the Scopus database, 2022 was the year with the highest number of documents with 227 academic studies. A total of 54 studies were accessed in the Web of Science database: 8 in 2013, 11 in 2014, 8 in 2015, 4 in 2017, 7 in 2018, 4 in 2019, 8 in 2020 and 4 in 2021. The Web of Science database shows that the most studies were published in 2014. In the TR Dizin database, 11 academic studies were reached: 2 studies in 2015, 4 in 2017, 1 in 2020, 3 in 2021 and 1 in 2022 have been reached. Accordingly, the highest number of publications was obtained in 2017. In general, although there has been a decrease in the number of academic studies over the years, an increase can be observed in publications after 2021. The findings obtained within the scope of the study, it is possible to see that the studies published on the use of Web 2.0 tools in distance foreign language education have increased in importance with the technological innovations in the

society and that the studies have increased with the popularity of distance education due to the 2019 Covid pandemic. In the academic study conducted by Qassrawi and Al Karasneh (2023) on the use of Facebook application, it was emphasized that Web 2.0 tools could be used more in foreign language teaching in higher education institutions for interaction and communication not only to improve the academic success of learners but also to increase intercultural dialogue and to provide meaningful learning. It has been mentioned that the use of social networking applications in the distance learning environment of foreign language teachers should be encouraged. It is foreseen that the use of Web 2.0 technologies in educational environments will increase with the widespread use of technology.

According to the findings obtained in the distribution of this study according to document types, a total of 3,950 documents were found by typing 'the use of Web 2.0 tools in distance foreign language education' in the Google Scholar database, and 3,360 documents were accessed when the years 2013-2023 were written in the special range section. When the Scopus database was examined, 836 articles, 6 encyclopedias, 249 book chapters, 84 papers and 147 other sources were found. Access to 11 articles was provided in the TR Dizin database; In the Web of Science database, 30 articles and 24 papers were reached. According to the information obtained, the fact that it is possible to access a wide variety of document types such as articles, papers, encyclopedias, book chapters in the Scopus database is consistent with the findings obtained. The variety of document types shows that there is a wide range of research on the advantages and disadvantages of using Web 2.0 tools in distance foreign language education. Binici (2020) mentioned that Web 2.0 tools in foreign language teaching support collective intelligence, differentiate individuals and encourage a competitive environment. Furthermore Binici (2020) mentioned that Web 2.0 tools contribute to lifelong learning in terms of allowing global information sharing. However, he also emphasized that the disadvantages of the use of information technologies in foreign language education in terms of inappropriate content, security, cyberbullying, privacy, lack of communication and time consuming should not be ignored.

As a result of the analyzes, when the distribution according to scientific sources in the last decade is examined, it is published in the Web of Science database with a maximum of 11 documents in academic sources serving in the field of Iated- Technology Education & Devolopment. In the Scopus database, it is seen that 44 documents are published in academic resources serving in the field of Computer Asisted Language Learning. Accordingly, it is consistent with the findings to say that Web 2.0 tools are mostly used in the field of technology-based education in distance foreign language education. As stated by Çoban and Adıgüzel (2022) in their research, they concluded that the use of Web 2.0 tools in English class by seventh grade secondary school students increased success, that information technologies were important for continuity in distance education and enriched learning-teaching processes. Çelebi and Sıralı (2021) argued that the use of Web 2.0 tools in language teaching should be the necessity of developing the technological infrastructure system in schools, providing the necessary equipment, supporting the use of Web 2.0 tools, providing the necessary training to foreign language teachers about Web 2.0 tools and increasing the work on these tools. They explained the necessity of Web 2.0 tools to help digital natives learn foreign languages by closing the gaps in traditional education.

When the distribution of academic studies in the context of the countries where they have been carried out in the last decade is examined, it is found that the USA has 270 studies in the Scopus database. With 7 studies in the Web of Science database, Russia has been the leading country with its academic studies on the use of Web 2.0 tools in distance foreign language education. This shows that countries such as the US and Russia are focusing on technology-based applications. The fact that these countries are leading the world in technological innovations is consistent among themselves. Vorobel (2022) from the USA has found that technological developments provide flexibility and convenience in education and lead to the opening of courses by various institutions and organizations for distance language learning. In the article of Fedorova, Rasskazova and Muzafarova (2018) in Russia, they mentioned that the use of Skype from Web 2.0 applications in foreign language lessons in distance education benefits more attention to learner pronunciation during the lesson and contributes to the support of the lesson with online videos.

When the distribution of academic studies between 2013 and 2023 in the context of the institutions where they were carried out was analyzed, it was found that 15 studies were published in the Scopus database within Universiti Kebangsaan Malaysia and 13 studies were published within Michigan State University. When the Web of Science database is examined, Aristotle University of Thessaloniki has pioneered the most academic studies with 3 publications; In the TR Dizin database, it was found that it was the institution that published the most within the Ministry of National Education of the Republic of Turkey with 2 academic publications.

The results obtained in the context of the countries with the highest number of academic studies on the use of Web 2.0 tools in distance foreign language education are also consistent. In a study by Tan and Yunus (2023) at Universiti Kebangsaan Malaysia, which has the most studies, it is mentioned that English has always been a challenging language and that social networks have a positive impact on improving English language proficiency in a rapidly globalizing world.

4.1. Suggestion

As a result of the systematic review of the use of Web 2.0 tools in distance foreign language education, it is thought that it will guide future academic studies. A number of recommendations have been developed based on the data and results obtained in order to conduct more qualified studies:

- 1- Beyond just master's degrees, theses or papers, a wider picture can be reached by screening in a multi-faceted way in other academic studies.
- 2- TR Dizin, Web of Science, Google Scholar and Scopus databases as well as databases such as ERIC, EBSCO can be used.
- 3- The number of qualified academic studies to be carried out in this field can be increased.
- 4- The number of in-service trainings for teachers on the use of Web 2.0 tools can be increased.
- 5- Necessary arrangements can be made by interviewing teachers for their thoughts about Web 2.0 tools.

In the literature review on the use of Web 2.0 tools in distance foreign language education, it was found that there are opinions that the hesitation against Web 2.0 tools will be eliminated by increasing the number of academic studies. The importance of increasing the quality of distance education by encouraging each country's own researchers has once again been confronted with this systematic screening. The fact that each type of document contributes to research without more or less and that the studies should be published with the support of more institutions has revealed the fact that the educational environment will be enriched and provide permanent learning.

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89-The Use of Virtual Lab to Support Students' Learning Process on Management and Entrepreneurship Skills

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Abstract

The study aims to design and develop a virtual lab program to support students' learning process on management and entrepreneurship skills. The course of management and entrepreneurial skills must be mastered by students of the economic faculty of Universitas Terbuka. Research problems of this study involve: first, is the use of virtual lab as an instructional media able to enhance students' learning achievement? Second, how to design and develop an effective virtual lab that can facilitate students' learning process? This program consists of course content that must be practiced by students to implement management and entrepreneurship skills. The program entails several essential courses for the economics faculty such as operation management, financial management, marketing management, and human resources management. After studying the virtual lab programs the students will be able to create a model of business that can be used as tools for entrepreneurial or business. In addition, the program integrates learning journey components such as a proposition, idea development, concept development, business development, and sales program. These components are essential for students to develop and conduct the start-up business. These courses are considered as core courses in the study program of Management. This virtual lab was designed to facilitate and practice knowledge and skills for a large amount of open and distance learning students. UT students were domiciled in a wide area of Indonesia. This study used a research and development model that involve three phases: design, development, and evaluation. The multi-year study was planned for three years phases. In the design phase, a series of focus group discussions (FGD) was used to brainstorm the blueprint of the program that includes goals, contents, methods, strategies, and learning assessment. The FGDs of the design phase involve subject matter experts, instructional designers, media experts, digital content experts, and entrepreneurial practitioners. These components will be used as a base for producing the virtual laboratory program. The second year's study resulted from the draft of the program that will be formatively evaluated in the third phase or third year of the study. The result of the study in the Draft of the program consists of a simulation of content through a computer application. The structure of the draft program entails some sections such as pre-study, program introduction, content presentation, assignment and exercises, and feedback. This article only reported the design phase of the first year of the study. The first year of the study resulted from the comprehensive design of the virtual lab program for Economic Faculty students.

Keywords: Entrepreneurship skills, management, virtual lab.

1. Introduction

The use of media as the delivery system cannot be separated from the held distance learning system. The media in this sense have an essential role as the bridge between tutors and students. Many types of media are used. The study's purpose is to create and implement a virtual lab program to aid students' development of management and entrepreneurship skills. Students from Universitas Terbuka's economic faculty must complete a management and entrepreneurial skills course. This program includes course content that students must practice to utilize management and entrepreneurship abilities. The study employed a research and development

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paradigm with three stages: design, development, and evaluation. The multi-year study was divided into three phases. This article only covered the design process of the study's first year. The first year of research culminated in the comprehensive creation of a virtual lab program for Economic Faculty students to deliver course substances that must be studied by students. The use of media must be designed and developed to be able to support distance learning students.

The use of media as learning support for students must be based on the learning objectives that should be achieved by students. Every type of media has specific characteristics or attributes that can be explored maximally to facilitate students' learning. Basically, the media that can be used in distance learning can be classified into six categories 1) printed media, 2) audio media, 3) video, 4) multimedia, and 5) network-based media. In distant learning systems, the use of media is in line with the development of information and communication technology. In this digital and network technology era, e-learning is frequently used as media in many distance learning institutions globally.

Many distance learning institutions recently use online learning to deliver course substance to their students. Many advantages are offered by this system to facilitate students' learning process to achieve the predetermined learning goals. The advantages of implementing online learning include product development, working capital calculation, human resource needs, and market needs. The virtual lab can be considered as one of the media that can be used to support students' learning process in distance education. Using a virtual lab provides some advantages that can be elaborated on in this study.

1.1. Research Questions

This present study will explore the following research questions 1) Is the use of virtual lab as an instructional media able to enhance students' learning achievement? 2) how to design and develop an effective virtual lab that can facilitate students' learning process?

1.2. Research Objectives

This study aims to elaborate on how to design and develop a virtual laboratory that can facilitate students' learning process on managerial and entrepreneurial skills of distance education students.

2. Literature Review

2.1. Open and Distance Learning

The separation of students and instructors is the main characteristic of distance learning. To bridge the learning process the use of media and technology is a must (Smaldino, et. al. 2018). Distance education can refer to any form of learning where individuals are not physically present in a traditional setting, such as a classroom. This form of learning offers many advantages over traditional learning, providing individuals with the ability to learn at their own pace and in their own space. In this sense, the media have an important role in the delivery use course substances or content to students.

The practical courses offered to students required a specific type of media to be learned. A media with a certain attribute is necessary to support the student's learning process of management and entrepreneurial skills. Students need authentic learning experiences to master the skills of designing and developing a business model based on managerial and entrepreneurship. In this sense designing and developing a virtual lab is necessary to support student's learning process to attain the learning goal – of developing a proper business model.

There is some debate about an exact definition of e-learning, but a useful definition is the delivery of learning via any form of electronic media. The simple definition neatly encapsulates the two dimensions of e-learning: technology and education. There are two main reasons to start with technology. First, the development of e-learning owes itself to the exciting potential for technology to be used in education, and second, there has been dominance in the development of e-learning by technical experts (Paulsen, 2004).

Essentially learning is distance or distributed education. The original distance educators and learners relied on the postal system but now they rely on sophisticated technology. An important aspect of this approach to

learning is that the learner has a greater degree of control over how, when, and where their learning takes place. Learning resources can be accessed but are usually less convenient to the learner. This has obvious advantages but there is usually less direct contact with tutors and fellow learners compared with a course that is delivered face-to-face (Kats, 2010).

According to (Singh & Thurman, 2019) learning as a concept and as a keyword has consistently been a focus of education research for over two decades. In this paper, we present results from a systematic literature review for the definitions of online learning because the concept of online learning, though often defined, has a range of meanings attached to it. The origins of the term e-learning are not certain, although it is suggested that the term most likely originated during the 1980s, within a similar time frame to another delivery mode of online learning (Moore et al., 2011). While some authors explicitly define e-Learning, others imply a specific definition or view of e-Learning in their articles. These definitions materialize, some through conflicting views of other definitions, and some just by simply comparing defining characteristics with other existing terms. (Kirkwood, 2009).

It considers contextual factors that are of greater significance in determining how and why e-learning is used in HE. Students' engagement with e-learning relates to their expectations and conceptions of learning and to assessment demands. Academics need to re-assess their own beliefs and practices concerning teaching and assessment and their impact on the experience of learners. Both teachers and learners need to understand why e-learning activities are to be undertaken and the rewards expected to be derived. (Hussain, 2012) This paper first describes the three generations of the Web, usually referred to as, Web 1.0, Web 2.0, and the recently used neologism, Web 3.0.

After explaining how the educational technologies and the information systems used in each are different, these are related to the concept of e-learning. E-Learning literature also broadly distinguishes between e-Learning 1.0, e-Learning 2.0, and e-Learning 3.0; hence the paper draws a parallel between the generations of the Web and e-Learning. E-learning is part of the biggest change in the way our species conducts training since the invention of the chalkboard or perhaps the alphabet. The development of computers and electronic communications has removed barriers of space and time. We can obtain and deliver knowledge anytime anywhere (Horton, 2000). E-learning can be defined as the use of computer network technology, primarily over an intranet or through the Internet, to deliver information and instruction to individuals (in our case, employees). Our SMEs suggested that while terms such as computer-based learning, online learning, distributed learning, or web-based training are sometimes used, e-learning will increasingly dominate as the term of choice in organizations (Welsh et al., 2003).

Implementation of E-learning is a relatively young approach to education, but it can offer exciting learning opportunities for learners if technology is appropriately used to enhance the e-learning experience. It is readily apparent that e-learning is not simply one approach. It is composed of a variety of methods that can be mixed and matched depending on the requirements of both the educational provider and the learner.

2.2. Managerial and Entrepreneurship Skills

Kirby, Guerrero, & Urbano, (2011) where present that entrepreneurship is becoming an increasingly attractive job option not only for experienced and highly skilled professionals but also for university graduates. According to the latest research and statistics, universities around the world are making great efforts to develop students' entrepreneurial skills. In the Management Study Program, entrepreneurship is one of the main subjects that support the achievement of the graduate profile of the Management Study Program, namely as entrepreneurs.

According to a systematic literature review presented by the National Council on Postgraduate Entrepreneurship (Pittaway & Cope, 2006) entrepreneurship education has a significant impact on students' motivation, inclinations, and intentionality. "It is now recognized that the benefits of entrepreneurship education are not limited to the creation of new businesses and the next new job, but will develop students' core competencies, develop their mindset and in turn enable them to be more creative and confident in whatever they do" (Entrepreneurship Education in Ireland: Towards Creating the Entrepreneurial Graduate, 2009).

The integration of entrepreneurship courses in the fields of engineering, humanities, science, and education faculty programs in universities that aim to develop an entrepreneurial mindset is seen as a student entrepreneurship phenomenon but has not been widely studied (Fini, Meoli, Sobrero, Ghiselli, & Ferrante,

2016) as universities need to develop certain ways of thinking and behavior in their graduates. In addition, great attention has been paid to the suitability of different types of entrepreneurship education and the choice of pedagogical approach (Ojastu, Chiu, & Olsen, 2011).

Regarding the learning outcomes of the Management Study Program, one of which is the development of entrepreneurship which is also the content of the institution. This is in line with previous studies where universities around the world are making great efforts to develop students' entrepreneurial skills (Kirby, Guerrero, & Urbano, 2011) both through formal academic programs and through extracurricular activities, which firstly aim to foster mindset entrepreneurship (Hathaway, Bell-Masterson, & Stangler, 2013).

Xu and Li (2010) stated that because of its unique nature, entrepreneurship education needs to create a suitable business environment. Entrepreneurship education needs to build a suitable business environment, namely how to market after creating entrepreneurial ideas and obtaining appropriate benefits through the market. In the process of entrepreneurship education, it will involve expertise in various fields, such as marketing, e-commerce, finance, technology, and human resource management. Currently, entrepreneurship courses offered by universities are mostly theoretical or case studies in nature. It needs to be supported by investment in teaching and research and related incentive mechanisms. Entrepreneurship education needs to be supported with an educational platform to get the best entrepreneurial model through a certain market environment and the ability to solve practical problems.

In addition, great attention has been paid to the suitability of different types of entrepreneurship education and the choice of pedagogical approach (Ojastu, Chiu, & Olsen, 2011). The results of the study by Loboda, Ostrovskiy, and Katernyak (2018) state that in general, universities must promote entrepreneurship as a career choice and provide entrepreneurial experience to undergraduate and master students. Changing the academic culture is a shared challenge, which includes introducing entrepreneurial thinking and acting as an alternative to traditional teaching approaches, and opening up the university to the surrounding community and industrial ecosystem. The use of ICT and especially e-learning in providing entrepreneurship education may be an additional option for expanding the range of courses.

2.3. Virtual Lab as an Instructional Medium

Virtual laboratories are interactive, digital simulations of learning activities that typically take place in physical laboratory settings. Virtual laboratories enable students to engage in lab-based learning exercises without the costs and limitations of a physical lab. The virtual laboratory can be an important element in institutional efforts to widen access to lab-based courses to more and different groups of students. A virtual laboratory is also defined as a computer-simulated environment in which the conditions for experimentation typical of a conventional laboratory are recreated using generic or specific computer software. (Vergara, 2022).

Anderson (2020) noted that virtual labs are interactive online environments that support simulation-based learning. They let you create real-life simulations for conducting scientific experiments or engaging in other processes that may not be practical in physical classrooms.

Hurix (2022) noted several benefits of using the virtual laboratory to support the students' learning process that includes: 1) provides easy access to use new technology, 2) serves as a visual aid to teaching complex concepts, 3) ensures student safety, 4) engages learners, 5) offers instant feedback, and 6) allows learning flexibility, 7) affordable alternative to physical labs. In addition, Anderson (2020) also noted the benefits use of virtual laboratories as follows 1) Engaging with real-life simulations, 2) Explaining complex concepts, 3) Learning in a safe environment, 4) Eliminating ethical issues, 5) Unlimited time to learn, 6) Higher motivation and engagement, and 7) Better knowledge retention.

A virtual laboratory is an on-screen simulator or calculator that helps test ideas and observe results. In these online activities, students use advanced technology and media to conduct a series of experiments that yield authentic results. Virtual laboratories or virtual labs for short are the best way for students to practice in a safe, online environment. By doing virtual science lab games and engineering simulation software, students can interact with elements, machines, and interfaces before or instead of trying them out in real life.

Operating a virtual laboratory for a student must feel like they are working with real authentic devices in a real authentic space. By doing virtual laboratory students will engage in authentic learning situations to achieve the required learning competencies.

3. Research Method

This study used Research and Development to create virtual lab programs as instructional media for open and distance learning students. This model not only produces learning media but also elaborates the research question regarding the effective use of virtual labs as a substance learning delivery for studying managerial and entrepreneurial skills. The instructional goal of the virtual lab program is “the students will be able to demonstrate the ability to implement managerial and entrepreneurial skills in developing business models”.

The research and development model consists of three major steps that include: the design step, the development step, and the evaluation or research step. The design step of the program was analyzed to create a blueprint for the virtual lab program. The blueprint consists of the goals of the instructional program, content of substances, delivery method or learning activities, and learning results assessment. In the development phase, the blueprint was produced as a draft of the virtual lab instructional program that will be evaluated in the evaluation or research phase. The evaluation phase aims to measure the effectiveness of the implementation of the program.

This study was planned as a multi-year study that will be held in three years. The first year was the design phase. The production of the virtual lab program was done in the second year. The third year was planned to evaluate the program both formatively and summatively. This paper will report on the first and second years of the study.

This study used both qualitative and quantitative data. In the design phase, the data were collected through true focus group discussion (FGD) and expert interviews. This data was used as the base to create the blueprint of the program. In the second phase of the study the blueprint of the program was produced to be a draft of the virtual lab program.

4. Findings

This study of using a Virtual Lab to Support Students’ Learning Process on Management and Entrepreneurship Skills will report the first and the second year of the research process. Focus group discussions involved subject matter experts (SME), instructional design experts, digital content experts, and entrepreneur experts/practitioners. All of them contributed to designing the virtual lab program. The result of the FGD was used to create the blueprint of the program. the blueprint will be implemented as bases for program production.

The FGD was carried out in three phases with the aims to gather information regarding the description of program goals and content, program structure and selected media for delivery, description of learning activities and tasks, and indicators and criteria of program effectiveness. The results of FGDs can be seen in the following table.

Table 1. The Result of Focus Discussion Group

Session Of Data Gathering	Persons Involved	Activities	Results
FGD 1	Subject matter expert, instructional designer, media expert, digital content expert, and entrepreneurial practitioner	Brainstorm goal and content program	Description of Program Goals and Content
FGD 2	Subject matter expert, instructional designer, media expert, digital content expert, and entrepreneurial practitioner	Discuss program structure and media	Program structure and selected media for delivery
FGD 3	Subject matter expert, instructional designer, media expert, digital content expert, and entrepreneurial practitioner	Discuss the Learning Activities of Students to achieve the Goal	Description of learning activities and tasks
Expert Interview		Assess the preliminary of the program	Indicators and Criteria of program effectiveness

In the design phase of the FGD program, the Description of Program goals and content to be learned by students to achieve the predetermined competencies – goal: the students can build and run businesses based on regional resources. The content of the program is derived from the analysis result of the instructional goals. The analysis resulted from several learning objectives such as product development, working capital calculation, human resource needs, and market needs. These learning objectives are related to the five components of the following learning journey: proposition (namely competence, knowledge, skills, and characteristics possessed), idea development, concept development, business development, and business operations sales. The components or stages of the learning journey are depicted in the following table.

Table 2. *The components or stages of learning journey*

Stage of Entrepreneurial Process and Journey	Checkpoint and the Topic/Phase of Process-Based Entrepreneurship Training Course
0. Proposition/Prior Knowledge and Idea	0. Beginning/Before the Course/Initial Idea
1. Idea Development	1. Idea of Startup. Idea and Reality. Idea and Creativity
2. Concept Development	2. Scan Environment. Analyze Industry. Identify Opportunity. Recreate Idea 3. Protect Idea. Intellectual Property Issue
3. Business Development	4. Bring the Idea into the Market 5. Define Capital Needs and Get Funding 6. Few Minutes Can Define Your Entrepreneurial Journey. Presentation of Strategy

Adopted from: Mets, Tõnis et al. 2019

These learning journeys must be studied by students deeply and comprehensively by the students to ensure that they will be able to attain their learning goals.

In the development phase workshop or FGD identified the structure and media program. The program was structured based on learning content media and student learning activities. The structure of the program must be systematic and systemic in order to facilitate students to achieve the determined instructional goals. In this phase, appropriate media must be selected to be relevant to student learning activities. The selected media used in this program include video and animation that are relevant to program content.

In the following FGD, the discussion involved determining student learning activities that include: Pre-instructional sessions, content delivery, and student feedback. Activities of students' learning must be ensured to facilitate students to achieve instructional goals. Students must be active to study contents that are related to determining instructional objectives. Instructional methods and strategies that create student learning involvement must be implemented in this program. The instructional methods and strategies that are potential to be used in this program include case and project-based methods.

The whole activities of the workshop and FGDs resulted in the comprehensive scheme or design of the virtual laboratory program of the Management course that summarized in the following figure.

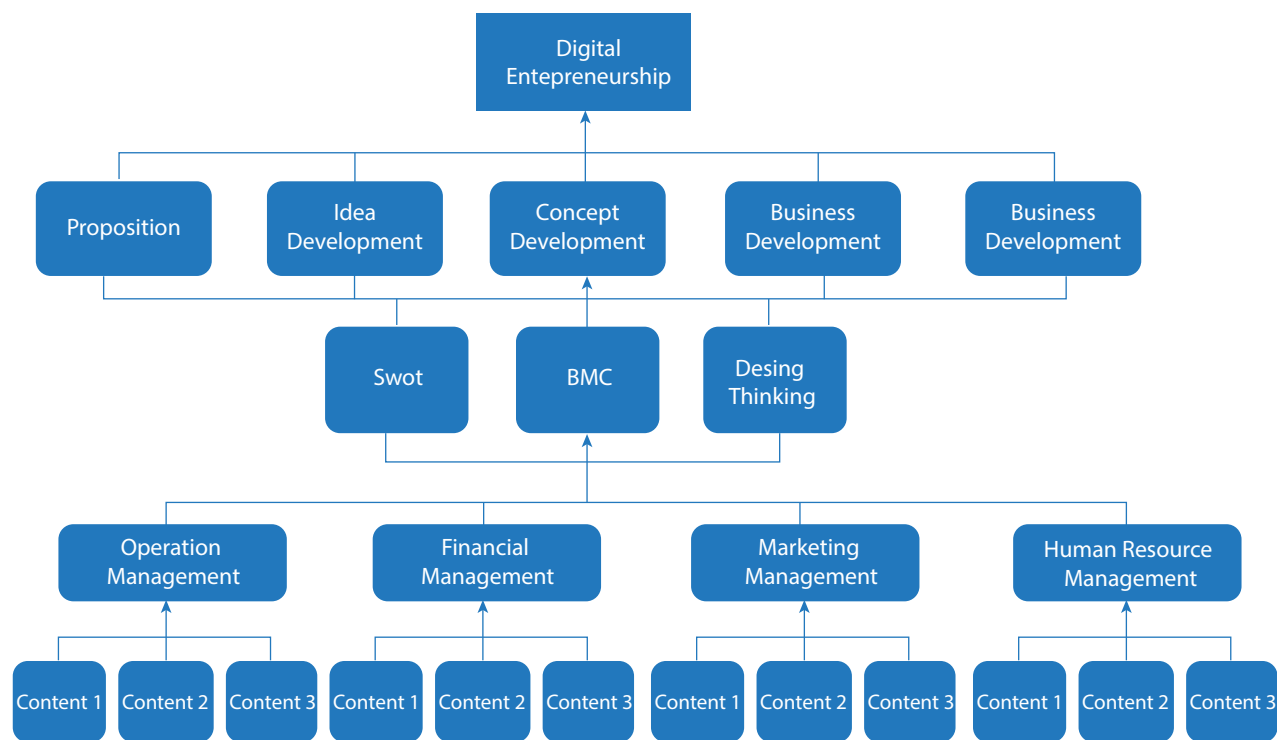


Figure 1. Design of Virtual Laboratory Program of Management Course

This use of technology allows them to implement for example laboratories, as mentioned throughout this article, recreating scenarios for students to explore and interact with knowledge.

5. Discussion and Conclusion

This study of developing virtual lab program resulted the draft of the program that consists of several component such as pre-study, program introduction, content presentation, assignment and exercises, and feedback. Component of the pre-study describes task and assignment that measure students prerequisite skills that students' have owned before studying the virtual lab program. The program introduction components describe the procedure that students must explore during studying the substances of the program. The content presentation entails comprehensive substances from economics core courses such as operation management, financial management, marketing management, and human resources management.

Besides, the program involve the component of learning journey such as a proposition, idea development, concept development, business development, and sales program. These learning journey components facilitated students to achieve instructional goals of the program - after studying the virtual lab programs the students will be able to create a model of business that can be used as tools for entrepreneurial or business. This study will be continued by implementing the formative evaluation of the program. The aims of the evaluation phase program is to ensure that the program will be use effectively by Economic Faculty students of Open and Distance Learning – Universitas Terbuka.

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Young Innovator Award Silver Medal

90-Revolutionising Learning Management System With Aigc-Avatar: An Insights From Students' Perspectives

Saw Fen, Tan¹

Abstract

Most of communication within conventional Learning Management Systems (LMS) is primarily text-based. However, text-based communication is less engaging for students in comparison to multimodal communication, which makes it challenging to capture students' attention effectively. Thus, this study proposes the use of Artificial Intelligence Generated Content-Avatar (AIGC-avatar) in communication with students within the LMS. This study aims to investigate students' perceptions regarding the integration of AIGC-Avatar within the LMS of an open distance learning institution. This qualitative study involved seven students from a postgraduate course. The AIGC-avatar was developed using three distinct artificial intelligence tools, namely ChatGPT, Leonardo, and HeyGen. The avatar was employed to communicate with students in the LMS, providing welcome notes, assignment guidance, feedback, tutorial reminders and preparation, encouragement, and study tips. Throughout the semester, all students enrolled in the course had access to the AIGC-avatar videos. Individual semi-structured interviews were conducted at the end of the semester, which were then video recorded, transcribed verbatim, and analyzed using NVivo software. Data analysis revealed that the majority of students expressed positive feedback regarding the use of AIGC-avatar in the LMS. It was deemed to enhance their perceived instructor social presence and motivation. Nonetheless, a few students expressed a preference for text-based communication over the AIGC-avatar. Participants highly valued the assignment guide and feedback delivered by the AIGC-avatar. Although the participants found the avatar's movements to be lacking in naturalness, they appreciated the avatar's clear and professional speech. The participating students expressed their anticipation for further applications of the AIGC-avatar in their teaching and learning support.

Keywords: *Artificial Intelligence Generated Content-Avatar (AIGC-Avatar), Learning management system (LMS), students' perceptions*

1. Introduction

Open and distance education is booming, with an ever-increasing number of students enrolling in distance learning programme each year (Muljana & Luo, 2019). Seaman et al. (2018) reported that the growth between 2012 and 2016 was 17.2%. However, the institutions offering distance learning programs continue to face challenges with low retention and completion rates, as well as high dropout rates (Muljana & Luo, 2019; Radovan, 2019; Xavier & Meneses, 2020). Many reasons contribute to student dropout. One of the reasons is the geographical distance between learners, their course mates, and instructors, which often leads to feelings of loneliness and isolation (Burns, 2013). These sentiments demotivate learners, causing them to feel discouraged and ultimately drop out of their studies.

The learning management system (LMS) plays a crucial role as the primary communication platform in open distance learning. It serves as a comprehensive tool for distributing educational materials, assessment tasks, announcements, facilitating discussions, and enabling communication among students and instructors. Being the central portal in open distance learning, it serves as the key link connecting students with their peers and instructors. Nevertheless, communication within the LMS is primarily text-based. Text-based communication lacks nonverbal cues such as facial expressions, body language, and tone of voice. The absence of these nonverbal cues hinders the establishment of rapport and trust between instructors and learners. Cobb (2009)

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reported that several researchers have found social presence in text-based online communication to be perceived as low. This creates feelings of disconnection or transactional distance between learners and instructors (Byrd, 2016; Estes, 2016), which in turn contributes to student dropout.

As a response, some researchers have introduced multimodal communication in online learning to enhance social presence and engagement, for instance, Flipgrid, LMS video-response discussion boards, and VoiceThread (Carr, 2020; Casan-Nunez, 2021; Chen & Bogachenko, 2022). Carr (2020) reported that participants preferred alternative communication modes over traditional text-based communication. Similarly, Casan-Nunez (2021) found that participants in his study responded positively to the use of Flipgrid in their online classroom. Despite the positive response to multimodal communication, the study conducted by Lowenthal and Moore (2020), where Flipgrid was used as video-based discussion tools in online learning, revealed that some students were uncomfortable showing their face in the video. This hindered their ability to communicate with others in the online learning environment. Shyness and lack of confidence might also pose issues for certain online instructors to communicate through video online.

As a result, the instructors may find themselves interacting with students from diverse regions, each with their unique dialects and slangs that significantly influence their English proficiency. The diversity may pose challenges to effective video communication. Hence, this study proposed to use the AIGC-avatar as a means of communication in LMS. Since students are the core beneficiaries of teaching and learning process, this study set out to explore the students' perceptions regarding the use of AIGC-avatar in LMS. By understanding their perceptions, we would be able to understand whether AIGC-avatar has the potential to replace real human video in LMS to enhance the teaching and learning process.

Open distance learning has shattered the limitations of educational opportunities. Students can enroll in programmes from any corner of the globe, without being restricted by their geographical location. As a result, instructors may find themselves interacting with students from diverse regions, each with their unique dialects and slangs that significantly influence their English proficiency. This diversity may pose challenges to effective video communication. Thus, this study proposes using the AIGC-avatar as a means of communication in the LMS. Since students are the primary beneficiaries of the teaching and learning process, this study aims to explore students' perceptions regarding the use of the AIGC-avatar in the LMS. By understanding their perceptions, we can determine whether the AIGC-avatar has the potential to replace real human video in the LMS in enhancing the teaching and learning process.

1.1. Artificial Intelligence Generated Content (AIGC)

Artificial intelligence-generated content (AIGC) involves the utilization of artificial intelligence (AI) to aid or automate the content creation process. By analyzing the keywords or requirements input by the user, AI systems generate relevant content to meet specific criteria or preferences. As mentioned by Wu et al. (2023), there are three modes of content creation, namely Professional Generated Content (PGC), User Generated Content (UGC), and Artificial Intelligence Generated Content (AIGC). In the PGC mode, content is generated by professional teams with expertise in their respective fields. This mode often produces high-quality content, but the production process can be time-consuming and challenging to meet the demand for top-tier content. Meanwhile, in the UGC mode, users create content using authoring tools. The use of tools reduces the threshold and costs of generation. However, the quality of the content created may vary depending on the users' competencies, which could lead to inconsistencies in content quality. In the AIGC mode, content is produced with the assistance or complete automation of artificial intelligence technologies. It employs machine learning algorithms, natural language processing (NLP), and other AI techniques to analyze large datasets for content generation. AIGC can be categorized into text, image, audio, and video.

AI-generated voices were used by Leong et al. (2023) for explainer videos at a university in Malaysia. The study investigated students' responses to AI-generated voices. The 31 participants were exposed to a set of explainer videos using different voice-overs, including human voices, speaker notes apps, and AI-generated voices. Based on their responses collected through a questionnaire, the students preferred the more human-like voice-overs and showed no substantial negative perceptions of the AI-generated voices that closely resembled human voices.

To the knowledge of the author, no study has explored the potential of AIGC-avatar in LMS. Hence, there is a research gap to be filled. Positive feedback from students regarding this innovation would be particularly valuable because producing AIGC-avatar is much simpler than creating real human content. It does not require the setup of an expensive studio, and only minimal training is needed for its production. Wu et al. (2023) observed that the use of AIGC enhances efficiency and scalability. Content can be generated in a shorter time. Besides, AIGC can perform language localization by translating content into languages commonly spoken in specific regions. However, they also expressed concerns that AIGC may lack creativity and emotional expression.

1.2. Instructor Social Presence

Instructor social presence is a construct based on the Community of Inquiry (CoI) Framework advocated by Garrison, Anderson, and Archer (2000). According to this framework, social, cognitive, and teaching presence are essential components of the educational experience. Social presence is defined as ‘the ability of participants in the community of inquiry to project their personal characteristics into the community, thereby presenting themselves to others as “real people”’ (p. 89). Garrison and Anderson (2003) elaborated that social presence involves “creating a climate that supports and encourages probing questions, scepticism and the contribution of more explanatory ideas” (p. 50). Teaching presence refers to “the design, facilitation, and direction of cognitive and social processes for the purpose of realising personally meaningful and educationally worthwhile outcomes” (Anderson et al., 2001, p. 8). Teaching presence includes managing instruction, building understanding, and providing direct instruction.

The construct of instructor social presence is the overlap between social presence and teaching presence. It refers to the way an instructor “positions him/herself socially and pedagogically in an online community” (Richardson et al., 2015, p. 259). It is the social presence of the instructor. According to Richardson and Lowenthal (2017), instructor social presence can be created in online learning by giving welcome and orientations announcement, providing timely and detailed feedback, communicating with students regularly and so forth.

The construct of instructor social presence is the intersection of social presence and teaching presence. It refers to the way an instructor “positions him/herself socially and pedagogically in an online community” (Richardson et al., 2015, p. 259). It represents the social presence of the instructor. According to Richardson and Lowenthal (2017), instructor social presence can be created in online learning by giving welcome and orientation announcements, providing timely and detailed feedback, and maintaining regular communication with students (Gunawardena & Zittle, 1997; Ho, et. al., 2022; Jaggars et al., 2013; Nasir, 2020; Richardson & Lowenthal, 2017). When students feel connected to their instructors, they are more likely to actively engage in idea-sharing, collaborative work, and meaningful discussions within the online learning environment, ultimately enhancing their performance.

The use of asynchronous videos by Borup et al. (2011, 2012, 2014) was found to foster closeness and increase instructor social presence. These videos conveyed verbal and non-verbal immediacy cues. This study proposes using AIGC-avatar to communicate with students in the LMS. Throughout the semester, it provides a welcome note, assignment guide, assignment feedback, encouragement, study tips, as well as tutorial reminders and preparation. By engaging with the AIGC-avatar, students’ perceptions of instructor social presence may be further enhanced.

2. Methodology

2.1. Participants

In this study, the AIGC-avatar was employed for communication purposes within the LMS for a specific postgraduate course at the university. All students enrolled in the course had equal access to the AIGC-avatar videos. Seven students were chosen from the course to take part in a semi-structured interview, which was conducted by the researcher. The demographic information of these seven participating students is presented in the Table 1. As displayed in the Table 1, Carmen was the only student in her first semester, while the other six participants were at various stages in their academic journey.

Table 1. Demographic information of participants

Student	Gender	Academic Term	Age
Linda	Female	4th	45
Kenny	Male	4th	31
Eugene	Male	2nd	37
Melissa	Female	2nd	49
Alex	Male	5th	40
Carmen	Female	1st	39
Jasmine	Female	3rd	40

2.2. Data Collection

Qualitative data was collected through semi-structured interviews. The researcher conducted individual interviews with the participants at the end of the semester. These interviews aimed to explore the participants' perceptions regarding the use of the AIGC-avatar within the LMS. All interviews were video-recorded with permission for analysis purposes.

2.3. Procedure

The AIGC-avatar was used for communication purposes in the LMS for a single semester within a postgraduate course. The duration of the semester was 14 weeks, including 11 weeks of teaching and learning, 1 week for self-study, and 2 weeks for examinations. Over the span of the 11 teaching and learning weeks, students were required to complete 2 assignments, while three online tutorials were also offered, although attendance to these tutorials was not compulsory. The AIGC-avatar videos were posted in the LMS from week 1 to week 11 to convey the following messages:

- i. Welcoming note (at the beginning of the semester)
- ii. Assignment guide
- iii. Assignment feedback
- iv. Tutorial reminder and preparation
- v. Encouragement
- vi. Study tips

The creation of the AIGC-avatar videos involved the utilization of three AI tools, namely Leonardo, ChatGPT, and Heygen. The image of the avatar was crafted using Leonardo, followed by the generation of the script by ChatGPT. Important points were integrated into the ChatGPT, which was then instructed to rephrase the script in a friendly and motivating tone. Lastly, the script from ChatGPT and the image from Leonardo were combined within Heygen to transform the text and image into video format.

2.4. Data Analysis

All the interviews were transcribed verbatim and imported into NVivo. Then, the transcripts were read through several times to explore the participants' perceptions regarding the use of AIGC-avatar in LMS.

3. Findings and Discussion

This study aimed to explore the students' perceptions regarding the use of AIGC-avatar in LMS. The findings from the analysis were divided into four sections, which included the students' perceptions regarding the use of AIGC-avatar in LMS, the content delivered by the AIGC-avatar, the design of the AIGC-avatar and the suggestions for advancement.

3.1. Students' Perceptions Regarding the Use of AIGC-Avatar in LMS

The analysis of semi-structured interview with the participating students revealed that majority of them were excited with the use AIGC-avatar in the LMS.

“I felt really creative. Unlike the conventional method, we call it the traditional method, it’s through text, slides and everything. Video tends to trigger my interest. It’s quite engaging.” (Eugene)

“This is my first time to have avatar in my learning management system. So it’s very new to me, but I would say it’s a great start to have all these videos into our LMS.” (Jasmine)

“I watched the first video about the introduction. It’s the avatar introducing herself. I was eager to it. It makes me want to know what’s the next video about.” (Alex)

Jasmine found the inclusion of AIGC-avatar in the LMS interesting as it provided multimodal learning compared to text, which was unimodal communication.

“I do enjoy both text and videos. But, adding the visual and the sound create another way of learning. It’s not like we only read, write and look at the text. All the materials are in text, right? It’s something different to have the video.” (Jasmine)

Alex and Linda had similar comments regarding the use of multimodal communication. Alex commented that *“for the text, I have to refer to it many times, compared to the video. Even I listen only one time, I still remember the details. I don’t have to play the video many times. Compared to the written text, I have to check many times when I’m doing my assignment”*. He further elaborated that *“maybe because I’m a music person, or maybe I prefer the audio. I feel like listening is better than reading.”*

Similar comment was given by Linda,

“If compare the text and avatar in LMS definitely avatar will be better because I am audio type of people, I need to listen in order to learn better so avatar will... I think offer me a better understanding in terms of the assignment guide and needs and compared to text because sometimes I will not be able to comprehend that much from the text. So about that actually offer another way of learning and understanding in terms of the in the LMS learning.”

While Alex and Linda commented that they can comprehend the assignment guide better through the verbal explanation from the avatar over the text, some students expressed that they still prefer text, as compared to avatar. As mentioned by Kenny, *“I like [the assignment guide in] text. I like to get the information as quick as possible so that I can start do my work. Now, when I click into it, I have to wait for the avatar to talk. Say already, I have to pause and write it down. I have played again.”*

Melissa also had similar comment regarding the use of AIGC-avatar to explain the assignment guide,

“when I was listening. I have to pause a few times, after that, listen again to make sure that I capture the information accurately before I start my assignment. I’m very particular about my marks, this portion how many points, this portion how many points. It’s not very useful [to be used for assignment guide] because I have to [view] it a few times.”

There was a mix of responses among the students regarding the use of the AIGC-avatar for the assignment guide. Two students commented that they prefer the AIGC-avatar, while the rest of the students preferred to have the assignment guide in text form. This preference could be influenced by the students’ learning styles. Those who are auditory learners may find it easier to grasp the information through video and verbal explanations from the AIGC-avatar.

The use of the AIGC-avatar was also found to create a perceived instructor social presence among the students. Alex commented that *“it feels like a real person. Feel like someone is talking to me.”* He elaborated that *“usually the LMS, there are just text, right? With this video, when we listen, when I listen to the speech, it feels like listening to someone encouraging.”* Similar comment was given by Carmen,

“I feel more motivated. I will feel that there are some people there. When I listen to the study tips, I feel someone is supporting you by giving you some tips to help you, you feel supported and then you won’t feel lonely”.

Furthermore, the welcome note delivered by the AIGC-avatar also made Carmen feel welcomed, especially when compared to another course where the welcome note was delivered in text. She said, *“the video will have a different feeling, like I am welcomed. Compare to just a formal text, I don’t have the feeling.”*

These findings contribute to the current pool of knowledge, suggesting that the use of AIGC-avatar has the potential to create instructor social presence in the online learning environment, which was one of the component in the CoI Framework, advocated by Garrison et al. (2000).

3.2. Content Delivered by the AIGC-Avatar

Table 2 shows the students' responses towards the different types of content delivered by the AIGC-avatar in the LMS. Among these content types, assignment guide and feedback received the most favorable feedback from the participating students. Five out of seven of them commented that these two types of content were helpful for their study.

Table 2. Number of students with positive perceptions towards AIGC-avatar delivered content

Type of content	Number of students
Assignment guide	5
Assignment feedback	5
Tutorial reminder and preparation	2
Encouragement	2
Study tips	1
Welcome note	1

As mentioned by Carmen, *“the most helpful one is the assignment guide. As you know, we are ODL, we have no classmate to discuss, so there's the only thing I can get before I prepare my assignment”*. Similar points were given by Jasmine, *“I try to seek some clues how to start off with my assignment”*. Likewise, Melissa expressed that *“I play the video [with assignment guide], I listen, get the points, then I can start do my assignment. It helps me a lot.”* Most of the participating students reported that the assignment guide delivered by the AIGC-avatar assisted them in preparing their assignments.

Assignment feedback was delivered after the marks were released. The feedback was prepared based on the common mistakes in students' submitted assignments and advise on how to perform better in upcoming assignment tasks. The students found that those advise was helpful in better preparing for future assessments.

“Listening to feedback makes me... I mean try to improve for the next assignment and the final assessment. It is the most valuable.” (Alex)

“I like the advise, like go straight to the point, try not to give superficial points, that I what I always did because of the word count limit... I really like that part.” (Eugene)

This finding supports the argument presented by Vlachopoulos and Makri (2019), who have conducted a literature review to identify strategies for enhancing communication and interaction in online learning environments. They highlighted the significance of guidance and feedback on assignments as crucial factors for enhancing learning.

Out of the seven participants, two of them highlighted how the tutorial reminder and preparation assisted them in their learning. As commented by Jasmine, *“the reminder of the tutorial and what the tutor is going to discuss in the coming tutorial. So, give me the picture of what I need to get prepared for the next tutorial. What topic, which area that I need to prepare myself.”* The students stated that they were able to prepare in advance for the tutorial based on the instructions delivered by the AIGC-avatar.

There were also two participating students perceived that the motivational messages were helpful to them. As expressed by Alex, *“the the encouragement is quite good because... usually the LMS they are just text, right? Uh, with this video we list when we I listen, when I listen to speech, it's it's. It feels like listening to someone encouraging. It feels like a bit of human touch there.”* He felts motivated from the message he received from the AIGC-avatar.

As reported by Tan et al. (2021), time management and seeking help were correlated with academic performance of open distance learners. Hence, the AIGC-avatar encouraged the students to seek for help if needed and allocate time for their studies. While many students found this message not useful as they were already aware of the importance of time management, Carmen, a first-term student, appreciated the message. According to her,

“I get the point from the video is everyday we allocate one hour for reading and then that is actually helps a lot. I think everyone knows, but... when it comes out from your mentor, you will have a feeling like ohh my mentor is advising me to do this, so I will have the feeling like you have the motivation to do that.”

This could be attributed to newcomers' uncertainty in navigating their learning process, making them more receptive to guidance. In contrast, students from the second semester onwards have already gained experience

with distance learning and developed their own strategies. Hence, such tips might not be useful to them. Instructors should consider students' academic level when communicating with them. Academic guidance could benefit first-semester students, preparing them for distance learning. However, this advice should be minimized as students advance in their studies.

3.3. Design of the AIGC-Avatar

When asked about the design of the AIGC-avatar, most of the participants commented that the appearance was attractive. However, they observed that the motion of the avatar was not natural.

"Tone speech is OK, but the speech and the mouth is not so coordinated. Eye blink is not so natural." (Melissa)

"The tone in terms of the speed is OK and then the appearance also very attractive. So just that it's not natural." (Linda)

Three students provided positive comments regarding the speech. Carmen commented that *"I like the speech, very professional"*. Similarly, Alex highlighted that use of speech by AI encountered problem with instructors who has less proficiency in English speaking.

"[the speech] is very clear, let's say if someone take their own video, I think they might have a problem with the speech as a problem with the audio. Sometimes, the audio is not very clear."

Jasmine shared a similar view with Alex, she mentioned that it would be good for international students.

"If let's say for international learning, we need to localise. We need to consider those foreign students that don't really understand well. [Some foreign lecturers'] slang are very strong. So yeah, that one the avatar will work better."

In summary, despite the AIGC-avatar's appearance and motion being perceived as lacking naturalness, students found value in the AI-generated speech addressing language-related challenges. This is particularly relevant for instructors with limited English proficiency or strong accents that might hinder student comprehension. This aligns with the findings of Leong et al. (2022), who reported that students found AI-generated voices easier to understand.

3.4. Suggestions for Advancement

The participating students were excited with the utilisation of AIGC-avatar in the LMS. They recommended expanding its use to deliver course content, particularly for providing summaries and highlighting key points.

"At least we don't have to go through the entire units. Lots of words. If we can have this kind of video to bring out the important points of that particular unit, and also the whole course. That would be very helpful." (Jasmine)

"The course materials are all PDF, right? What I normally read is the contents to make to get an overall guideline. Then after that go and read the details. So probably another step would be to have the avatar to give a summary of each of the unit so that it provides the students with a brief overview." (Melissa)

Besides, the students also suggested enhancing the AIGC-avatar videos by incorporating textual elements to visually emphasize key points.

"The speech is presented by the avatar. Maybe some important points are presented with visual. With some infographics." (Alex)

In addition to content-related suggestions, the students also recommended making the background of the AIGC-avatar videos brighter to impart a livelier atmosphere. Eugene shared his preference and stated, *"maybe the background can change too. I like brighter brighter background."*

4. Conclusion

This study marks a significant initial step in venturing the application of AIGC in the context of open distance learning. The analysis of data based on the students' perception revealed a combination of positive and negative comments regarding this innovation. Majority of the participating students expressed positive perceptions regarding the use of AIGC-avatar, it was deemed to enhance their perceived instructor social presence and motivation in learning. Meanwhile, there were also a few participants expressed their preference of text over the AIGC-avatar. The discrepancy in response could be caused by the difference in their learning style.

The assignment guide and feedback were most valued by participants among the various messages delivered. While of the participating students commented that the AIGC-avatar was lack of naturalness, some of them expressed appreciation for the clear and professional speech delivered by the AIGC-avatar. They also highlighted its potential in addressing English language proficiency challenges faced by certain instructors. Students expressed anticipation for broader integration of the AIGC-avatar in their learning process, suggesting its use for delivering course materials.

Overall, the use of AIGC-avatar received positive feedback from most participants. This might imply that the use of multimodal communication through AIGC-avatar has the potential to enhance the online learning experience in LMS. Instructors could incorporate the AIGC-avatar for communication and course content delivery, such as summaries and key concepts of the course materials. The AIGC-avatar's clear and professional speech makes it useful for instructors lacking English proficiency. In a multicultural context like Malaysia, where citizens know multiple languages, the AIGC-avatar could prepare videos in different languages to cater to student needs and enhance engagement.

This study focused on only one course with seven participants, its findings might have limited generalizability. Future research can be conducted with larger sample sizes to explore the AIGC-avatar's impact on students with different demographics. Additionally, further studies could examine its effectiveness in summarizing course content and highlighting key concepts.

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91-A Corpus-Based Analysis of ‘*Distance Learning*’ in a Malaysian Internet Forum

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Abstract

This study examines a corpus of forum threads aiming to: i) identify how language is used to represent *distance learning* and; ii) find out aspects of distance learning that are not represented. To facilitate this research, a 30 million words corpus made up of threads from a sub-forum named *Education Essentials* in Lowyat.net, an Internet forum in Malaysia, was created. Another corpus comprising articles by Malaysian practitioners of ODL (open and distance learning), named MODLA in short, was created to function as a point of reference. The result of frequency analysis shows that the node word *distance learning* and its variant, *ODL* occur 488 times (0.0016%) in the corpus. The low frequency suggests most Malaysians may not be aware of this mode of education. The collocational analysis results show that *distance learning* generally occurs in the company of rather neutral associations. The frequently used neutral collocations can be attributed to questions and statements forum users asked and made about *distance learning*. Also, *distance learning* is interpreted as synonymous to online learning and part-time learning. While it is found that collocates *open*, *courses*, and *institutions* or *university* in MODLA and the Lowyat Education Essential corpus are the same, analysis of the former’s concordance list reveals different associations. The practitioners tended to focus on issues facing distance learners which are student intention to continue study, student interaction, assignment, and learning management system. Also, the use of the term *online distance learning* among the lay people and practitioners can be regarded as the onset of the blurred distinction among all forms of education conducted online. Open universities and practitioners are suggested to: i) enhance institution reputation by investing in faculty and staff professional development as well as capacity building and; ii) redefine themselves as lifelong learning centres.

Keywords: *Distance learning, corpus-based method, Internet forum, lifelong learning, Malaysia.*

1. Introduction

Based on the data from the Department of Statistics Malaysia (DOSM) (2018), a majority of employees (55.6%) reported having secondary education as their highest education attainment. This suggests that a large proportion of working adults are not grabbing the opportunity to pursue tertiary education to enhance their knowledge, skills, and competencies. Human capital development can be achieved through open and distance learning (ODL) for regular working individuals to study part-time so that they can remain sustainable and employable (Rajadurai, et al., 2018). Nonetheless, personal characteristics which include attitudes, needs, interest, motivation, expectation, study habits and other commitments adult learners possess (Mohd Salleh, et al., 2015) may encourage or discourage them to further their studies. Despite Md Harizan and Tahir (2020) claiming ODL as a popular choice among working adults, it does not seem to be a preferred mode of education in Malaysia; the percentage of employees holding at least a degree in 2018 is only 28.6% (Department of Statistics Malaysia [DOSM], 2018). From a broader perspective, Kanwar (2018) highlights that the total enrollment of 27 open universities in the Commonwealth in 2016 was 4.4 million and it could not help to improve the gross enrollment ratio in tertiary education. This shows ODL may not be as widespread as the traditional mode of study (Brown et al., 2015) offered by most conventional universities.

The term *distance learning* has been used interchangeably with *online learning* and *e-learning* (Moore et al., 2011). At this juncture, it is important to define these three concepts to distinguish the differences in

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these learning environments as well as characteristics unique to each of them. Based on Singh and Thurman's (2019) systematic review, *distance learning* refers to teaching and learning activities not taking place in a physical classroom setting while *online learning* and *e-learning* are differentiated by the types of technology used. According to Guilar and Loring (2008), the term *distance learning* is used to focus on aspects related to distance, specifically time and place. It is described as all teaching and learning arrangements between teachers and students happening at different time and space with separated set-up, using various forms of instructional materials (Kant, 2019; Moore et al., 2011). Distance learning has mostly been associated to digitally mediated environment and leveraging information communication technology (ICT) so that students get full access of the curriculum (Atchoarena, 2021; Brown et al., 2015; Radovan, 2019).

Since the context of this study is Malaysia, getting the definition of ODL from the Malaysian Qualifications Agency (MQA), the governing body in charge of quality assurance of higher education programs, is necessary. According to MQA Code of Practice for Programme Accreditation: Open and Distance Learning (COPPA:ODL) (MQA, 2019, p.1), ODL refers to "the provision of flexible educational opportunities in terms of access and multiple modes of knowledge acquisition". In other words, choices for educational activities are made available anywhere, anytime, opportunities are given to all without time and place restriction, and various delivery systems and learning resources are used for teaching and learning (MQA, 2019). This corresponds to the aim and action of ODL systems (comprising open learning institutions and repositories of open educational resources) that offer flexibility and choices to reach people wherever they are (Kanwar & Daniel, 2020).

While the definition of *distance learning* focuses on time and space difference, the description of *e-learning* and *online learning* links to the use of technology in the teaching and learning context. *E-learning* provides learning opportunity to individuals via Internet and other electronic mediums such as CD-ROMs, satellite broadcast, Intranet, and television (Benson, 2002; Ryan & Young, 2016 as cited in Singh & Thurman, 2019), which means the digital device used by learners to access materials need not be connected to a digital network. Because of the technological explosion, the concept of 'e-learning' is introduced as an umbrella term referring to the use of any digital devices and medium for content delivery or access of learning materials (United Nations Educational, Scientific and Cultural Organization [UNESCO], 2021). 'Online learning' is defined as education delivered through web-based platforms like posting course materials on learning management systems (Benson, 2002; Bates, 2001 as cited in Singh & Thurman, 2016). In other words, 'online learning' is a form of learning conducted via a digital network which allows learners to access some learning materials and services in addition to enabling them to interact with the content, educators, and other learners.

These three concepts seem to share one feature, i.e. learning takes place online (but not necessarily in the case of e-learning) while the synchronous / asynchronous interactions, physical distance, delivery of educational materials according to Singh and Thurman (2019) are the dissimilarities. The inconsistencies in the use of *distance learning*, *online learning*, and *e-learning* and that their definitions have not been consistently applied may cause confusion among the lay people. Also, their slight differences are not apparent enough to be taken into account by members of the public including prospective students.

1.1. Research Objectives

This study aims to find out Malaysians' perception on *distance learning*. In particular, we seek to achieve the following research objectives:

- i) to identify how language is used to represent distance learning
- ii) to find out aspects of distance learning that are not represented

It is helpful if ODL providers understand the (mis)conceptions Malaysians may have which explain the less-than-ideal uptake of what is on offer. Educational policy makers can then address the misconceptions (if any) so that working adults can be more aware and confident to take up ODL to upskill themselves.

The emphasis in this study will be the analysis of linguistic forms in forum threads related to *distance learning* using corpus linguistics tools. The accessibility of Lowyat.net, which allows Malaysians to discuss diverse topics including education related matters, presents an opportunity for research into the representation of *distance learning* in an Internet forum. Findings will then be compared with studies by key players of distance education at the national level, extracted from Asian Association of Open Universities Journal (AAOUJ) and Commonwealth of Learning (COL). This second dataset functions as a point of reference to bring to light what *distance learning* is and its association from the subject matter experts' point of view.

Following this introduction, we discuss the significance of using a corpus of forum threads and refer to literature by key players to shed light on ODL (Section 2). The findings of our analysis are presented in Section 3, and then discussed in the concluding Section 4.

2. Method

A corpus comprising forum threads from a sub-forum in Lowyat.net was developed for analysis. This forum is selected because it is claimed to be one of the most active forums in Malaysia (Goh, 2014); it has approximately 940 thousand registered members who have contributed more than 75 million posts since its launch in 2002 (see <https://forum.Lowyat.net/>). The subsequent section explains the creation of the Lowyat Education Essential corpus followed by criteria to select ODL studies published by two organisations committed to distance education. The data analysis process, which involves concordance and frequency data exploiting the two forms of analysis – qualitative and quantitative (McEnery & Hardie, 2012), is then described.

2.1. Creating the Lowyat Education Essential Corpus

To facilitate this research, forum threads from the Lowyat Education Essential sub-forum were extracted to create a purpose-built corpus of 30 million words. This particular sub-forum is chosen because it is expected to contain the term *distance learning* in discussions about education related matters in Malaysia.

Firstly, the data was obtained through the use of a specially designed Perl script, which automatically downloaded it. Additionally, the script performed post-processing on the data to eliminate HTML boilerplate and other irrelevant text sections. In the subsequent stage, the data was structured to distinguish meta-data (such as the sub-forum name and forum postdate) from the actual content. Lastly, various elements within the forum posts underwent automatic reformatting. For instance, any text identified as a quote was replaced with the generic placeholder “<QUOTE>,” which helped avoid duplicated text that could potentially influence quantitative findings. Furthermore, HTML links to graphical emojis were converted to their alphanumeric equivalents (e.g., <:P> or <shakehead>). As a result, the final corpus format (in TXT file) was compatible with standard concordance software, while still maintaining a coherent reading experience for human readers.

2.2. Using Information from AAOUJ and COL as Reference

Referring to articles published by AAOUJ and COL can inform issues in ODL that are possibly regarded as key areas by practitioners of ODL. Information disseminated by these two organisations (cf. “About the Commonwealth of Learning”, 2023 and “Asian Association of Open Universities Journal”, 2023), which are prominent proponents of open learning and distance education is considered valid, accurate and credible.

The databases of AAOUJ and COL were selected for this study. Both platforms are active and continuously expanding with a vast collection of recent and classic articles. Having a list of selection criteria is important to ensure only information related to *distance learning* is included so that it could act as the point of reference in this study. One main criterion that should be noted is that the context of the selected articles has to be related to Malaysian ODL scenario. Because comparing what the Malaysian public is saying and areas of *distance learning* key players are emphasising could identify the knowledge gaps among Malaysians. Empirical and non-empirical research articles retrieved from both databases need to meet the following conditions:

- i) published between 2010 and 2023
- ii) contained either distance learning, ODL or both in the articles
- iii) associated to the Malaysian ODL context

This corpus, made up of 31 articles from AAOUJ and 4 articles from COL, has a total of 180 thousand running words. It is named Malaysian ODL Articles, MODLA in short.

2.3. Data Analysis Process

The Lowyat Education Essential corpus was uploaded to Sketch Engine, an online text analysis software which offers both basic and advanced tools to explore how language works. The node word for the analysis was *distance learning* and the first step was to identify all its instances from the corpus. Its variant, *ODL* was also keyed in to make sure all grounds were covered. The node word is presented in the middle (using the concordance tool) accompanied by some context to the left and right which is also known as Keyword

in Context view (“Sketch Engine”, n.d). Following this, the software collocates tool was used to generate *distance learning* collocates in the corpus. The collocate span adopted was the standard configuration, which is three words to the left and three words to the right of the node word.

Similarly, all 35 AAOUJ and COL articles were uploaded to Sketch Engine. Both *distance learning* and *ODL* were used as the node words. It is vital to take the latter into account because the authors of the articles are stakeholders (ranging from faculty members, teaching instructors, to instructional designers, Wagner, Hassanein, & Head, 2008) who have different responsibilities in the ODL community and are presumed to be familiar with the ins and outs of distance education. They would therefore more likely use the abbreviation than the full expression. All the steps taken to analyse the Lowyat Education Essential corpus were repeated with MODLA, ultimately generating two lists of concordances and collocates.

A collocational analysis was carried out in both corpora. According to Hoffmann, et al. (2008), frequency of co-occurrence, significance of co-occurrence and effect size (i.e. the ratio between observed and expected frequency) are three quantitative properties that can define collocational strength. The potential word combinations identified within the given range are refined by applying a combined measure of co-occurrence frequency, Log-likelihood (LL) and Mutual Information (MI) score. Function words were eliminated from the list of potential word combinations. Content words with an LL value equal to or higher than 30 and an MI score equal to or higher than 3.0 are considered statistically significant potential word combinations. Since the sizes of both corpora are not equal (i.e. Lowyat Education Essential corpus has 30 million words while MODLA has 180 thousand words), the frequencies have to be normalised. We decided to use frequency per million words, commonly abbreviated to “pmw”. Once the list of statistically significant potential word combinations is obtained, the normalised frequencies are examined to ensure accurate interpretation of MI scores and LL values. The collocates from both corpora were then compared and their concordance lines were analysed.

3. Findings

We begin our analysis with a brief overview of the main linguistic patterns that surround the node word *distance learning* in the Lowyat Education Essential corpus. It occurs 470 times while its variant, ‘ODL’ occurs 18 times, totaling up to 488 (0.0016%). The low frequency suggests most Malaysians may not be aware of this mode of education or it could simply be because little discussion about *distance learning* happens in the forum. However, the frequencies of *distance learning* and *ODL* in MODLA are 264 (0.15%) and 452 (0.25%) respectively, bringing the total to 716 (0.4%) in this corpus. It is unsurprising to observe such high frequency as articles included in MODLA are topic specific and definitely contain either one or both the node words.

The subsequent sub-sections show content words (referring to lexical nouns, verbs or adjectives) that meet the above-mentioned collocational strength criteria. We want to consider the general patterns surrounding the use of *distance learning* and *ODL* by focusing on the collocates in both Lowyat Education Essential corpus and MODLA corpus.

3.1. Representation of ‘Distance Learning’ in the Malaysian Internet Forum

Table 1 shows the details of 12 collocates of *distance learning* in the Lowyat Education Essential corpus. Four of the collocates *degree*, *programme*, *course*, and *MBA* are associated to tertiary education and distance education exclusively. It should be highlighted that the collocate *time* is preceded by the word *part*, capturing the adjective *part time*, without a hyphen. This means the frequency of collocate *part-time* is higher than the figure shown in Table 1. Also, the collocate *part-time* has the highest MI score (10.11) which means its link with *distance learning* is rather strong.

Table 1. Collocates of 'distance learning' in Lowyat Education Essential corpus

Collocates	Frequency (pmw)	Log-Likelihood
degree	1.03	5.37
programme	1.00	7.69
time	0.93	5.11
online	0.83	8.14
course	0.83	4.78
offer	0.80	6.59
MBA	0.67	7.72
part-time	0.57	10.11
study	0.46	4.16
long	0.43	5.83
University	0.36	5.44
Open	0.33	9.46

Focusing on the most frequently occurring collate, the concordance lines for *degree* are extracted from the Sketch Engine (see Figure 1.1) and the examination of them reveal a mixture of positive, negative and neutral associations. While some Malaysians support and promote ODL as can be seen in lines 1, 3, 11, 15, and 29, a few seem to be in doubt (lines 6, 14, 28, and 30). The neutrality of most lines can be attributed to questions (lines 5, 7, 10, 13, 19, 21) and statements (lines 2, 4, 8, 9, 12, 16, 22, 23, 31) forum users asked and made about *distance learning*.

Figure 1.1 displays 31 concordance lines for the word 'degree' in the Lowyat Education Essential corpus. Each line shows a snippet of text from a forum post, with the word 'degree' highlighted in red. The lines illustrate various contexts and associations related to distance learning, such as switching from full-time to part-time, taking degrees at different universities, and discussing the value of distance learning degrees compared to traditional on-campus degrees.

Figure 1. Concordance lines for 'degree' in Lowyat Education Essential corpus

The collocates 'programme', 'course' and 'MBA' are comparable to 'degree' as they are associated with remarks made about this mode of education which have inherently neutral connotative meaning. They are illustrated in examples (1) to (4). These are common instances demonstrating enquiries made by forum users about various programmes or courses (e.g. MBA, psychology, and architecture) offered in distance learning mode.

- (1) How your guys think of it??? any other university that offer open distance learning for MBA in malaysia???
- (2) Hi, I am currently a working adult thinking to pursue distance learning in Pyschology programme, however not sure if Wawasan or Open University. Please advise
- (3) Is there any part-time or distance learning architecture programme conducted by any university?
- (4) Hi, does Sunway University offer any distance learning course where we only need to attend class during weekend or something like that?

With regard to the three adjectival collocates, *online*, *part-time*, and *long*, they seem to give a clear picture of what Malaysians and prospective students believe distance learning is. Firstly, *distance learning* is interpreted as synonymous to online learning and part-time learning as shown in the use of conjunction *or* and the slash symbol which typically denotes ‘or’ in Figures 1.2 and 1.3.



Figure 2. Sample concordance lines for 'online' in Lowyat Education Essential corpus

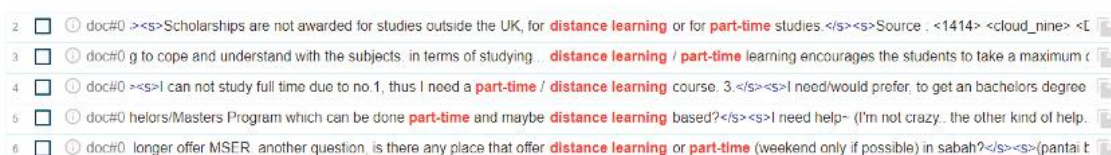


Figure 3. Sample concordance lines for 'part-time' in Lowyat Education Essential corpus

Secondly, the use of the collocate *long* preceding *distance learning* can be associated to the Malay term for distance education, i.e. *pendidikan jarak jauh* as shown in Figure 1.4. It may cause misinterpretation because the adjective *long* can mean a great distance or taking a great amount of time (Dictionary.com, 2023). In this case, the adjective *long* takes the first meaning corresponding to the translation of *distance learning* from the Malay language, also the language of the dominant group in Malaysia.



Figure 4. Sample concordance lines for 'long' in Lowyat Education Essential corpus

It is also observed that Malaysians tend to discuss both local (e.g. Open University Malaysia, Wawasan Open University, Asia-e University, Sunway University) and foreign universities (e.g. University of London) offering open learning, courses or programmes that can be done online. An analysis of the raw concordance lines reveals more local university names such as UM (Universiti Malaya), USM (Universiti Sains Malaysia), MMU (Multimedia University), UNITAR emerged. Due to the spelling variation of the word *university* (e.g. the Malay spelling is *universiti*) and the preference of using the abbreviated forms (i.e. *uni*), they did not make it to the collocational list.

3.2. Representation of 'Distance Learning' and 'ODL' in MODLA Corpus

Table 2 and 3 respectively show the collocational lists of *distance learning* and *ODL* in the MODLA corpus. The collocate *open* has the highest MI score and LL value which is unsurprising because it always co-occurs with the node word, *distance learning*. Also, the subject matter experts are familiar with the term *open and distance learning* and use it extensively in their articles. The two sets of collocates only share 2 words – *institutions* and *students*. It must be noted that the collocate *learners* which is synonymous to *students* only occurs in the ODL collocational list. The high frequency of these collocates are anticipated due to the nature

of the corpus data (i.e. a collection of empirical and non-empirical research articles examining and enhancing ODL systems in Malaysia). The relatively high frequency of these collocates in MODLA suggests research trends in Malaysian distance education prioritise issues revolving around ODL learners.

Table 2. Collocates of 'distance learning' in MODLA corpus

Collocates	Frequency (pmw)		Log-Likelihood
open	438.89	7.64	725.02
ODL	261.11	6.51	345.17
online	138.89	5.29	138.10
institutions	105.56	6.03	124.31
students	88.89	3.84	56.54
study	83.33	4.23	60.71
using	66.67	5.24	64.76

Table 3. Collocates of 'ODL' in MODLA corpus

Collocates	Frequency (pmw)		Log-Likelihood
institutions	383.33	7.12	575.52
learning	372.22	4.07	263.69
learners	200.00	4.59	164.57
context	172.22	6.82	241.05
distance	172.22	5.16	165.52
students	138.89	3.71	84.16
environment	111.11	5.76	123.47
courses	94.44	5.25	92.59
education	94.44	3.99	63.18
intention	88.89	5.58	94.58
adult	83.33	6.49	108.57
systems	77.78	6.20	95.24
important	66.67	5.32	66.35
interaction	61.11	4.50	48.28
higher	61.11	4.29	45.23
assignment	55.56	5.30	55.01

While it could be expected that collocates *open*, *courses* and *institutions* or *University* in MODLA and the Lowyat Education Essential corpus are the same, analysis of the former's concordance list reveals different associations. At first glance, it appears as though Malaysians at large and ODL key players are interested in the availability of different open universities nationally and internationally as well as courses offered in this particular mode. This is not the case in MODLA, open universities are usually linked to various issues facing ODL systems. Some of them include upgrading of online learning support systems, enhancing participation in learning management systems, retaining students in ODL institutions and designing relevant assignments as illustrated in examples (5) to (8).

- (5) this study focuses on how **open** and *distance learning* (ODL) institutions should develop their online learning support systems to uphold SR3Ls.
- (6) According to Mason and Weller (2000), established *distance learning* **institutions** such as the Open University of UK also face low numbers when it comes to such participation.
- (7) Therefore, it is very challenging for the *ODL* **institutions** to ensure their students remain with them if the students want to continue their studies to a higher level.
- (8) Thus the ultimate aim of this paper is to create assignment rubrics that are suitable for *ODL* **courses** which enhances common understanding of the assignment outcome.

Another collocate that occurs in both corpora is *online*. The significance of the collocate *online* preceding *distance learning* corroborates earlier claims on the interchangeability between *distance learning* and *online learning*. Figure 1.5 shows the use of the term *online distance learning* (instead of *open and distance learning*) among the subject matter experts.

1	<input type="checkbox"/>	<input type="radio"/>	doc#6	he number of learners who were enrolled in at least one online or distance learning course has significantly exceeded the growth rate of conventional
2	<input type="checkbox"/>	<input type="radio"/>	doc#10	tional universities have recognized the importance of online and distance learning in education, supplementing full-time classes previously offered th
3	<input type="checkbox"/>	<input type="radio"/>	doc#11	ine 20-25).</s><s>Interaction: What does it mean in online open distance learning ?</s><s>Paper presented at the ED-MEDIA/ED-TELECOM 98 W
4	<input type="checkbox"/>	<input type="radio"/>	doc#16	se provision is based on blended learning which combines online distance learning and traditional face-to-face learning methods.</s><s>Blended lea
5	<input type="checkbox"/>	<input type="radio"/>	doc#26	and Management Open University Malaysia Abstract The online distance learning (ODL) market has become very competitive with the emergence c
6	<input type="checkbox"/>	<input type="radio"/>	doc#26	influencing ODL students' intention to study further using online distance learning .</s><s>Keywords: perceived social ability, perceived usefulness,
7	<input type="checkbox"/>	<input type="radio"/>	doc#26	offer students both traditional face-to-face instruction and online distance learning .</s><s>E-learning and online distance learning have been used
8	<input type="checkbox"/>	<input type="radio"/>	doc#26	ction and online distance learning.</s><s>E-learning and online distance learning have been used interchangeably, however, they are not synonym
9	<input type="checkbox"/>	<input type="radio"/>	doc#26	re present in class.</s><s>This was deemed the same as online distance learning (Diana et al., 2005).</s><s>According to Junco et al. (2013), onlin
10	<input type="checkbox"/>	<input type="radio"/>	doc#26	ducation in Islamic Finance (INCEIF) are shifting towards online distance learning (MOHE, 2011).</s><s>Lifelong learners are working adults seekir

Figure 5. Sample concordance lines for 'online' in MODLA corpus

As mentioned earlier, the node word *ODL* has a higher frequency count compared to *distance learning*. Therefore, we identify collocates of *ODL* in MODLA to allow us to make out areas that are not mentioned by the lay people. There are 10 noun collocates (*learning, context, distance, environment, education, intention, adult, systems, interaction, and assignment*) and 2 adjectival collocates (*important* and *higher*) in Table 3 that are not found in the Lowyat Education Essential corpus. Five of them (i.e. *context, distance, environment, education, and higher*) can be disregarded as they are part of the common fixed phrases in ODL research – *ODL context, ODL environment, distance learning, and higher education*. Therefore, the following paragraphs will delve into the remaining collocates and their association with *ODL*.

The collocate *learning* mainly co-occurs with *open and distance* (60%) while the remaining instances are seen to co-occur with *teaching* and *support* as shown in examples (9) and (10) below.

- 9) more attention needs to be paid to the quality of teaching and **learning** materials if *ODL* institutions wish to continue attracting learners, reduce attrition rate and stay relevant
- 10) teachers and other primary *ODL* stakeholders of the importance of their role in providing **learning** supports in *ODL*

The frequent co-occurrences of *teaching and learning* with *ODL* is because it is a common phrase in the education industry. Also, it can be attributed to the nature of data in MODLA, made up of academic journals – one of the main aims of AAOUJ is functioning as a platform for “scholars to share their research and expertise in the field of open distance education” (“Asian Association of Open Universities Journal”, 2023) and it welcomes submissions related to various teaching and learning issues. *Learning support* seems to be another area that Malaysian *ODL* practitioners emphasise but not given attention to by the public. According to The Commonwealth of Learning and Asian Development Bank (1999), distance learners who are mainly adults (unlike younger learners) are influenced by various positive and negative factors including prior training, access to resources, lack of success in their previous education, holding down a job, etc., thus, *ODL* providers need to design suitable learner support services for them. Having seen the collocates *learning (support)* and *ODL* are infrequent in MODLA, we presume this matter has been looked into but may not be extensive or comprehensive enough because the collocate *support* appears does not meet the collocational strength requirements.

The collocate *intention* is seen to be headed by either *continuance* or *students'* as can be seen in examples (11) and (12). Similar to teaching and learning as well as learning support, distance learners' intention to continue studying seems to be a crucial subject in *ODL*. This corresponds to the global research trend in distance education that emphasise factors leading to the retention of existing students (cf. Baxter, 2012; Brown, Hughes, Keppell, Hard, & Smith, 2022; Radovan, 2019). In Malaysia, Chuah and Lim (2018) offer a structured problem-solving method to retain students in a non-profit university.

- (11) it was found that learners' satisfaction had a significant relationship with continuance **intention** in the *ODL* context (H8).
- (12) ... self-management learning, perceived usefulness, and attitude are all important antecedents to *ODL* students' **intention** to use the *ODL* system

It is predictable to identify the collocate *adult* with *ODL* in MODLA because it is a keyword in this mode of education. In COPPA: *ODL* (MQA, 2019), *adult education* is among the commonly used terms related to *ODL*. According to Freeman (2004, p.8), *ODL* “fits better with the complexities of adult life and is more suited to adult learners.” *ODL* employs a distinct strategy by centering learning on a diverse array of tasks,

a significant portion of which either leverage the students' personal encounters or prompt them to put their newfound knowledge into practice within their professional and familial spheres (Freeman, 2004). Malaysian ODL providers and practitioners are aware of the connection between adult learners in ODL context. This is probably why most studies conducted involve adult learners as participants (cf. Abeywardena & Yoong, 2012; Chiam, et al. 2017; Khor, 2015; Subramaniam & Kandasamy, 2013).

Out of the 14 occurrences of the collocate *system*, 6 co-occur with *learning management*, 3 co-occur with *support* and 5 of them are preceded by *ODL*. Besides *adult*, *learning management system* (or LMS in short) is another term extensively used in the ODL context. The use and maintenance of LMS is listed as one of the evaluation standards in Malaysian COPPA: ODL. We can now see in Figure 1.6 the types of *support system*, namely *online learning support system* and *online support system* (which are not captured earlier). Other forms of support such as intellectual support, organisational and emotional support highlighted by The Commonwealth of Learning and Asian Development Bank (1999) are not found in the data. Hisham (2006, p. 96) stresses that "introducing new technologies of communication may not necessary help adult distance learners, instead open universities should 're-understand' the process of learning at a distance".

12	<input type="checkbox"/>	doc#27	<s>To re-assess and re-design their online learning support systems ,	ODL	institutions are called to imply the implementation framework present:
13	<input type="checkbox"/>	doc#27	4.0 technologies into the online learning support systems provided by	ODL	institutions for sustainable SR3Ls </s><s>In identifying the level of imp
14	<input type="checkbox"/>	doc#27	Figure 2. </s><s>Implementation framework online support systems of	ODL	institutions. </s><s>Self-regulated lifelong learning does not stop at ac

Figure 6. Sample concordance lines for 'systems' in MODLA corpus

The node word, *ODL* collocating with *interaction* and *assignment* like *interaction in ODL* and *assignment rubrics for ODL* show that these two areas are also the focus of distance education research in Malaysia. Considering the former, it seems a connection is established or implied between ODL and different forms of interaction. According to Kanwar (2022), there are three kinds of interactions, i.e. student-text, student-student, and student-teacher interactions and the first is found to have led to the best learning outcomes. Examples (13) and (14) show student-student interaction may have been given more emphasis in Malaysian ODL scenario compared to the other two kinds of interactions which are not found in the data.

(13) Is interaction more important for certain groups of learners than others?

(14) The interaction skills of ODL students will allow them to learn more effectively from their peers.

The collocate *assignment* is significant in MODLA because assessment is an important component that can evaluate a student's academic achievement. However, all the instances of 'assignment rubrics' collocating with 'ODL' are found to come from one article. Clearly, this is not an exact representation of the Malaysian ODL research and the lack of articles on other areas related to continuous assessments does not mean they are not explored.

The last collocate, also the only adjective in the list, *important*, presents an interesting finding as can be seen in Figure 1.7. It appears to co-occur with some of the collocates listed in Table 3 such as *interactions* (lines 2, 5), *intention* (line 7), *institutions* (lines 6, 11), *adult* (line 12) and *students* or *learners* (lines 3, 10). They seem to validate the findings of this collocational analysis study by repeating words that tend to co-occur with *ODL*.

1	<input type="checkbox"/>	doc#6	ie of isolation and lack of support, which is especially important in the	ODL	environment. </s><s>While this research only focuses on a small samp
2	<input type="checkbox"/>	doc#11	id sufficient amount of learning interactions is particularly important in	ODL	because many DLs at UUM alike, perhaps for the first time, are now "fi
3	<input type="checkbox"/>	doc#11	and particularly on the students being the most important clientele to	ODL	; the technology use, and one pertinent issue that this article intended
4	<input type="checkbox"/>	doc#11	"link" of communication between these two important stakeholders in	ODL	</s><s>The link must be restored through overt institutional efforts so
5	<input type="checkbox"/>	doc#11	ne way or the other. </s><s>It is therefore particularly important for all	ODL	stakeholders to understand what interaction and interactivity is all abou
6	<input type="checkbox"/>	doc#19	strong relationships with students </s><s>This is more important for	ODL	institutions, in which their qualification has always been assumed to be
7	<input type="checkbox"/>	doc#26	g, perceived usefulness, and attitude are all important antecedents to	ODL	students' intention to use the ODL system to further their studies in the
8	<input type="checkbox"/>	doc#27	onsensus-based SR3Ls model serves as an important benchmark for	ODL	institutions across the regions in developing meaningful and relevant o
9	<input type="checkbox"/>	doc#27	onsensus-based SR3Ls model serves as an important benchmark for	ODL	institutions across the regions in developing meaningful and relevant o
10	<input type="checkbox"/>	doc#29) further explained that meta-cognitive self-regulation is important for	ODL	learners because they are busy with work and family </s><s>In this stu
11	<input type="checkbox"/>	doc#32	ning (ODL) environment. </s><s>This is especially important today as	ODL	institutions mushroom and compete on an increasingly global platform
12	<input type="checkbox"/>	doc#32	his availability of multiple learning pathways is especially important to	ODL	learners who are mainly working adults as adult education must make

Figure 7. Sample concordance lines for 'important' in MODLA corpus

4. Discussion and Conclusion

We have analysed the collocates and words co-occurring with them around the node words ‘distance learning’ and ‘ODL’ in a large collection of Malaysian Internet forum threads as well as research articles. Our analysis noted a distinction between the public and ODL practitioners with regard to the representation of ‘distance learning’; where the Malaysian public tended to discuss institutions offering various degree programmes that can be done part-time, the practitioners tended to focus on issues facing distance learners which include learning support, learning management system, student intention to continue studying, student interaction, and assignment. The representation of *distance learning*, particularly its definition is still unclear. Despite the high frequency of collocate *open* preceding the node word, the significance of the term *online distance learning* in both corpora should be acknowledged. The tendency of two distinct groups of people (i.e. one without or with only limited knowledge of ODL while the other is formed by experts in the field) equating *distance learning* and *online learning* validates Benson’s (2002 as cited in Moore, et al., 2011) belief that there is a vague relationship between them. This can be regarded as the onset of the blurred distinction among all forms of education conducted online.

The underrepresentation of matters related to ODL students in the Lowyat Education Essential corpus is anticipated. It is because those who contributed to the threads are probably lay people and prospective students. Their discussions are limited to identifying credible universities offering programmes that they can do part-time. Enrolling into a university with good reputation is reported to be the most influential factor influencing Malaysian students’ choice of tertiary institutions (Khairani & Abd. Razak, 2013). This corresponds to the findings of this study as the collocates *institutions / university* with *distance learning / ODL* are relatively frequent and significant in both corpora. To enhance institution reputation, the academic or teaching staff plays a significant role in creating a positive learning experience for students (Aziz, 2019). Open universities and Malaysian higher education institutions (HEIs) that are planning to expand distance education are recommended to invest in faculty and staff professional development as well as capacity building.

Referring to the statistics shared earlier, Malaysian working adults who have yet to pursue tertiary education are at an alarming rate. Since the collocate *adult* is significant in MODLA but not in Lowyat Education Essential corpus, open universities and practitioners are suggested to reposition and redefine themselves as lifelong learning centres to attract more adult learners. As stated by Kanwar (2023), open universities have a major role in raising the rates of adults participating in higher education in numerous developing nations. Giving a glimpse of ODL teaching and learning systems (e.g. autonomous learning, technology-enabled learning, self-instructional materials) and possible study pathways (e.g. Accreditation of Prior Experiential Learning, entry via micro-credentials) to prospective students or the public may be beneficial. Once they grasp the concept of ODL and distinguish it from the traditional mode of study, an informed-decision can be made. Ultimately, lifelong learning opportunities for all via distance learning which is in line with Sustainable Development Goal 4 can be achieved.

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94-Developing a New Micro-Credentials Model for Formal Academic Qualifications in Malaysia: A Potential Talent Gap Solution

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Abstract

Globally, there is a growing concern of the talent gap where companies have reported mismatched of skills among job seekers. Micro-credentials have emerged as a popular alternative to traditional academic qualifications, providing individuals with a flexible and cost-effective way to acquire specific skills and knowledge. Despite their growing popularity, the implementation of micro-credential practices worldwide and Malaysia remains unclear. This study aims to develop a model for unbundling formal academic qualifications into sub-certifications that can lead to a pathway for formal academic qualifications via the Accreditation of Prior Experiential Learning Micro-credentials (APEL.M) in Malaysia. The model was created through a review of Malaysian Qualifications Agency (MQA) guidelines and standards and three focus group discussions. The model focuses on the progression from micro-credentials to formal academic qualifications, including the identification of suitable micro-credential courses, and pathways to formal academic qualifications. The model was tested with two case study programmes, namely Bachelor of Software Engineering (Honours) (BDSE) and Bachelor of Technology in Electronics (Honours) (BTEL). The BDSE model was launched in May 2023, and the BTEL model will be launched in September 2023. While the model serves as a useful guide for the future implementation of pathways leading to formal academic qualifications in Malaysia, the study identified challenges such as the need for clearer guidelines for educational institutions and support from industry stakeholders. The developed model is relevant to policymakers, educational institutions, and industry stakeholders interested in creating pathways to formal academic qualifications via APEL.M in Malaysia and as a potential solution to bridge the talent gap.

Keywords: *Micro-credentials, talent gap, MQA, APEL.M, formal academic qualifications.*

1. Introduction

The past three years have been challenging due to the Covid-19 pandemic, and the economic and geopolitical instabilities. According to the World Economic Forum (WEF)'s 2023 Future of Jobs report, 83 million jobs will be lost globally by 2027, while close to 70 million new ones will be created (World Economic Forum, 2023). The implication of this is that there is not much a single employee can do against the shifting norms, but to improve their skills. The WEF report further revealed that one of the major obstacles preventing companies from transforming their business model is due to the huge talent gap.

What is talent gap? It is the mismatch or difference between the skills and qualifications job seekers have and what the employers are seeking. Talent gap occurs due to the advancement of technologies, changing job needs and skills shortages in specific fields (World Economic Forum, 2023). This gap can significantly impact the economy, as it can lead to unfilled job openings and a shortage of talents in major industries. The global talent gap is a growing concern for many organisations and industries worldwide. In the current dynamic and often disruptive business environment, companies are struggling to keep up with the demand for new skills and competencies. Agrawal et al. (2020) from McKinsey reported that many companies are addressing the talent gap by resorting to various strategies such as hiring, reskilling, contracting, redeploying or releasing of employees. In the same report, 87% of companies surveyed revealed that they are currently experiencing

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skills gap among their workforce or expecting them within the next five years. According to these companies, the situation arises not only due to the shifting trends of market and technology but also the changing talent needs. As a result, the majority of companies have placed closing the talent gap as their top priority. Although most of them shared that skill building, reskilling and upskilling are effective to internally close the talent gap, these companies lack strong capabilities in curriculum design of their skills building programmes. Similarly, in Malaysia, the Economy Minister Mohd Rafizi Ramli stated that the high 10% unemployment rate among Malaysian youths is caused by a mismatch of skills that youths have in comparison with the industry demand (Tay, 2023). Even the existing technical and vocational education and training (TVET) is outdated as the industry is moving from machine knowledge to automation where digital skills are needed. A more recent news report stated that the job market growing trend is where employers are currently focusing on the skills that jobseekers possess rather than academic qualifications or working experience (Yuen & Pfordten, 2023).

Therefore, to address the talent gap and ensure that the workforce is equipped with the skills needed for the future of work, companies and higher education providers (HEPs) must adopt innovative approaches. One potential solution is the use of micro-credentials, which provide targeted training in specific skills and competencies that are in high demand (Brown et al., 2021). The World Economic Forum (2023) predicts that employers will increasingly turn to alternative credentials, such as micro-credentials, as a way to identify and evaluate job seekers. This study will explore the potential of micro-credentials in addressing the talent gap, with a focus on the development of a new micro-credentials model for formal academic qualifications. The new model supports the challenges faced by companies in building their own skills building or reskilling programmes by offering on-demand micro-credential courses which are shorter, affordable and more flexible. These courses are sub-certifications that can lead to a pathway for formal academic qualifications.

2. Literature Review

2.1. The Emergence of Micro-Credentials

The growing popularity of micro-credentials is due to various factors such as the changing nature of work attributing to the need for continuous upskilling and reskilling, and the demand for more accessible, flexible and affordable education options. Unlike macro-credentials such as diplomas and degrees that represent a comprehensive interrelated skillset (Lim et al., 2018; Randall & West, 2020), micro-credentials are alternative credentials that form complementary components can lead to formal academic qualifications (Oliver, 2019), short, specific courses that recognise a person's individual skills proficiency (Che Ahmat et al., 2021; Clements et al., 2020; Pickard et al., 2018), where industries can utilize these short courses to reskill and upskill their workers (Lim et al., 2018). Micro-credentials enable learners balance work and life challenges with learning needs so that their learning experience is meaningful (Ponte & Saray, 2019), authentic, autonomous, and sustainable (Peacock et al., 2020). Micro-credentials are oftentimes known as digital badges, professional certificates or short courses (Peacock et al., 2020; Raish & Gross, 2021). While digital badges are usually used as evidence of achieved credentials (Lim et al., 2018), their application is limited if there is no recognition and validation from professional bodies or academic qualification agencies (West et al., 2020). To address this concern, the Mozilla Foundation introduced an Open Badge Infrastructure that enables micro-credentials to be recognized among different systems (Fanfarelli & McDaniel, 2019), thus removing barriers between formal, informal, and professional education (Clements et al., 2020; Raish & Gross, 2021). Nonetheless, employers often questioned the significance of micro-credentials especially if they do not meet an industry-recognized learning pathway (Randall & West, 2020; Selvaratnam & Sankey, 2021). Despite this, micro-credentials are predicted to be a critical part of future higher education policy (Wheelahan & Moodie, 2021). Extant research on micro-credentials mostly focused on its adoption, implementation and strategies of sustaining MCs in higher education institutions (HEIs) (Hunt et al., 2020; Selvaratnam & Sankey, 2021; Varadarajan et al., 2023) and its value in skills building, reskilling and upskilling (Hunt et al., 2020; Young et al., 2019). Based on the above discussion, Brown et al. (2020) sums the traditional and alternative credential ecosystem best (see Figure 1).

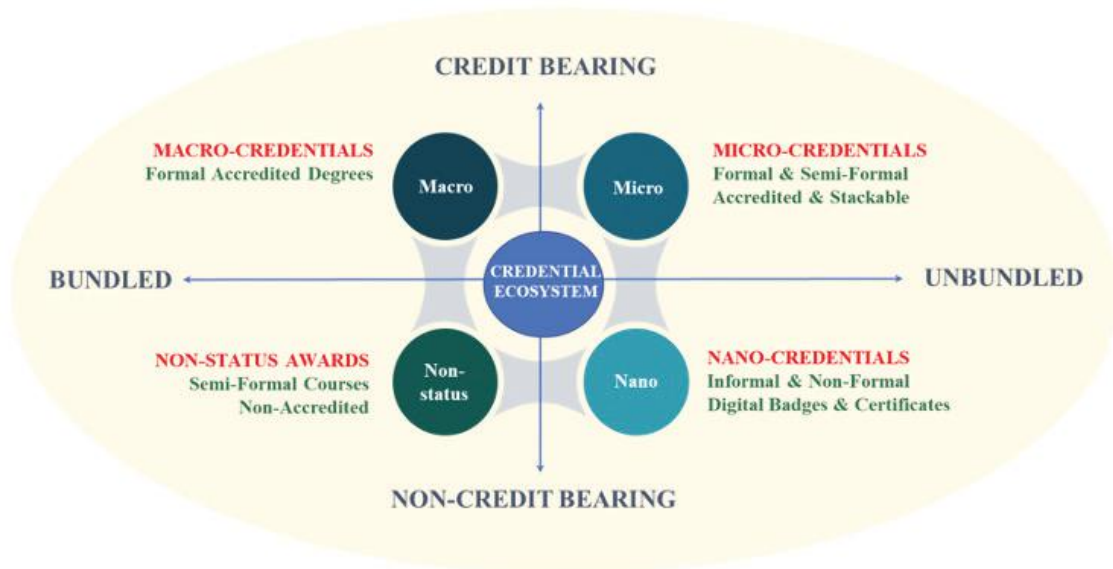


Figure 1. The Credential Ecosystem

Source: Adapted from Brown et al. (2020)

2.2. The Challenges and Opportunities of Micro-Credentials

Varadarajan et al. (2023), through a systematic literature review of 60 extant studies from 2015 to 2022, revealed various stakeholders’ perspectives of micro-credentials’ challenges and opportunities (see Figure 2). Based on their findings, the highest research on implementation of micro-credentials is from the perspective of HEIs (32%) while the least research is from the perspective of governments (14%).

PERSPECTIVE	KEY CHALLENGES	KEY OPPORTUNITIES
LEARNER	<ul style="list-style-type: none"> • Knowledge gain • Specific credentials to a specific job • No federal/standalone aid for micro-credentials; lack funding 	<ul style="list-style-type: none"> • Student-centred learning; motivation boost • Increase learning flexibility • Support lifelong learning; upskilling; skills recognition • Increase employability • Develop 21st century skills • Increase formal education access & pathways; affordable
HEI	<ul style="list-style-type: none"> • Lack of academic (faculty/dept/school/ senior managers) support • Credit, credit transfer, value defining assessment; external qualification accreditation • Extensive faculty review process 	<ul style="list-style-type: none"> • Support new pedagogy models • Technology advancements • Develop a new credential for the 21st century • Catalyst of innovations and changes • Education system reformation • Boost institution earnings and standing • Lower training & education costs • Increase student enrolment
EMPLOYER	<ul style="list-style-type: none"> • Consistency of micro-credentials • Fraud/questionable authenticity due to variety • Lack formal recognition 	<ul style="list-style-type: none"> • Fulfilling employers’ demands • Skills recognition • Promote SDGs/CPD • Support future work and skills • Narrow skills gaps due to dynamic job changes
GOVERNMENT	<ul style="list-style-type: none"> • Confusion in definitions and taxonomy • Lack of funding & financing 	<ul style="list-style-type: none"> • Addressing learners’ changing demographics • Reflects Neo-liberal market forces • Response to Covid-19 pandemic • Growth and Globalisation • Boost equity of under-represented groups • Government initiative and nation-wide policies

Figure 2. Challenges & Opportunities of Micro-credentials

Source: Adapted from Varadarajan et al. (2023)

Specifically, in the Malaysian context, there are some key challenges faced by HEIs that were not mentioned in Varadarajan et al.'s (2023) research. First, handling the huge influx of online learners (Alias, 2020) can lead to difficulties to monitor progress and assess learning activities and affect traditional degree intakes (Che Ahmat et al., 2021). Second, institutional readiness where high commitment (in terms of financial and non-financial support), facilities, and infrastructure are needed to ensure successful offering of micro-credentials programmes (Che Ahmat et al., 2021). Third, awareness and acceptance of micro-credentials can be challenging for HEIs as the general public (including learners) is not familiar with micro-credentials and employers still prefer academic transcripts instead of digital badges (Che Ahmat et al., 2021). Lastly, Che Ahmat et al. (2022) found that HEI educators lack digital skills and knowledge, and have limited resources in developing micro-credential courses. In a way, the current study will be able to fill the knowledge gap as the new micro-credentials model for formal academic qualifications can act as a practical guideline for future micro-credentials implementation.

As for the opportunities, Che Ahmat et al. (2021) touched on the flexibility of design and delivery as micro-credentials provide learners with more access and choice on higher education. As learning is self-paced with learning resources available anywhere and anytime, learners are able to control their own continual professional development and customize their learning pathways. The demand-driven, shorter and cost-effectiveness of micro-credentials enable learners enter the workforce faster. In Malaysia, a series of stackable micro-credentials can lead to a formal academic qualification provided the HEIs comply with the Malaysian Qualifications Agency's micro-credentials regulations and guidelines.

It is also important to know the critical stakeholders within the micro-credential ecosystem. Brown et al. (2021) suggest that HEIs implementing micro-credentials must be aware of their position and other stakeholders within the micro-credential ecosystem. Further on, Brown and Mhichil (2021) identified four critical stakeholders as learners, HEIs, governments and employers. Varadarajan et al. (2023), through a systematic literature review, argued that HEIs play a central role in the micro-credential ecosystem (see Figure 3).

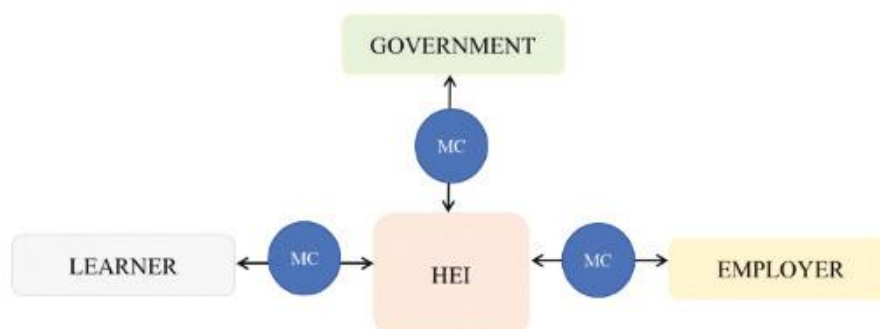


Figure 3. Micro-Credential Ecosystem

Source: Brown & Mhichil (2021); Varadarajan et al. (2023)

2.3. Micro-Credentials – The Malaysian Context

In the context of Malaysia, micro-credentials implementation among HEIs are slowly gaining traction due to the accreditation guidelines and policies that were introduced by the Malaysian Qualifications Agency (MQA) since 2019. Besides that, the Human Resource Development Corporation (HRD Corp), under the Ministry of Human Resources, introduced the first industry-based micro-credential initiative in 2022, with the collaboration with the Ministry of Higher Education. From an industry perspective, micro-credentials support employees' growth in gaining expertise through short learning bite-sized certificates (HRD Corp, 2022). As such, the micro-credential initiative is timely as it recognizes non-traditional career paths through lifelong learning and continuous professional development. As of 2022, HRD Corp has approved 11,493 micro-credential courses, while there are 13,224 micro-credential course applications for approval (HRD Corp, 2022). This large number of micro-credential courses reinforces the commitment of the government towards narrowing the talent gap and lifelong learning through innovative means such as the micro-credential initiative.

Although micro-credentials have a strong potential to overcome talent gap, micro-credentials research in Malaysia is still at an infancy stage (Che Ahmat et al. 2022; Kumar et al., 2022). This limitation provides

future research opportunities to explore micro-credentials' role and impact from a wider context (West et al., 2020). A quick literature review search conducted on several main research databases such as Google Scholar, Semantic Scholar, and ResearchGate revealed the following micro-credentials research conducted in Malaysia. First, Lim et al. (2018), in a case study of a private university in Malaysia, outlined six potential ways of micro-credentials' implementation for undergraduate programmes such as establishing design and evaluation principles, assembling an information kit, identifying appropriate learning platform, and outlining the learner's journey in each of the stages involved in the micro-credential eco-system. Second, in Che Ahmat et al.'s (2021) concept paper, they presented an overview and examined the challenges and benefits of micro-credentials locally and globally, as well as shared UiTM's (a public university in Malaysia) micro-credential framework and action plans, and some recommendations on how to maximize the use of micro-credentials via digital badges to combat graduate unemployability. Third, Sugathan et al. (2021) conducted a desk review on the implementation of micro-credentials in three top public universities in Malaysia. The micro-credential framework these universities used was based on MQA guidelines, and OpenLearning and FutureLearn were the go-to online platforms for marketing and offering micro-credentials. Fourth, due to limited understanding of micro-credentials' benefits, challenges and application among HEIs in Malaysia, Kumar et al. (2022) conducted a study exploring pre-service teachers' perceptions on the use of micro-credentials to address online learning challenges during the Covid-19 pandemic. Despite positive reactions towards micro-credentials, the pre-service teachers are unaware of the micro-credentials' professional value. Nevertheless, the experience shaped their identity as aspiring educators embracing technology. Finally, Che Ahmat et al. (2022), in a qualitative study to gain insights from 25 micro-credential content developers of a public university in Malaysia, highlighted that these developers understood the concept of micro-credentials but shared that their digital skills and knowledge are lacking and development of micro-credential courses are affected due to limited resources.

What can be concluded from these past studies on micro-credentials in Malaysia is that most of the studies are either concept papers or case studies sharing implementation of micro-credentials based on private or public universities. However, firstly, none of the studies was based on the experience of open and distance learning (ODL) universities. There is a difference in how public/private HEIs operate compared to ODL universities. As an ODL university like Wawasan Open University (WOU), we have an existing robust online learning platform that enables us to provide learners with engaging and interactive course contents either through developing our own contents or leveraging on third-party learning platforms. As such, offering learners alternate learning opportunities that are flexible, affordable and accessible such as micro-credential courses is our DNA. Also, our internal course developers are supported by the Centre for ODL Experiences (COLE) where its team leads have digital capabilities to continuously improve WOU learner experience and engagement; thus, challenges related to digital skills and knowledge as mentioned by Che Ahmat et al. (2022) are minimized at WOU. Secondly, although there were extant studies related to case studies of micro-credentials implementation, none of these studies share a clear micro-credentials model that can benefit both the industry (closing the talent gap) and the individual learner (acquire formal academic qualifications).

2.4. The Micro-Credentials Governance in Malaysia

Based on extant information gathered from the Malaysian Qualifications Agency (2020) website and the Enhancement Themes (2022) webinar under the QAA Scotland, the development of the micro-credentials guidelines in Malaysia started in 2019 where Phase 1 introduced micro-credentials under the "Continuous Professional Development (CPD)". In 2020, Phase 2 saw the establishment of "Guidelines to Good Practices: Micro-Credentials" which contained explanation on how micro-credentials can lead to formal academic qualifications. In 2022, Phase 3 kicked off the "Guidelines to Good Practices: Quality Verification of Stand-alone Micro-Credentials" which is meant to consolidate all short and non-credentialed courses under the overarching Malaysian Qualifications Framework. Introduction of all these micro-credentials policies and guidelines is to meet the nation's aspirations for a flexible higher education, lifelong and life-wide learning agenda. Through this approach, no one is left behind as non-traditional learners are able to access higher education through the unbundled accredited programmes in the form of micro-credentials.

The introduction of the micro-credential guidelines by the Malaysia Qualification Agency (MQA) has stimulated the interest of HEIs and training providers, both big and small, to adopt this practice. This interest was reinforced by a Google Trends analysis from May 2022 to May 2023 (refer to Figure 4), where Malaysia topped the Southeast Asian region's search interest on the term 'micro-credentials'.



Figure 4. Google Trends - Global interest by region on micro-credentials search term

Source: <https://trends.google.com/trends/explore?q=microcredentials&hl=en>

While the guidelines are general in nature, each HEI or training provider is responsible for implementing micro-credential practices, including creating online platforms with digital badges and certificates, and adapting them to their internal management and approval processes. These programmes must also align with the requirements of MQA (Sugathan et al., 2021). Figure 5 depicts a summary of the quality assurance that MQA imposes on HEIs or training providers when implementing micro-credentials.

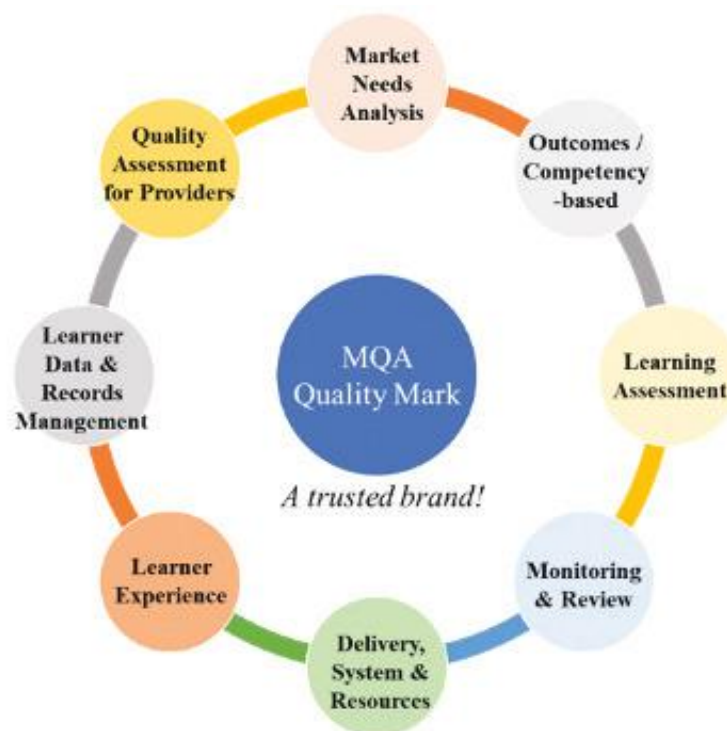


Figure 5. Quality Assurance for Micro-Credentials

Source: Adapted from MQA (2022, pp. 15-18); Enhancement Themes (2022)

In a recent QAA Scotland micro-credentials webinar, Khairul Salleh Mohamed Sahari, the Deputy Chief Executive Officer at MQA, revealed as of April 21, 2022, 67 higher education providers (HEPs) have unbundled 648 accredited programmes from Level 3 to Level 8 of the Malaysian Qualifications Framework (MQF) into a total of 11,763 micro-credential courses (Enhancement Themes, 2022). The high number of micro-credential courses implies that with proper guidelines and policies in-place, HEPs are more confident in unbundling their programmes according to the MQA requirements.

Additionally, MQA has also introduced a new stand-alone micro-credentials policy that will expand the higher education market to training providers and industry players (Chua, 2022). The rationale behind this policy is to enhance existing short courses offered by various providers for upskilling, reskilling, and professional development. By registering these courses with the MQA, learners will be able to accumulate credits, mix and match micro-credentials, and eventually obtain a formal qualification through the stacking of credentials. A previous micro-credentials policy introduced in 2020 allows HEIs to offer small, bite-sized courses that are derived from their existing accredited academic programmes (MQA, 2020). These micro-credentials, if assessed and credit-bearing, serve as a pathway for learners to access academic programmes even if they do not meet the entry requirements. To facilitate their entrance into these programmes, a pathway called APEL.M (Accreditation of Prior Experiential Learning with Micro-Credentials) was introduced early 2023 and documented in the Guideline to Good Practices: Accreditation of Prior Experiential Learning for Access (APEL.A) and Accreditation of Prior Experiential Learning for Micro-credentials (APEL.M) (MQA, 2023). Figure 6 provides a brief snapshot of the APEL.M good practices guideline as shared by Khairul Salleh Mohamed Sahari, the Deputy Chief Executive Officer at MQA (Enhancement Themes, 2022).

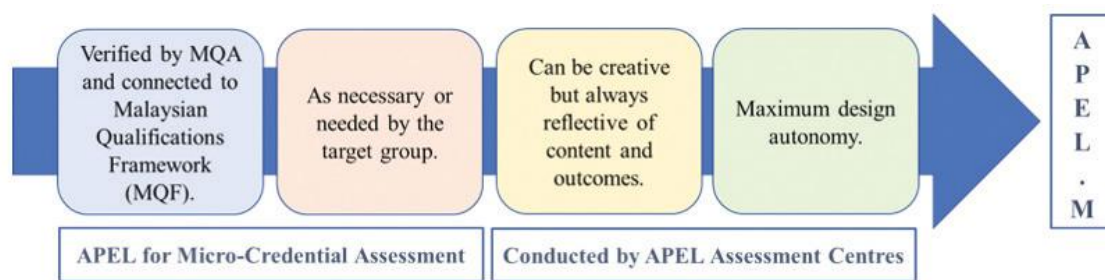


Figure 6. Overview of APEL.M Good Practices Guideline

Source: Adapted from Enhancement Themes (2022)

3. Development of the New Micro-Credentials Model at WOU

The WOU new micro-credentials model was developed by first reviewing the MQA guidelines and standard. Three focus group discussions were conducted with specific outcomes achieved (see Figure 7).

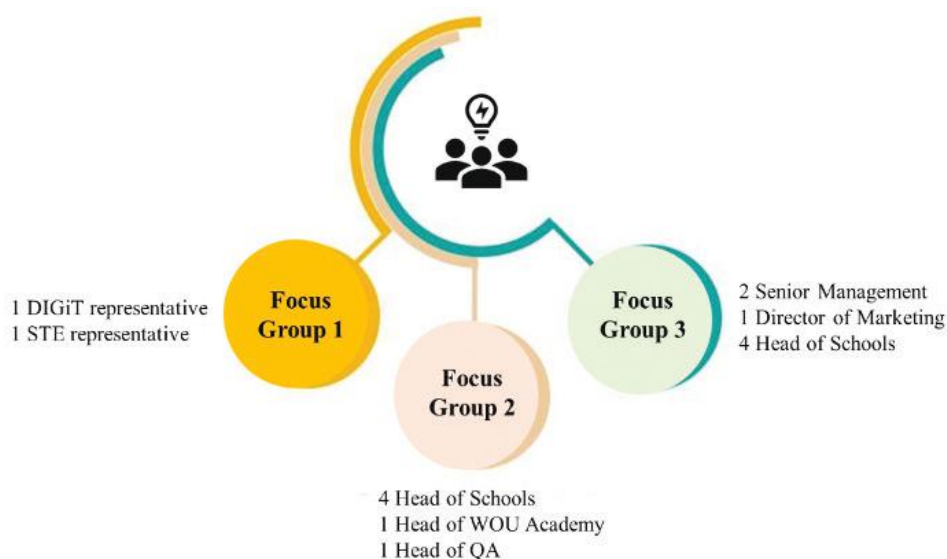


Figure 7. Focus Group Discussions

3.1. Focus Group 1 – Findings and Discussion

The first focus group discussion involved two representatives from the School of Digital Technology (DiGiT) and the School of Technology and Engineering Science (STE). The aim of this focus group discussion was to review the requirements of the MQA and APEL.M guidelines and to design an unbundled micro-credentials model that can lead to formal academic qualifications, while at the same time, meet the industry needs. As a result of this focus group discussion, a generic new micro-credentials model (see Figure 8), and two specific unbundled academic programme micro-credentials models (see Figure 9) were crafted.



Figure 8. The Generic New Micro-Credentials Model

Figure 8 illustrates the outline of the WOU New Micro-Credentials Model, which was developed based on an initial focus group discussion. In the Malaysian education system, SPM refers to the Sijil Pelajaran Malaysia, a national examination taken by learners upon completing their secondary education. WOU recognizes the potential of individuals aged 17 and above who have completed their SPM, and in response, has introduced a distinctive programme called the WOU Unbundled MC (Micro-Credential) programme.

The WOU Unbundled MC programme is specifically designed to provide learners with the opportunity to pursue professional certifications alongside their studies. It offers a flexible learning experience with multiple exit points, allowing learners to select certifications that align with their career goals and exit the programme once they have attained those specific certifications. This approach enables learners to obtain industry-recognized qualifications at a young age, equipping them with specialized skills that enhance their employability.

Upon successful completion of the WOU Unbundled MC programme, learners are provided with the option to transition into WOU's Bachelor's degree programme. This transition is facilitated through the APEL.M pathway, which allows learners to join the Bachelor's degree programme once they have completed at least 50% of the required credits for the degree. This opportunity enables learners to continue their education and further enhance their knowledge and skills in their chosen field.

Throughout their journey in WOU's Bachelor's degree programme, learners are strongly encouraged to continue earning and learning to bridge talent gaps within their chosen fields. This approach ensures that learners not only acquire theoretical knowledge but also develop practical skills that are highly valued by employers. By integrating academic learning with real-world experience, learners become well-rounded professionals who are well-prepared to tackle the challenges of the job market.

3.2. Focus Group 2 – Findings and Discussion

The second focus group discussion was conducted to get feedback on the models developed and to discuss potential challenges and constraints. All Heads of School, Head of WOU Academy and the Head of QA were included in the focus group. Some of the concerns raised regarding the development and implementation of micro-credentials were similar with those indicated in past studies.

For instance, one specific concern was the potential lack of industry recognition, which could cast doubt on the value and relevance of these micro-credentials, and consequently, impact learners' career prospects. Similarly, there was a concern about the need for public and parent acceptance. The focus group recognized that the concept of micro-credentials might be met with scepticism or a lack of understanding among the general public and parents. In Malaysia, parental acceptance is particularly crucial as they often play a pivotal role in deciding their children's future studies. These concerns align with previous studies that have highlighted challenges associated with the unfamiliarity of the public with micro-credentials (Che Ahmat et al., 2021) and the lack of formal recognition (Varadarajan et al., 2023). Notably, even pre-service teachers may not fully grasp the value of micro-credentials for their profession (Kumar et al., 2022). Addressing these concerns requires effective communication and outreach efforts to raise awareness and build confidence in the value and credibility of micro-credentials as a viable alternative pathway for education.

Financial considerations and the sustainability model for learners were also highlighted as a concern. The focus group acknowledged that ensuring accessibility and affordability of micro-credential programmes would require careful attention to financial aid options and sustainable funding mechanisms. Of particular concern were the potential financial difficulties faced by SPM school leavers, especially those from lower income groups (B40). Recognizing this, the focus group highlighted the importance of developing a robust financial framework through collaboration between universities, industry partners, and the government. Such collaboration would help overcome the cost barrier and facilitate the participation of a diverse range of learners in micro-credential programmes. It is worth noting that this concern differed slightly from the findings of Che Ahmat et al. (2021), who highlighted the financial readiness concerns of HEPs in developing and implementing micro-credential programmes.

Lastly, during the focus group discussion, an additional concern was raised regarding the knowledge gap that SPM school leavers may face when entering micro-credential programmes. The focus group shared their apprehension about whether these learners would have sufficient knowledge and preparation to handle the academic rigour at the higher education level. This concern highlights the importance of ensuring that learners transitioning from secondary education to micro-credential programmes are adequately equipped with the foundational knowledge and skills required for higher education. Addressing this concern becomes critical to facilitate a smooth transition and provide an effective learning experience for these learners. It is noteworthy that this particular concern was not previously addressed in existing micro-credential studies.

3.3. Focus Group 3 – Findings and Discussion

Finally, the third focus group discussion involving the Senior Management, Director of Marketing and Head of Schools was held to get endorsement of the new micro-credentials model. Consequently, two academic degree programmes, namely the Bachelor of Software Engineering (Honours) (BDSE) and Bachelor of Technology in Electronics (Honours) (BTEL), were identified to be pilot tested for unbundling according to the new micro-credentials model. These two programmes contain courses that can provide learners with specific skills and competencies needed by industry players operating in an automated and digitized business landscape (Agrawal et al., 2020; Brown et al., 2021; Tay, 2023; Yuen & Pfordten, 2023). The BDSE model was launched in May 2023, while the BTEL model will be launched in September 2023. Figure 9 clearly illustrates how different academic programmes within the WOU Unbundled MC programme operate and lead to different exit points that align with the programme and industry requirements.

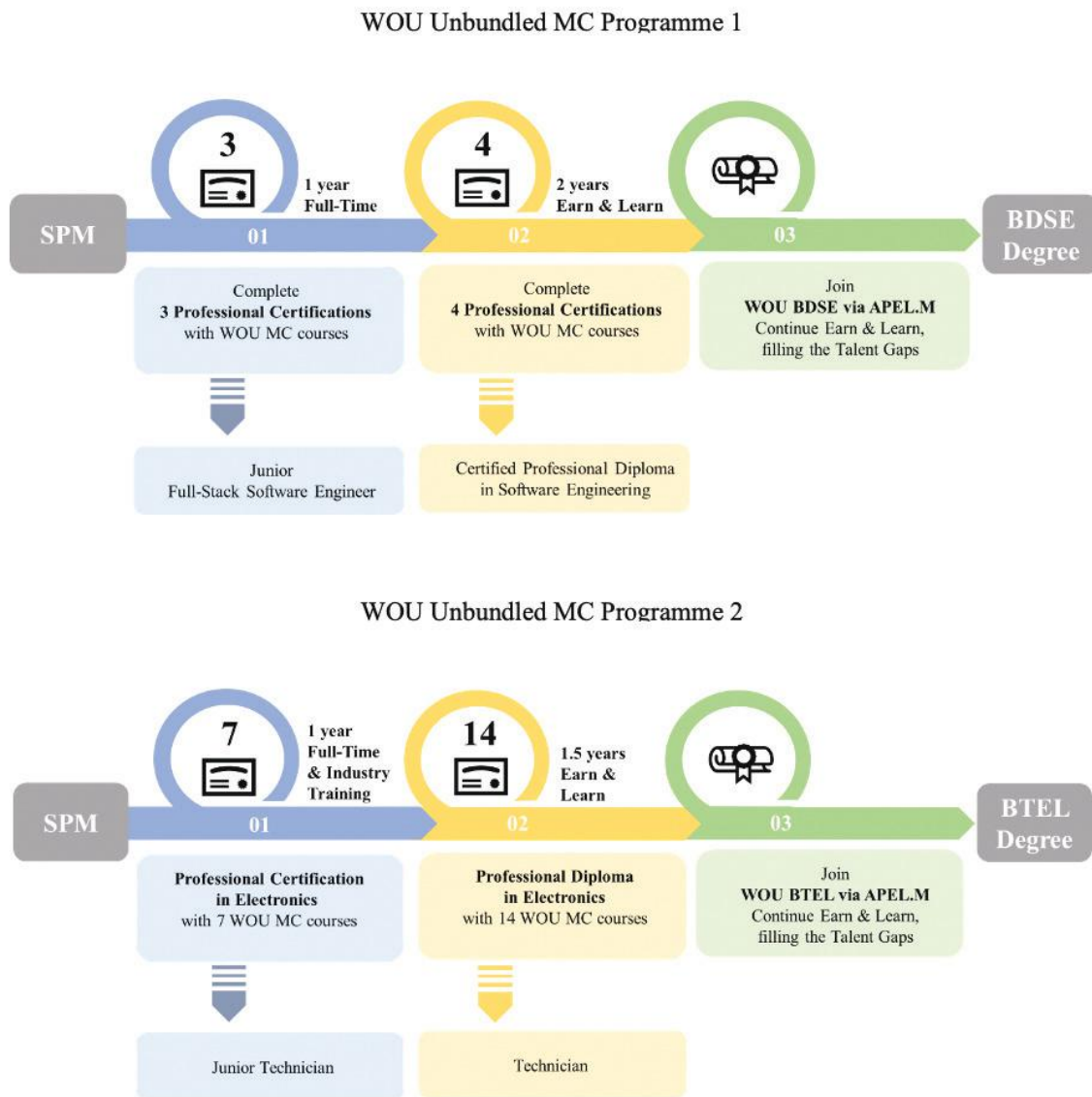


Figure 9. *BDSE & BTEL New Micro-Credentials Study Pathway Models*

For the BDSE model, learners can enroll in WOU’s unbundled micro-credential courses and complete three professional certifications. This pathway is designed to be completed within one year of full-time study. By successfully completing these certifications, learners will acquire the necessary skills and knowledge to work as Junior Full-Stack Software Engineers.

Upon completing their first year of studies, learners have the option to either exit or continue with further education. For those who choose to continue, the next pathway suggests a longer duration of the study, approximately two years, during which they pursue four additional professional certifications through WOU’s unbundled micro-credential courses. The outcome of this pathway is attaining the Certified Professional Diploma in Software Engineering. To progress further, learners have the possibility of joining WOU’s BDSE programme through the APEL.M process. This option allows for continued skills development and addressing talent gaps through the “Earn & Learn” approach.

In contrast to the BDSE Micro-Credentials Model which enables learners to earn up to seven professional certifications upon completion of the WOU Unbundled MC programme, the BTEL Micro-Credentials Model leads to the acquisition of two professional certifications upon completion. After a careful evaluation, the BTEL academic team has selected seven essential courses for Junior Electronic Technicians, which are delivered during the first year of study after SPM examinations.

Similarly, learners who opt for the BTEL model can either exit after their first year of studies or continue their academic journey towards earning the Professional Diploma in Electronics. This requires the completion of an additional 14 unbundled MC courses. Upon successfully obtaining the Professional Diploma in Electronics, learners are equipped to work as technicians. Finally, the planned model provides an opportunity for learners to obtain an MQA formal academic qualification by joining the BTEL programme via the APEL.M process.

4. Implications and Potential Impact of Micro-Credentials

Unbundling is the process of breaking down a traditional academic degree into smaller, more modular components, such as courses or micro-credentials. This allows learners to choose only the specific skills or knowledge they need, and to learn at their own pace and on their own schedule. In the context of creating stackable micro-credentials, the unbundling process involves identifying the specific skills and knowledge that learners need, and designing a series of micro-credentials that can be stacked together to build a larger set of competencies. Thus, the WOU new micro-credentials model can potentially support the effort of narrowing the talent gap. This learning shift has several significant implications for the higher education industry.

First, micro-credentials enable learners to have more flexibility and personalize learning. Learners can select specific micro-credentials that support their career goals or areas of interest without having to commit to a full degree or programme. In particular, this flexibility can be of great value to working adults who have time or financial constraints.

Second, micro-credentials enable learners to have more targeted and relevant learning experiences. As micro-credentials are designed to develop specific skills and competencies based on industry needs and demands, learners are assured of gaining the most in-demand skills in the job market.

Third, micro-credentials enable learners to have industry-relevant skills that employers are looking for. When this happens, mismatch of job seekers' skills and the industries' demand can be minimized. Learners who have the opportunity to complete industry-relevant micro-credentials can develop specific skills and competencies that are in high demand, thus increasing their employability and bridging the talent gap.

Lastly, micro-credentials enable HEIs to adopt new education models that offer flexible and targeted learning experiences. For instance, lifelong learning focuses on continuous learning and skill development throughout a person's career journey, while just-in-time learning emphasizes the acquisition of specific skills and knowledge needed at that exact time needed.

As a whole, unbundling traditional academic programmes into stackable micro-credentials has a significant potential to positively impact the higher education industry as it allows higher flexibility and relevance, and helps narrow the talent gap. Due to the rapid changes and disruptions in the job market, HEIs that embrace micro-credentials may have the competitive advantage of meeting the learner-employer changing needs.

5. Limitations and Future Research

The current case study has two limitations. First, as the micro-credentials model is still fairly new and tested on two formal academic programmes, the model's effectiveness cannot be ascertained yet. Second, although the micro-credentials model has been theoretically shared with WOU's industry panel members, the model's practicality for the industries has yet to be examined. As such, the current case study could be extended for future research on the effectiveness of micro-credentials in helping learners gain specific skills and competencies required to be successful in the job market. In particular, this research could evaluate micro-credentials' impact on learners' job prospects and career progression. Additionally, future research could focus on validation of micro-credentials by the industry. This research area is important as with the growing popularity of micro-credentials, having insights into how much industry players value micro-credentials and how they use them in their hiring decisions will be extremely useful for HEPs and the job seekers or learners.

6. Conclusion

In conclusion, this study highlights that micro-credentials play a crucial role as a potential solution to address the local and global talent gap. The new micro-credentials model developed in this study provides a flexible, affordable, and accessible pathway for individuals to acquire specific skills and knowledge, leading to formal academic qualifications through APEL.M. The implementation of this model can benefit policymakers,

educational institutions, and industry stakeholders by providing a flexible and cost-effective way to acquire skills and knowledge. While the study identified some challenges, the model serves as a useful reference for future implementation. With the launch of the BDSE model and upcoming launch of the BTEL model, this study can contribute to bridging the talent gap in Malaysia and potentially serve as a model for other countries to address the global talent gap.

Based on WOU's experience, the following are some recommendations for ODL universities interested in implementing micro-credentials (see Figure 10):



Figure 10. Summary of micro-credentials implementation recommendations

First, establish strong academic-industry collaborations. ODL universities should conduct research to have a better understanding of the specific on-demand skills and competencies in the job market. This action will help ensure micro-credentials offered are relevant and of value to learners. Additionally, working closely with industry experts to develop and design micro-credentials will ensure that micro-credentials offered are aligned with industry needs and demands.

Second, focus on quality. ODL universities should establish clear learning outcomes for individual micro-credentials so that learners know what they will gain from completing the micro-credential. Also, universities will be able to assess the effectiveness of their micro-credentials. Besides, clear guidelines and standards are needed to ensure consistency and quality across various micro-credentials. It is important for ODL universities to ensure that the micro-credentials offered are aligned with accreditation standards, especially if they are stackable towards a larger degree programme.

Third, have strong support systems and promotion. ODL universities should develop a clear pathway for learners to progress through the various micro-credentials so that they can build their skills and competencies over time and stack them into an accredited degree programme if they wish to. In order to help learners successfully complete their micro-credentials, universities should develop strong learner support systems such as access to tutors or resources. ODL universities should promote the value of micro-credentials to learners and employers so as to allay any concerns on their quality and recognition. Specific skills and competencies that learners will gain from completing each micro-credential should be highlighted during the promotion.

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95-OIJ's Challenge for Global Outreach

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Abstract

The Open University of Japan (OUJ) celebrates forty years anniversary in 2023. It was designed to assure the quality of higher education and lifelong learning using both broadcasting distance education and face-to-face classroom education. With the progress of Internet environments, from the 2000s, OUJ started on-demand delivery of TV and radio broadcasting materials by Internet; from 2015, fully online courses were provided. In the midst of the COVID-19 Pandemic, OUJ decided to change the final examination for credits from traditional face-to-face mode to IBT (Internet-Based Testing) mode. In addition, after the amendment of the related ministry ordinances and regulations, minimum credits by face-to-face courses can be replaced with those by synchronous and interactive courses for graduation requirements. It means that both technical and institutional environments are fulfilled to accept students overseas in OUJ formal education. Now, OUJ had a monitor survey focusing on Japanese overseas. From the institution's viewpoint, one of the most critical issues was how to clear the copyrights of the materials in the development and delivery of broadcasting and video-on-demand materials. In Japan, the copyright law was amended in 2020 and the Society for the Administration of Remuneration for Public Transmission for School Lessons (SARTRAS) was established. In this system, educational institutions can use copyrighted works for educational purposes by paying compensation to SARTRAS under fixed conditions. In the overseas survey, the copyright clearance was processed under the new system. As the SARTRAS system has several constraints, such as the maximum number of students in each course, it was found that it is difficult to apply in many cases of the future full operation. In the next survey, the copyright will be cleared by the licensing agreements with each copyright holder. The remaining issues, such as the digital library and virtual learning commons, will be discussed.

Keywords: *Global outreach, Copyright, SARTRAS.*

1. Overview of the Open University of Japan

Television and radio broadcast media spread rapidly beginning in the 1960s. Against this backdrop, the Japanese government considered ways in which broadcast media could be effectively utilized in the field of education and as a result, the Open University of Japan Foundation was established in 1981 as a semi-governmental corporation² under the provisions of a specially enacted law. Subsequently, the Open University of Japan Foundation established the Open University of Japan (OUJ) in 1983. These newly established institutions aimed to respond to the nation's growing need for higher education, to further the provision of and open access to the output of university research, and to promote reform and improvement in educational methods in higher education (the use of broadcast media in university education).

From the outset, OUJ adopted a two-pronged approach to providing higher education and lifelong learning. The first consists of distance learning utilizing broadcast media, while the second features face-to-face lectures offered in Study Centers located throughout Japan.

Currently, OUJ annually offers more than 300 television and radio broadcast courses. OUJ operates its own broadcasting station and broadcasts its courses via satellite to all parts of Japan. As a result, broadcast courses can be viewed or listened to free of charge by anyone in any part of Japan³.

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³ In recent years, university education has become increasingly open to the public through MOOC and other initiatives. Since its inception, OUJ has openly offered its university courses to the Japanese public through the use of broadcasting.

2. Quality Assurance of Educational Content: Broadcast Courses and Online Courses

2.1. Copyright Issues

The educational materials used in broadcast courses consist of printed materials and educational content directly distributed through broadcast programs. The latter takes full advantage of the nature of broadcast media by incorporating such elements as music, photographs, and video content (limited to video courses) and filming on location, and is designed to stimulate the interest and curiosity of learners. Once produced, a broadcast program is generally re-used over a period of four to six years.

Because the repeated broadcasting of a program over a number of years represented an unprecedented format, questions related to the copyright of audio and educational materials used in courses and lectures presented OIJ with serious issues from the time of its founding.

Various approaches have been employed to resolve copyright issues. In the case of music, OIJ signs annual comprehensive licensing agreements with the Japanese Society for Rights of Authors, Composers, and Publishers (JASRAC) and other copyright management organizations, which permits various types of music to be freely used in broadcast courses. Other copyrighted works (photographs, videos, writings, etc.) are used in courses and lectures pursuant to licenses obtained from associations and organizations managing the copyrights in question or from individual copyright owners.

As discussed below, in addition to broadcast courses, OIJ has been offering online courses that are conducted fully online since 2015. Basically, the same approaches have been used in online courses to resolve copyright issues. An important difference however is that unlike broadcast programs, online courses can be accessed only by OIJ students and only for courses that they have registered for. This means that copyright royalty payments are significantly lower for online courses than for broadcast programs.

2.2. Review

As a rule, the educational content of broadcast courses offered by OIJ is left to the discretion of individual lecturers. On the other hand, because broadcast courses are transmitted over public airwaves, they must satisfy the conditions of fairness and neutrality as required under Japan's Broadcasting Act. For this reason, all broadcast courses are checked and reviewed by professional staff referred to as "reviewers."

This arrangement makes it possible for OIJ to ensure a certain level of quality in terms of fairness and neutrality in the courses it offers.

3. Support for a Diverse Student Body: Responding to the Needs of the Internet Age

3.1. Delivery of Broadcast Courses Over the Internet

As the Internet environment underwent significant changes and developments, the public's stance toward distance learning steadily shifted from a preference for broadcast media to the Internet. Responding to this change, OIJ began to utilize the Internet for transmitting courses in the mid-2000s.

Internet transmission of radio broadcast courses began in 2005, and Internet transmission of television broadcast courses followed in 2009.

Copyright-related issues again posed challenges that had to be overcome in order to enable the Internet transmission of broadcast courses. Because copyright licenses that had been previously obtained for the production of broadcast courses only covered broadcast media, new licenses now had to be acquired for Internet transmission. Consequently, the Internet transmission of courses started with programs for which copyright procedures had been completed and was gradually expanded as the copyright licensing process moved forward. It was in 2019 that it became possible to transmit all TV and radio courses through the Internet⁴.

⁴ Internet transmission as used in this context denotes access limited to registered OIJ students who have been assigned a login ID and password. This means that persons who are not registered students and persons living abroad cannot access OIJ broadcast courses.

3.2. Start of Online Courses

As the online environment continued to grow and improve, in addition to its existing broadcast courses based on broadcast media, OUJ decided to produce and transmit online courses that would be made available only through the Internet. In a significant departure from broadcast courses, these online courses are not limited to video recordings of lectures, and contain various additional elements that utilize the bidirectional possibilities of multimedia-based interaction. These include tests and discussions undertaken during a lecture to check student comprehension, and mutual grading by students (formative assessment). Online courses began in 2015 with the transmission of two courses, and have been gradually expanded to include 82 courses as of 2023.

3.3. Introduction of IBT (Internet-Based Testing)

For students to earn credits on broadcast courses, they are required to attend broadcast classes, study the relevant printed materials, and score a passing grade on a credit-certification test. Since its foundation, all of OUJ's credit-certification tests were administered in Study Centers located throughout Japan in the form of in-person written tests.

However, following the COVID-19 Pandemic, in 2022, OUJ switched its testing protocol from in-person written tests to Internet-based testing (IBT). As a result, an aggregate number of about 180,000 people have been taking IBT examinations at the end of each semester. Thus far, no major systems failure has occurred during IBT. Continued improvements are scheduled to be made in IBT to ensure the fair and rigorous administration of tests, including the more exacting online identification of test takers.

3.4. Using the Internet in Face-to-Face Classes

As noted above, OUJ has since its inception conducted face-to-face classes in addition to its broadcast courses. The utilization of these two modalities aims to combine the acquisition of knowledge through unidirectional distance learning lectures with the advantages provided by face-to-face bidirectional learning in anchoring new knowledge and skills, as well as in participating in the joint and collaborative acquisition of knowledge.

In this regard, it should be noted that the Ministry of Education, Culture, Sports, Science and Technology (MEXT) in Japan revised its "Standards for the Establishment of Distant Learning Programs at Universities" in 2001. Under the previous standards, out of a total of 124 credits needed for university graduation, 30 or more credits had to be earned in face-to-face classes. However, the revised standards allow a substitution whereby these "30 or more credits" can be earned in media-based classes that support simultaneous and bidirectional interaction. At OUJ, this means that following the abovementioned start of online courses, it has been possible since 2016 to earn the credits needed for graduation by substituting face-to-face classes with online classes.

These ongoing changes in underlying systems and technologies have created an environment where people can formally access the courses and classes offered by OUJ from throughout the world without being bound by restrictions imposed by time differences and physical distance.

4. Challenges Facing Global Outreach

4.1. Challenges Circa 2010

OUJ conducted its first overseas survey during a three-year period between 2009 and 2011 covering Japanese persons living in New York and Los Angeles. The survey results obtained at this time indicated that participation in Internet-based lectures and courses had proceeded without major difficulties, but that other serious problems and obstacles did exist. These included various problems that placed a heavier burden on faculty members, such as administering credit-certification tests at local sites and preparing tests that differed from those administered in Japan. The evaluation of these survey results identified numerous challenges, leading to a decision to postpone full-scale overseas expansion.

4.2. Academic Vision

Given the various technological and institutional improvements that were achieved in the decade following the first survey, OUJ has now decided to launch a full-fledged effort toward overseas expansion. In March 2022, the Open University of Japan Foundation and OUJ adopted a series of documents outlining the future direction

of OUI. These include “The Open University of Japan Foundation Medium- to Long-Term Vision 2033,” “The Open University of Japan Foundation Medium-Term Plan,” and “Vision2027.” OUI’s principle to promoting global outreach is reiterated in all of these documents.

4.3. Online Survey of Needs

Subsequent to these decisions, a “Survey of Needs on Accepting Japanese Overseas” was undertaken in the spring of 2022. The survey covered 511 Japanese individuals living in various countries throughout the world and was conducted in the form of a web-based questionnaire.

The questionnaire asked about taking OUI classes and received the following positive feedback (multiple answers).

- “Want to take free, Internet-accessible open courses.”
329 persons (64.4%)
- “Want to select and study interesting courses (for charge, for credit).”
311 persons (60.9%)
- “Want to try taking Internet-accessible open courses (for charge, informal, non-credit).”
252 persons (49.3%)
- “Want to formally register as a student (for charge) and earn a degree.”
208 persons (40.7%)

The questionnaire also asked about interested areas of study in the OUI syllabi (Figure 1). The most popular field was “Foreign Languages” (56.6%), followed by “Psychology and Education” (53.8%) and “Humanities and Culture” (38.4%).



Figure 1. Interested areas of study in the OUI syllabi

4.4. Monitor Study for the First Semester of 2023

4.4.1. Overview of the Monitor Study

Pursuant to the abovementioned decisions and Survey of Needs, a monitor study was conducted on overseas participation during the first semester of 2023 that began in April 2023. This constituted the first such study to be undertaken in twelve years.

During the first semester, the study covered a total of 19 courses consisting of eight video and 11 online courses. A total of 60 individuals participated in the study. It should be noted that all textbooks and teaching materials used in OUJ classes are available only in Japanese.

Each individual was asked to select one video course and one online course. Individuals passing the credit-certification test at the end of a course would earn credits.

The 60 individuals monitored during the first semester were living in a total of 17 countries. By region, the largest number resided in Asia (31 individuals = 51%), followed by Europe (15 individuals = 25%), and North America (9 individuals = 15%). In this study, of all those living in Asia, a particularly large number were residing in India and Malaysia (Figure 2).

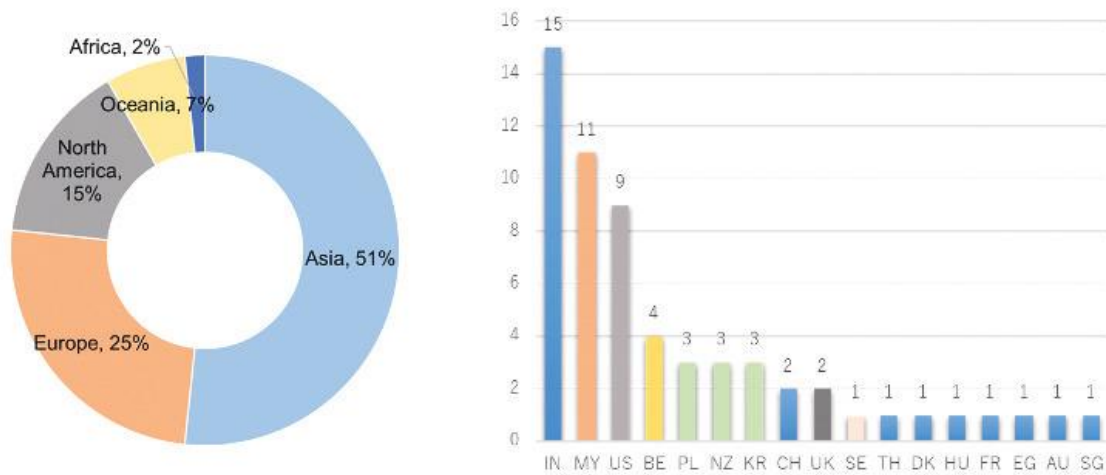


Figure 2. Demographic characteristics: Country of residence

An overwhelming percentage of the individuals monitored were women, with women accounting for 85% of the total (51 individuals) and men accounting for 15% (9 individuals). By age (Figure 3, Left), the individuals monitored ranged from people in their 20s to those in their 80s. The largest groups were in their 40s (25 individuals) and 30s (17 individuals). By occupation (Figure 3, Right), full-time housewives (househusbands) accounted for 38% of the total (23 individuals), followed by company employees at 28% (17 individuals), and self-employed and freelance workers at 12% (7 individuals).

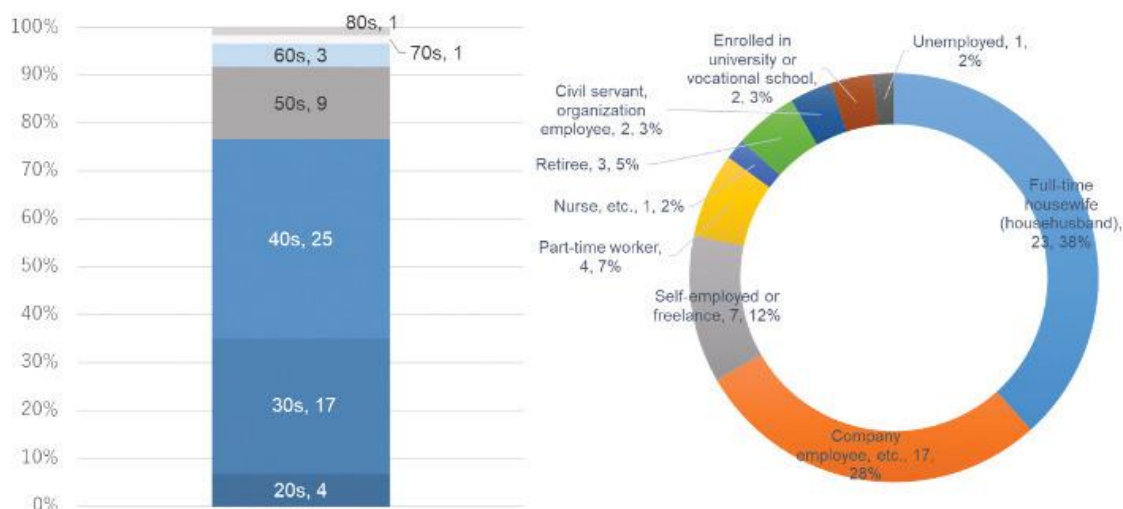


Figure 3. Demographic characteristics: Age and Occupation

Of the courses monitored in this study, the largest number of monitored individuals were enrolled in language-related subjects, followed by courses on “Living and Welfare” and “Psychology and Education.”

Asked how they would have liked to have the monitor study conducted, a relatively large number opted for a method that could be completed fully online (PDF transmission of textbooks coupled with online class participation).

4.4.2. Resolving Copyright Issues Related to Monitored Courses (Use of SARTRAS)

A major obstacle to the overseas use of courses produced in Japan for broadcasting purposes was once again the question of copyrights. As mentioned earlier, the video and radio broadcast courses that form the core of the OUJ curricula are covered by copyright agreements that are restricted to domestic broadcasting and Internet transmission restricted to students living inside Japan. Thus, as they stood, these existing arrangements precluded the overseas transmission of OUJ courses.

Regarding this matter, Japan’s copyright system provides two options. The first option requires separately obtaining copyright licenses for courses that are to be transmitted abroad. The second option involves utilizing the Compensation System for Public Transmission for Educational Purposes⁵ that was adopted in 2020. Under the latter system, to the extent that the rights of copyright owners are not unfairly infringed upon, educational institutions in Japan are permitted to freely use copyrighted works in public transmissions for educational purposes by making compensatory payments to designated organizations, which is called SARTRAS (the Society for the Administration of Remuneration for Public Transmission for School Lessons).

For the overseas monitor study conducted during the first semester of 2023, the decision was made to utilize the Compensation System for Public Transmission for Educational Purposes because the procedural requirements were relatively simple.

4.5. Monitor Study for the Second Semester of 2023

4.5.1. Overview of the Monitor Study

As of July 2023, preparations are underway for conducting a monitor study during the second semester of 2023 that begins in October 2023.

As of July 27, applications for participating in the monitor study have been received from 126 individuals living in a total of 31 countries. The regional breakdown of applicants consists of 65 individuals in Europe, 31 in Asia and 19 in North America. Applicants from Asia include countries that were not represented in the first-semester study, such as Indonesia.

The scope of the second-semester study is scheduled to be expanded to go beyond Japanese individuals living abroad and to include foreign nationals who have the language skills to receive higher education in Japanese.

4.5.2. Resolving Copyright Issues Related to Monitored Courses (Individual Licensing)

As explained above, the decision was made to use the Compensation System for Public Transmission for Educational Purposes for the monitor study conducted during the first semester of 2023. However, the system does have certain drawbacks. Firstly, the use of copyrighted materials is restricted to educational purposes, which means that access to the courses in question must be restricted to registered students and cannot be openly shared with large numbers of other students and so on. Secondly, in order to avoid unfair infringement on the rights of copyright owners, the number of students per course must be held below a certain number.

⁵ Article 35 of the Copyright Act stipulates as follows.

- (1) A person in charge of teaching or a person taking classes at a school or other educational institution (except one founded for commercial purposes) may reproduce a work that has been made public or transmit that work to the public (including making that work available for transmission, if it is to be transmitted to the public via automatic public transmission; hereinafter the same applies in this Article), or publicly communicate a work that has been made public and is transmitted to the public through a receiver to the extent that is found to be necessary if the purpose of doing so is exploitation in the course of those classes; provided, however, that this does not apply if the action would unreasonably prejudice the interests of the copyright owner in light of the nature and purpose of the work, the number of copies that would be made, and the circumstances of its reproduction, public transmission, or transmission.
- (2) If a work is transmitted to the public pursuant to the provision of the preceding paragraph, a person that establishes an educational institution referred to in that paragraph must pay the copyright owner a reasonable amount of compensation.

Given that these restrictions may hinder full-scale global outreach in the future, a different approach is being examined for the second-semester monitor study. Instead of using the Compensation System for Public Transmission for Educational Purposes, the possibility of separately obtaining licenses for overseas use for individual copyrighted materials is being considered.

Each broadcast course consists of a total of 15 classes that are 45 minutes long, and various copyrighted materials are utilized in each of these sessions. The number of copyrighted materials used in an entire course of 15 classes may in some cases come to several hundred items. OIJ is now engaged in re-obtaining licenses for all of these.

The second-semester monitor study will cover a total of 28 courses. As of the end of July 2023, indications are that OIJ will be able to transmit almost all of the copyrighted materials used in these courses to overseas monitors without incurring additional costs.

In addition to copyright issues, there are some other matters that need to be resolved in the case of some TV broadcast courses. These include instances in which previous agreements with performers and other participants do not cover overseas transmission, cases in which overseas transmission may be problematic due to differences in local customs and traditions, and cases in which, apart from copyright royalties, temples, shrines, and other organizations ask for the payment of cooperation money. In all of these cases, it will be necessary to re-obtain permissions for use.

5. Summary and Outlook

Moving forward, it will be necessary to continue overseas monitor studies in order to identify problems and devise appropriate solutions. At the same time, there are many other challenges that need to be met. These include the digitalization of printed materials (textbooks) that are paired with broadcast courses; the development of an environment enabling overseas access to library functions, which is indispensable to a deepening of the learning experience; and, the creation of a space in which students located overseas can engage in mutual discussions. OIJ is aiming to commence the full-scale acceptance of overseas students beginning in 2026 after these outstanding problems and challenges have been resolved.

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102-Management of an ODL Institution: The Case of the UP Open University

Michael P. Lagaya¹, Melinda dP. Bandalaria²

Abstract

The experience of doing remote teaching during the COVID-19 pandemic has inspired many academic institutions to pursue open distance learning (ODL) as an institution sustainability model, and to maximize the return on investments made during the pandemic. The same experience also surfaced or brought to the forefront other aspects that need to be considered as well: the management of ODL programs or the institution itself. Much discussions had been done on the aspect of teaching and learning in the ODL mode of instruction since this is the core of the operations and given the emergency nature of doing it on the onset of the pandemic but so little, if at all, sharings had been done that focus on the management aspect in the ODL context. This paper aims to share some of the Management practices by the University of the Philippines Open University and in the process answer the following research questions: how different is the management of an ODL institution compared to a conventional university? What are the major factors that need to be considered for effective and efficient management system? The research employed the process documentation of the practices of the University of the Philippines Open University (UPOU) which focused on the following: 1). Managing human resources working remotely; 2). Managing administrative and financial processes; 3). Managing information for the different stakeholders; 4). Contextualized disaster preparedness; and 5). Promoting the sense of community and belongingness. The paper also hopes to trigger conversations and contribute to the thickening of the discourse about eManagement/management of ODL institutions. which can guide other academic institutions, especially those who are planning to pursue the ODL direction. While the role of technology emerged as a key factor, other relevant considerations were also identified especially those which were also identified as domains of quality in the ODL mode of instruction.

1. Introduction

Open Distance Learning (ODL) as a mode of delivering instruction has been in practice for so many years already. Many institutions adopted the model of the United Kingdom Open University (UKOU), which was established in 1969, to make higher education accessible to those who cannot participate in the conventional or on-campus mode of instruction (Bandalaria and Ivanovic, 2022).

The birth of the Internet and its integration in the education ecosystem has resulted in major changes in the way instruction and learner support are delivered to the students. The Internet technology, likewise, caused changes in the management of online programs and institutions as a result of the technology-enabled teaching and learning.

Open Universities naturally evolved as shaped by the dominant technologies (Bandalaria, 2007). As a function of necessity and the quest to constantly prove that ODL is at par or even better than conventional education when it comes to quality, the affordances of modern Information and Communication Technologies (ICTs) were fully harnessed through the years. But while so much research and publications have focused on the teaching and learning process in ODL, there's not much literature that can be found on managing ODL programs and institutions. A cursory analysis of the AAOU Annual Conferences during the past 10 years (2013-2022) during which time online learning has been increasingly implemented revealed that the aspect of management of management is included in the sub-themes. However, a similar review of the AAOU Journal during the same period (2013-2021) showed just three (3) articles which looked into the aspect of management.

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The experience of doing remote teaching during the COVID-19 pandemic has inspired many academic institutions to pursue open distance learning (ODL) as an institution sustainability model, and to maximize the return on investments made during the pandemic. It is in this context that this research was pursued to provide some insights to these institutions based on the experience of an open university, the University of the Philippines Open University (www.upou.edu.ph).

In general, this paper aims to share the management practices being employed by the UPOU with specific focus on: 1). managing human resources working remotely; 2). managing administrative and financial processes; 3). managing information for the different stakeholders; 4). contextualized disaster preparedness; and 5). promoting the sense of community and belongingness.

2. Method

Two methodologies were employed in this research: documentation of the management and governance processes at UPOU especially during the COVID-19 pandemic; and review of electronic communications (emails) among the university officials which pertain the the different aspects of management that are the focused of the study.

3. Findings and Discussion

3.1. Managing Human Resources Working Remotely

One of the consequences of online learning is enabling remote working. This, however, posed challenges in terms of monitoring performance of the workforce based on the conventional system of physical presence in the work station. This had become more apparent during the COVID-19 pandemic when offices had to implement the Work From Home (WFH) set-up. Various technologies and platforms became available to detect online presence simulating the attendance checking process like logging into the online work platform.

While technology can play an important role in managing people who are working remotely, UPOU also implemented the following schemes as part of its human resource management:

1. Outputs-based performance evaluation. Results of work done e.g. answering emails; conducting online classes; attendance to webinars and training programs; and the likes became the basis of determining whether a staff has performed the work. During the pandemic, a regular online reporting system of the outputs per week was implemented as well as the ticketing system for emails sent to offices which has a monitoring system as to whether the ticket was resolved and when.
2. Strict implementation of the monitoring and evaluation schemes that are built-in into the system like the evaluation of faculty. The evaluation is usually done by the students at the end of the semester/term.
3. A communication system in place to enable the feedbacking system from the different



Figure 1. Various group chats to facilitate management at UPOU

stakeholders e.g. students; colleagues; partners; service providers; etc. Under this, a student, for instance, can communicate to the Dean or even the Chancellor if the teacher is not doing his/her work on time.

3.2. Managing Administrative and Financial Processes

Online working, remote workers to be paid, official documents signatories who are not always physically present in the work stations necessitate digital transformation in the administrative and financial processes. The digital transformation has the following components:

1. Digitizing official documents to facilitate dissemination and transmission for information and action.
2. Strengthening the online communication process with the organization-managed email system, organized cyber groups/group chats using different platforms and for specific purposes (Figure 1)
3. Facilitating/enabling digital financial transactions for employees, service providers, and partner financial institutions.
4. Enabling a secure digital signing process of documents, digital archiving and documents flow recording system to facilitate the digital transactions

3.3. Managing Information for the Different Stakeholders

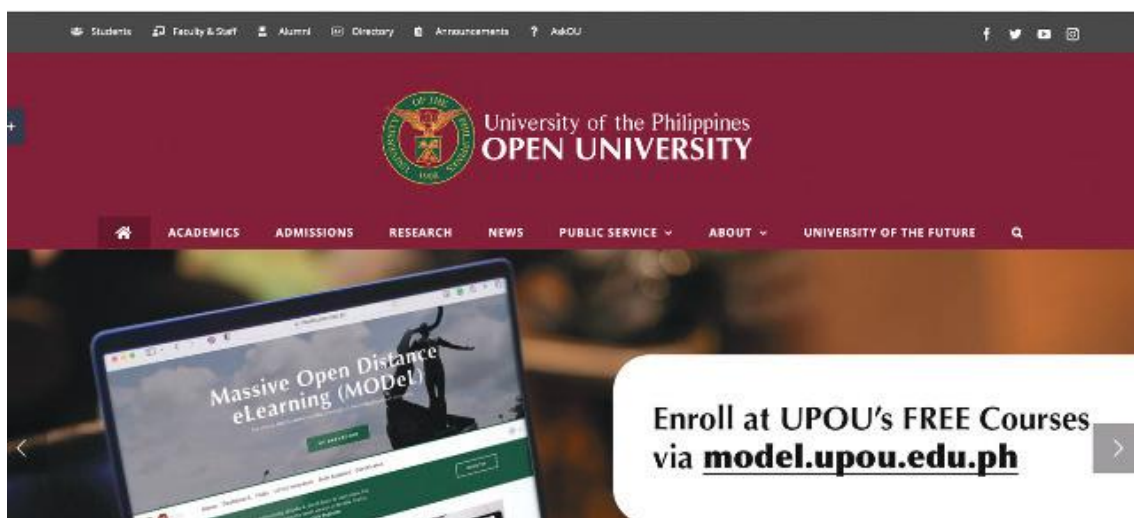


Figure 2. The University website at www.upou.edu.ph

1. Regular updating of the university website, other official microsities which are the go-to-platforms for on demand information (Figure 2).
2. Redundancy of information dissemination scheme using the university official social media platforms. Monthly publication of UPOU Open News, the online newsletter of the University (Figure 3)



Figure 3. The University eNewsletter published monthly and emailed to the different stakeholders

3.4. Contextualized Disaster Preparedness

1. An organized communication system e.g. buddy-buddy system; official information flow and reporting system; multi-system of reporting scheme
2. Implementation of a command responsibility assumption system to automatically enable the highest ranking official present onsite when disaster happens to take on the responsibility.
3. Assigning people to specific tasks. There are staff assigned to specific tasks and alternates identified as well to ensure that all Standard Operating Procedures are done when disaster happens.
4. Digital resilience. Being a fully online university, digital resilience is a major component of disaster preparedness.

3.5. Promoting the Sense of Community and Belongingness

With remote workers, it is not surprising if the staff will also experience the lack of the sense of community and belongingness like what the ODL students sometimes feel, Hence, it is important that programs and activities be implemented to avoid this. During the time of the pandemic, the following mechanisms proved to address this concern and can further be considered and enhanced as a component of ODL management.

1. Online meetings; Online and General Assemblies
2. Online Fellowship to celebrate important events like birthdays, retirement, etc. The term “eNuman” (or online drinking session/partying) was coined to refer to online celebrations. Zoomba, doing the Zumba using the zoom platform with participants connecting online wherever they are, was also done.
3. Cyber Groups/Group chats for informal conversations, announcements, greetings, etc. (Figure 4)

4. Conclusion

The mode of delivering instructional content affects the management of the academic institution. Integrating modern ICTs into the education ecosystem can enable remote working which can affect the various aspects of managing an organization. While technology can provide the relevant platforms that would simulate the conventional system of management based on the physical presence and reporting of the personnel, there are other equally effective mechanisms that can be implemented by an ODL institution. These mechanisms provide a new management framework in the context of an academic institution.

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www.upou.edu.ph

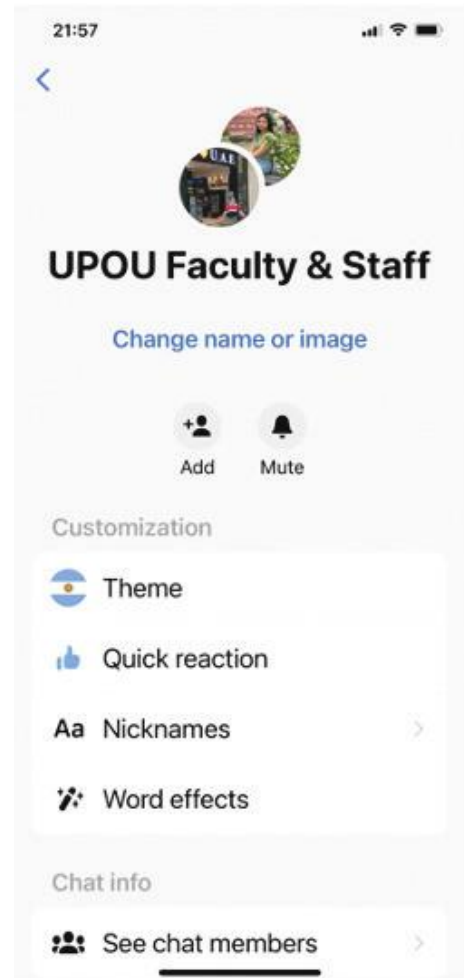


Figure 4. University Cyber group

112-The Effect of Using Pbl-Based E-Poster Media to Enhance Creative Thinking and Thinking Computation Ability on Global Warming Materials

Mery Berlian¹

Abstract

The purpose of this research is to improve students' creative thinking and computing skills through application in learning activities. This research is a quasi-experimental research. Respondents involved totaled 30 students in the experimental class and 30 students in the control class in class VIII with global warming material which was carried out in January and February 2023. The research implementation in the experimental class used PBL-based e-poster media while the Control class used conventional methods. The instruments in this study involved creative thinking variables. And computational thinking for the creative thinking variable instrument had 4 constructs in the form of test questions and variable B had 4 constructs in the form of test questions in the form of essay questions with a Richardson kuder reliability value > 0.80 . The data were obtained after carrying out the pretest and after treatment by carrying out the post test. The data were then analyzed using SPSS and presented descriptively and inferentially. From the results of data analysis it is known that there is a significant difference between the experimental class compared to the control class on students' creative thinking abilities ($p > 0.05$) and student computing ($p > 0.05$). The results of the study revealed that the application of PBL-based e-posters could improve students' creative thinking and computational thinking skills. So it can be concluded that PBL-based e-posters are good to apply in learning, these results have implications for education for student learning media. Through the development of learning media, it can become a reference for learning media for teachers to improve students' creative thinking and computational abilities. The e-poster has been adapted to the steps of the problem-based learning model and is equipped with questions that can stimulate creative thinking and computational thinking skills. In addition, the e-poster also uses an attractive design so students don't get bored studying it so that it can help improve students' creative thinking and computing skills. This e-poster has also gone through a validation process so that it is suitable for use in learning as a medium for increasing creative thinking and computational thinking

Keywords: *Pre test, post test, creative thinking, computational thinking, e-poster*

1. Introduction

This article discusses the problem of the effect of using PBL-based e-posters on students' creative thinking and computational abilities on global warming material. Creative thinking and computing abilities are some of the 21st century skills that need to be developed in every student (Laar, 2020; Siddiq, 2017). The effect of using e-posters on students' creative thinking and computing abilities needs to be investigated because there has been no research using e-posters to determine students' creative thinking and computing abilities.

In previous studies, it is known that there are no researchers who measure students' creative thinking and computational abilities based on learning using e-posters. The novelty of this research is in terms of the use of e-posters for creative thinking and computational abilities. Creative thinking and computing abilities very necessary to improve problem solving skills (Akpur, 2020; Siburian et al., 2019). At present students are required to have the ability to think creatively in order to solve various problems in the learning process. According to (Chevalier et al., 2020; Ulger, 2018) to develop creative thinking and computational abilities, students need to be exposed to problem-solving-based learning such as the problem-based learning model (Rahardjanto et al., 2019; Zabelina & Ganis, 2018).

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The current issue is about global warming which can cause a global greenhouse effect and also have a global impact throughout the world. From the data from previous research it is known that the thing that causes a lack of students' creative thinking and computational abilities is because the teacher is not good at applying appropriate learning models for problem solving (Kartika et al., 2019), the teacher in teaching is too monotonous to use the lecture method which quite boring for students (Sari & Hidayat, 2019) and teachers also do not use learning media during the learning process so that students are less interested in the teaching and learning process (Winasih et al., 2019). Based on the explanation above, the purpose of this study is to determine the effect of using PBL-based e-posters on students' creative thinking and computational abilities.

2. Method

2.1. Research Design

The method used in this research is quasi experiment, pre test, post test. Quasi-experimental is a research method where the sample is not random but the sample consists of 2 groups, namely control and experiment (Finch, 2017; Gaffney, 2019). This quasi experiment was used in this study because this method is more detailed in looking for the influence of a thinking ability. The benefit of using this quasi experiment is that through this method it is easier for researchers to examine students' creative thinking and computational abilities. The benefit of this method is that it provides more detailed and detailed research results to researchers (Flammer, 2017; Hwang, 2017).

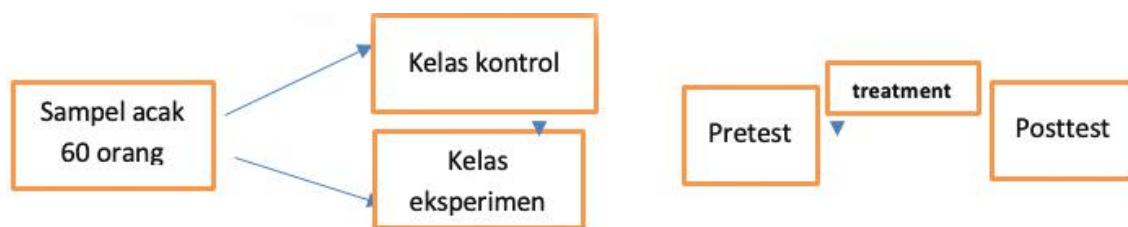


Figure 1. Research Procedure

The procedure for this quasi-experimental is that first a pre-test is carried out to determine the control and experimental class, then in the two sample groups the research product is given to understand the material in the product but in the control class there is no need to explain anymore regarding the material in the product while in the experimental class it is the other way around and finally, a post test was carried out on both samples and finally to find out the increase in the two samples, a t test was carried out (Brackmann, 2017; C. (Alex) Wang, 2018).

The research design used in this study was a *pretest and posttest nonequivalent control group design*. The research design can be seen in the table below:

Table 1. Research Design

Group	Preliminary Test	Treatment / Treatment	Final Test
Experiment	0 1	X 1	0 2
Control	0 3	X 2	0 4

Information:

0_1 = initial test (pretest) of students' initial mastery of concepts in the experimental class

0_2 = final test (posttest) ability to master the concept after get treatment in the experimental class

0_3 = initial test (pretest) of students' initial mastery of concepts in the control class

0_4 = final test (posttest) ability to master the concept after get treatment in the control class

X_1 = learning treatment with e-poster media

X_2 = treatment of learning with conventional methods

2.2. Population and Sample

This research was conducted at SMP Negeri 4 Padangsidempuan with a sample of 60 people consisting of 30 people in the control class and 30 people in the experimental class. This research was conducted for a week and the research participants were class VIII students of junior high school. The sample was chosen because class VII students have studied global warming material so it is easier to retrieve research data on class VIII students. The sampling technique was carried out by random and *purposive sampling* in accordance with the research needs, namely class VIII A as the experimental class and class VIII B as the control class.

2.3. Development of creative thinking and computational test instruments

The researcher uses a test instrument that has been made in previous research because the test instrument has gone through the validation and practicality stages. The creative thinking test instrument and thinking computation are already in the valid category as evidenced by $r \text{ table} > r \text{ count}$. The computational thinking test instrument is also in the reliable category, as evidenced by the practicality test results > 0.80 . The constructs for creative thinking are fluency of thinking, flexibility of thinking, elaboration and originality (Tohir et al., 2018; Wechsler et al., 2018). The constructs for computational thinking are decomposition, pattern recognition, abstraction and algorithms (Nouri et al., 2020; Olmo-Muñoz, 2020).

2.4. PBL Based E-Poster Development

The product used in this study is a PBL-based e-poster that has gone through a pilot project and has gone through validity, reliability and practicality tests. The material used in product i.e. global warming material. This material is used in this research because this material is an issue that is currently being discussed all over the world. Researchers hope that by choosing this material students can find various solutions in reducing the impact of global warming by increasing their creative thinking and computing skills. The following is an overview of PBL-based e-poster products that have been carried out in previous pilot projects.



Figure 2. Product Overview

2.5. Data Collection

The type of data that the researchers collected were pre-test and post-test data. These data are important because from these data it can be seen how much creative thinking and computational thinking skills students have. Data was taken in January and February 2023. The technique used in data collection was the mean score technique and also the t test (Ramadhani et al., 2019). The stages of data collection are first by conducting a pre test and post test from the two tests to produce research data. Overall data in this study were collected for 2 months. The amount of data generated is very adequate because the total data generated is as many as 60 people. The quality of the data collected is quite good with the pre-test results in both classes having a difference of 2 and for the post-test the difference is 7 in both classes.

2.6. Data Analysis

Researchers analyzed the data using SPSS with the theoretical mean score and also the t test. Researchers use the mean score technique because the technique is easier to use in research that uses quasi-experimental models. The stages in data analysis are pre-test and post-test. From the results of the two tests, the data needed in the research is generated. In this study, the T test was used to test the average difference between the two samples (experimental class and control class). As for the T-Test criteria, that is, when the significance value is less than or equal to 0.05, it can be concluded that there is a significant difference between the two groups in terms of one or all of the variables. The use of the t test aims to find out how much the increase in the two classes is significant (Ramadhani et al., 2019).

3. Discussion

3.1. Introduction to Results

The implementation of the research conducted by the researchers was carried out in stages in coordination with the teachers at the schools where the research was carried out. First, the researcher conducted a pretest, after that the scores from the pretest were grouped into two classes, namely the control and experimental classes. For the control class the teacher showed the PBL-based e-posters to the students in the class while for the experimental class the researcher explained the material in the e-poster again. After the two classes saw the e-poster, a post-test was carried out in both classes and the results were set forth in this study.

This research is a quantitative research which consists of two variables, namely creative thinking and computational thinking variables. The data in this study were obtained from questionnaires and questions. The use of a questionnaire is to measure the ability to think creatively, scores obtained using creative thinking essay questions. The questions that researchers use to measure students' computational thinking are in the form of essay questions. The research questions were distributed to the research sample, namely class VIII students of SMPN 4 Padangsidempuan with a total of 60 respondents consisting of 30 students in class VIII A and 30 students in class VIII D.



Figure 3. Students Observing the Product While Working on the Post Test

3.2. Pre Test and Post Test Results for Creative Thinking and Computational Thinking Variables

Table 2. Pre-test and post-test data for creative thinking skills

No	Data	Experiment Class		Control Class	
		Pre-test	Post-test	Pre-test	Post-test
1	The number of students	30	30	30	30
2	Average	38,7	78,5	40,3	70,3
3	The highest score	50	90	60	90
4	Lowest value	30	80	50	70
5	Standard deviation	2,29	3,62	2,54	3,54

The mean value of each sample for the ability to think creatively, namely for the pre-test of the experimental class, which was 38.7 and the control class, 40.3, from these values, the control and experimental classes were determined (Anwar et al., 2019; Chalhoub, 2018; C. (Alex) Wang, 2018). As for the post-test scores of the two samples, namely for the experimental class 78.5 and the control class 70.3, for the experimental class it increased by 39.8 and for the control class it increased by 30, the difference between the two samples was 8.8 and the highest mean score namely the experimental class (Graham, 2020; Shu, 2019; Xu, 2020). After obtaining data from the results of the pre-test and post-test, then a t-test was carried out to find out the difference and a significant increase from the pre-test and post-test that had been carried out previously (Ramadhani et al., 2019; K. Wang, 2019; Yang, 2020).

Table 3. Pre-Test and Post-Test Computational Thinking Data

No	Data	Experiment Class		Control Class	
		Pre-test	Post-test	Pre-test	Post-test
1	The number of students	30	30	30	30
2	Average	36,2	77,2	38,3	70,1
3	The highest score	50	90	60	90
4	Lowest value	30	80	50	70
5	Standard deviation	2,17	3,57	2,24	3,50

The mean value of each sample for computational thinking ability, namely for the pre-test of the experimental class, is 36.2 and the control class is 38.3. From these values, the control and experimental classes are determined (Anwar et al., 2019; Chalhoub, 2018; C. (Alex) Wang, 2018). As for the post-test scores of the two samples, namely 77.2 for the experimental class and 70.1 for the control class, the difference in the increase in value is around 7.1, the highest mean score, namely the experimental class (Graham, 2020; Shu, 2019; Xu, 2020). After obtaining data from the results of the pre test and post test, then a t test was carried out to find out the difference and significant improvement from the pre test and post test that had been done previously. (Ramadhani et al., 2019; K. Wang, 2019; Yang, 2020).

Table 4. Results of the Creative Thinking Pre-Test

Creative thinking	N	Means	Standard deviation	t value	Sig
Experiment class	30	38,7	2,29	0.0512	0.0507
control class	30	48,3	2.54		

The results of the t test of the creative thinking pre-test show significant results with $p > 0.05$ which shows that the distribution is normal and there is significance.

Table 5. Results of the Thinking Computational Pre-Test

Computing thinking	N	Means	Standard deviation	t value	Sig
Experiment class	30	36,2	2,17	0.0527	0.0523
control class	30	38,3	2,24		

The results of the t test of the thinking computational pre-test showed significant results with $p > 0.05$ which indicated that the distribution was normal and there was significance.

Table 6. Post Test Results of Creative Thinking

Creative thinking	N	Means	Standard deviation	t value	Sig
Experiment class	30	78.5	3,62	0.0623	0.0617
control class	30	70,3	3.84		

The results of the t test of the creative thinking post test show significant results with $p > 0.05$ which shows a normal distribution and there is significance.

Table 7. Post Test Results of Thinking Computing

Computing thinking	N	Means	Standard deviation	t value	Sig
Experiment class	30	77,2	3.57	0.0532	0.0523
control class	30	70,1	3.50		

The results of the t test from the computational thinking post test show significant results with $p > 0.05$ which indicates a normal distribution and there is significance.

The findings from this study indicate that:

The pre-test results of the two classes and the two variables show that the scores are quite good with a mean > 30 . The results of the post test of both classes and also of the two variables show that the scores of both classes are good as evidenced by the mean value > 70 . The pre-test results with an average value of > 30 are in the pretty good category (Gaffney, 2019). According to (Brackmann, 2017; Hwang, 2017) the post-test results with an average > 70 are included in the good category. The mean value of each sample, namely for the pre-test of the experimental class, was 38.7 and the control class was 48.3. From these values, the control and experimental classes were determined (Arvate, 2018; Kitagawa, 2018; Weidlich, 2019). As for the post-test scores of the two samples, namely for the experimental class 78.5 and the control class 70.3, for the experimental class it increased by 39.8 and for the control class it increased by 30, the difference between the two samples was 8.8 and the highest mean score namely the experimental class (Fu, 2019; Huang, 2020; Kaiser, 2020). After obtaining data from the results of the pre-test and post-test, then a t-test was carried out to find out the difference and significant improvement from the pre-test and post-test that had been carried out previously (Suryawati, 2018; Tsai, 2018; Vanbecelaere, 2020). The results of the t test, namely the values for the pre-test and post-test results are all < 0.05 , which means that the test distribution is normal and there is significance (Cheng, 2018; C. Wang, 2018). Overall the results of the pre-test and post-test that have been carried out are quite good and if related to the research objectives it has been quite successful in increasing creative thinking and computational abilities as evidenced by the results of the t-test < 0.05 (Hu, 2021; Song, 2020).

4. Conclusion

In this study it can be concluded that the results of the pre-test and post-test carried out in the quasi-experimental method show that the pre-test results are in a pretty good category with an average value for both variables > 30 . The post-test results in this study were included in the good category, this is evidenced by the post-test average scores for creative thinking and computational variables > 70 . Meanwhile, the results of the t-test showed that the values of the two samples were > 0.05 with a statement that the distribution was in the normal category and there was significance. This has implications for improving students' creative thinking and computational abilities. So this study recommends that teachers be able to use this PBL-based e-poster in the teaching and learning process.

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Best Paper Award
Silver Medal

**115-A Study on The Fulfillment of Practicum and Digital Literacy in
Distance Education**

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Abstract

The COVID-19 era saw digital literacy becoming a learning requirement for students receiving distance education, regardless of age and gender. However, performing tasks using computers and digital devices proved difficult for many, depending on their level of digital literacy. Especially for practical subjects such as video production, the learner's access and ability to utilize digital devices, including the use of cameras and editing applications, emerged as the most significant factors dictating the level of learning. To find out how much, this study conducted an online survey on 'digital attitudes' and 'utilization of digital devices and technologies,' using students enrolled in practical subjects at the Department of Media Arts & Sciences at Korea National Open University and analyzed their learning experiences vis-à-vis their digital literacy competency. Responses from 423 respondents were collected, with the analysis conducted using SPSS Statistics 27.0 to perform frequency analysis, crosstabulation analysis, and ANOVA to test for mean differences in the satisfaction score in comparison to digital literacy competency levels. The results of the study affirmed that the respondents perceived a practicum for such courses was essential for understanding the topic and acquiring the necessary skills. Despite this perception, however, it was discovered that a significant number of students did not participate in the practicum portion of the course and the main reasons for this were that they were not aware of which tools were used how for the practicum, and that they lacked the digital skills necessary for utilizing such tools during the practicum. The results from the measurement of digital competency indicated that respondents' attitudes toward and awareness of digital tools usage were rather low, with their ability at using various digital tools also low. In addition, students who did participate in the practicum often needed help to complete their tasks. They also reached out for help from external acquaintances to overcome such difficulties. Finally, this study indicates a real need for university-level support for strengthening students' digital competence, a measure that will help achieve the desired learning effect in distance university practicum courses, and suggests several pathways toward this goal.

Keywords: *Digital Literacy, Digital Competency, Distance Learning, Practicum*

1. Introduction

During the COVID-19 pandemic, most higher education institutions adopted non-face-to-face classes, including Zoom classes, accelerating digitalization in the education sector. In the case of KNOU, an e-learning-based institution, previous sessions conducted face-to-face were all converted to non-face-to-face methods. Evaluative methods were also changed for some subjects, replacing the traditional testing method with online assignment evaluations. The result was that learners needed digital literacy skills required for operating basic digital devices, including using cameras and microphones on laptops, PCs, and smartphones, so that they could participate in non-face-to-face Zoom courses and do their online assignments.

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The term digital literacy encompasses the use of instruments such as digital devices, the ability to produce and share information, and the ability to utilize networks. It also includes digital familiarity and digital efficacy in addition to technical ability, as well as the ability to solve problems via the basic use of digital devices. Generally, students enrolled in distance education do possess at least a rudimentary level of digital literacy, allowing them to take Internet-based classes and do homework online. In this respect, digital literacy is also a skill that students of open distance universities must have for a successful ODeL program (Buckingham, 2006).

However, because distance education students vary widely in age and educational background, their ability to learn could differ greatly based on the level of digital literacy. On average, older students tend to show a slightly lower level of digital literacy, making learning that much more a challenge. Korea National Open University has opened and operated “Understanding Distance Education” as a 1-credit basic selective as means for distance education learners to adapt more easily to digital distance education. In this course, they learn about the nature of distance education, the curriculum and courses, evaluative and learning methods, digital smart education, and how to navigate and enjoy U-KNOU campus using smart devices. Such basic information on distance education and on basic digital technology can be a great help to new learners. The students also had to learn on their own materials and technical aspects of some practicum subjects normally best learned via physical attendance. Thus, an individual’s grasp on digital literacy becomes ever more critical, for he or she now must create on his or her own digital contents using various media, digital devices, and applications.

Some of the practicum courses in the Department of Media Arts and Sciences which require multidimensional digital literacy tend to call for more individual digital literacy capabilities. In particular, with many of the physical attendance sessions during the COVID-19 pandemic being replaced with online lectures and test assignments, it became essential for students to have familiarity with digital devices and other technical aspects such as digital camera usage and editing to perform their assignments. It was no surprise then, that older students less familiar with the use of various digital devices and tools had difficulty completing practicum courses, with the lack of digital literacy being pointed out as an obstacle to distance learning for this group. Also, it was observed that digital literacy competency, one that allowed problem solving by the operation of digital devices and production of creative contents, was an important factor influencing students to register for practicum courses.

In this context, this study aims to examine how the degree of individual digital literacy affects the students of the Department of Media Arts and Sciences in their selection of and participation in practicum courses. Specifically, we investigate whether there is a difference in the level of digital literacy competencies (digital attitude and digital utilization competency) depending on practicum course experiences. By comparing digital literacy behaviors and practicum difficulties as well as satisfaction according to demographics, we will find the causes that impedes a student’s choice of practicum courses and explore what support for such courses can be designed for the future.

1.1. Digital Literacy and Distance Learning

Digital literacy is generally defined as the ability to use information and communication technologies in learning. Paul Gilster (1997), who introduced the concept of digital literacy for the first time, defined digital literacy as “the ability to understand and use information from various digital sources”. According to Gilster, digital literacy is a particular mindset that includes mastering not only computer technology but also concepts of the digital environment (Gilster, 1997). Martin, who emphasized digital literacy more broadly, defined it as the ability to perceive, use, analyze and assemble digital resources, create new information, and communicate with others in this way (Martin, 2005/2008).

Digital literacy, particularly in relation to distance learning, refers to an individual’s ability to find, evaluate, produce and communicate clear information through writing and other forms of communication across a variety of digital platforms. More specifically, digital literacy entails the use of digital devices such as smartphones, tablets, laptops, desktop PCs, and other applications in distance education. With the advent of various digital devices and the spread of social media, digital literacy is not just computer literacy, but rather finding and analyzing information and data on the Internet, using it for your own purposes, recreating it, expanding it, and then sharing and collaborating with people around you. It extends to the ability to communicate (Kwon & Hyeon, 2014;124). Digital literacy is also a kind of media literacy and includes the concept of information literacy.

Existing research on students' digital literacy skills in distance education include a study by Ozdamar-Keskin and colleagues (Ozdamar-Keskin, Ozata, Banar & Royle, 2015) and a study by Rahman and colleagues (Rahman, Ariawan, and Pratiwi, 2020). Ozdamar-Keskin et al. (2015) investigated the learning habits and digital literacy abilities of learners enrolled in Anadolu University in Turkey using a quantitative survey. The approach of this study was divided into four parts to investigate demographic information, ability to use digital technologies, learning habits, and learners' preferences in using digital technologies for learning purposes. The researchers applied major component analysis to group and differentiate learners' attitudes from personal learning preferences, problem-solving skills, project work skills, and abilities to use digital tools for learning purposes. According to the research results, learners answered that they have problem solving and project work skills to deal with educational difficulties. However, skills to use information and communication technologies and digital literacy skills are only rudimentary, requiring training on how to use digital tools more effectively for learning purposes (Ozdamar-Keskin et al, 2015; 74).

On the other hand, Raman and colleagues (2020) compared students' digital literacy competency by measuring students' digital literacy abilities by location in Indonesia. This study also used a survey method as a research method. As a result of the study, it was found that all students had similar intermediate digital literacy abilities in relation to location. This includes proficiency in using the media. The middle type of digital literacy means that the students' capability to operate digital media is quite high, and the ability to analyze and evaluate media content is quite good. The intermediate type of digital literacy was sufficient ability to use media for learning in the form of social interaction. In other words, Indonesian students already appear to be fairly proficient in digital media. However, as for the level of literacy related to creative content production, only a small number of students were able to use digital technology to create content (Rahman, Ariawan, and Pratiwi, 2020).

Existing research results suggest that among the various elements of digital literacy, the ability to create content requires a fairly high level of digital literacy, and the ability to utilize digital technology beyond information literacy is required. Specifically, students who take practical subjects such as "Introduction to Video Production" and "Multi-media Planning and Production" in the Department of Media Arts & Sciences must be able to use digital camera and digital non-linear editing as well as using software programs. Accordingly, students must have a high level of digital competence such as creative content production ability, in order to complete these practical subjects.

1.2. Digital Literacy Skills and Digital Competence Elements

Digital literacy can improve academic performance by allowing students to create content such as presentations, videos and blog posts. Learners are more likely to understand materials and retain more information when using digital tools to create their own original content. Digital literacy focuses on the ability to find, evaluate, and use information with the help of digital tools such as social media, web browsers, and online discussion boards. Moreover, the ability to use software that presents text or images (graphics, illustrations, etc.) to supplement the learning process plays an important role in optimizing collaboration and communication in online learning and performing practicum tasks. In the case of learners lacking these abilities, they are hesitant when choosing practical subjects or have difficulties in producing digital contents. Existing studies suggest various definitions and classification criteria for digital skills or digital capabilities. First of all, previous studies that measured digital ability among adults in Korea largely divided digital ability into the areas of awareness of digital technology, possession and operation of devices, use of digital devices, and digital safety and ethics (Gil, Kim & Cho, 2022). In addition, existing studies largely dealt with critical media understanding, including perceptions and attitudes toward digital technology, or measured possession and operation of digital devices as digital capabilities (Roque & Boot, 2018; Park & Jeong, 2019; Choi, Park, & Lee, 2021).

European Commission has divided digital skills and competencies for learners and citizens into three categories: digital competencies, job-related digital skills, and digital skills for ICT professionals. Among them, it is necessary to evaluate digital competencies, which are considered digital literacy, in order to conduct distance education. Digital competencies include a full set of basic digital skills covering information and data literacy, online communication and collaboration, digital content creation, safety, and problem solving. For example, the ability to retrieve, evaluate, store, create, present, and exchange information using computers and mobile computing devices, and to communicate and participate collaboratively in virtual networks (Misheva, 2021; Vuorikari, Kluzer, & Punie, 2022).

Digital literacy in distance learning is about the ability to apply those digital skills in a confident, critical and responsible way. Especially with regards to practicum courses, digital content creation capability is very important. It is the creation and editing of digital content in different formats to express oneself through digital means. Creative ability can be said to be a competency that students of the Department of Media Arts & Sciences especially need to perform assignments in practice subjects. Many assignments are related to the production of original digital content, creating or editing videos and images. For example, in the case of <Introduction to Video Production>, the subject of the assignment was to create a short-form storytelling video content through digital camera filming and editing.

Digital competence can be largely divided into digital attitudes and digital device utilization capabilities (Gil, Kim & Cho, 2022). Digital attitude consists of three factors: digital familiarity, digital efficacy, and digital self-management. First, digital familiarity is the attitude of not being psychologically afraid and trying to adapt actively when facing a new digital device. Second, digital efficacy is an attitude of self-directed use of digital devices and confidence that one can solve problems on their own when faced with a problem situation. It is the attitude of being able to figure out how to use a new digital device well, and being able to solve problems with confidence when problems arise. Third, digital self-management refers to the attitude of using digital devices only when necessary while managing the time of using digital devices. Next, digital device utilization capabilities involve the 'basic use of digital devices' and 'digital problem solving'. Basic use of digital devices refers to the ability to use the basic functions of digital devices proficiently. Digital problem-solving refers to the ability to use digital devices and technologies effectively to conveniently use transportation tools in daily life, or to carry out consumption, leisure, and administrative needs (Seoul Digital Foundation, 2021). Among the five digital competencies, the digital competencies required in distance education are to have a digital attitude and the ability to use digital devices.

In this context, it is necessary to examine how the degree of digital literacy among learners affects their willingness to take practical courses of distance education in the Department of Media and Visual Arts. To this end, this study uses the existing standards of measuring digital ability to find out whether or not students will take the practicum courses, and their reasons for not taking them, as well as the motivation to participate in them. Also, it will try to discover what the most difficult points or problem-solving methods were when students tried to perform on assignments, their satisfaction level with the practicum courses, and what specific support was needed for task execution. The research question is as follows.

- Research question 1. What are the learning experiences of taking practicum courses and the difficulties in performing the assignments?
- Research question 2. How is digital literacy competency different depending on the experience of taking the practicum course?
- Research question 3. What are the assignment performance behaviors and satisfaction according to the students' level of digital literacy?

2. Method

In order to analyze the learning experience of practice subjects according to their level of digital literacy, an online survey was conducted for two weeks from June 1st to June 13, 2023 targeting students of the Department of Media and Visual Arts at KNOU. The digital literacy diagnosis tool used the items corresponding to the factors of 'digital attitude' and 'use of digital devices and technology' in the Digital competency diagnosis tool developed by the Seoul Digital Foundation in 2022. 16 categories were selected and configured to measure digital attitudes and digital device literacy required for these distance education practicums. Of the 522 respondents who responded to the survey, the final 423 responses were analyzed, excluding insincere responses. By gender, the practicum subjects were 60.5% female, 39.5% male; and by age, 33.8% were in their 20s, 25.8% in their 30s, 16.5% in their 40s, 14.7% in their 50s, and 7.2% in their 60s or older. For analysis, SPSS Statistics 27.0 was used.

Through frequency analysis and descriptive statistical analysis for each item, the response pattern for each item was first confirmed, and differences between groups by gender and age were analyzed together. Afterwards, in order to confirm the difference level in digital literacy competency (digital attitude and digital utilization competency) according to the presence or absence of experience in taking the practical courses, a t-test was conducted between groups (with experience of taking the course, without experience of taking the course). In addition, the chi-square test was conducted to confirm the subjects' behavior in performing the assignments

and their satisfaction rates according to the level of digital literacy of respondents who had experience taking the practicum or practical course, and to confirm the statistical significance of group differences. The level of digital literacy competency was applied by dividing it into a below-average group and an above-average group based on the average score of those who had taken the practicums.

3. Findings

3.1. Frequency Analyses of Respondents' Perception of Practicum Experiences

About 90% of the respondents had taken practicum courses with overall satisfaction (on a 4-point scale) for those courses, found to be high among them (79.1% answered 'satisfied' or higher). The major motivating factors for students participating in the practicum courses were that the courses were 'a major subject required by the department' and 'to acquire practical skills or experience in production'. There was a statistically significant difference according to gender and age. Males answered 'because it is a major subject in the department', while most women responded 'to acquire skills or experience in production'. By age group, 55.7% of the respondents in their 20s showed the highest response to 'because it is a major subject in the department', and the response rate for 'to acquire practical skills or experience in production' increased as the age increased. It can be seen that there is a high interest in learning the practical experience itself in women and in the older age group.

The main reasons for not taking the course were that '[the respondents] don't know how to do the practicum' and 'they don't have the confidence to do the practicum'. There is a high rate of hesitation in taking these media practicums or practical courses due to a lack of digital literacy or insufficient prior information or guidance on the practicum courses. About 40% of the respondents answered that the most difficult aspect in performing the assignments was to understand and use the digital technology required by the practicum, such as digital editing program tools. Lack of time, difficulty in filming and producing recordings, and lack of information and data collection skills related to assignments were the next most difficult aspects of the program. It was confirmed that the students who took practicum courses found it difficult to use digital devices to fulfill the assignments.

When asked how to solve difficulties in performing assignments, the majority of the respondents answered that they 'inquired from external websites or acquaintances' (50.4%), and then posed an 'inquiry to the department study or at the student council meeting' (11.5%) or 'got counseling with a tutor by e-mail or text message' (10.2%), confirming that the rate of using resources outside the school was higher than using on-campus tools. Regarding this, there was a statistically significant difference according to age group. The response 'to inquire from external sites or acquaintances' was higher for those in their 20s (54.2%) and 30s (52.5%) than those in their 40s or older, making it difficult for this latter group to even consult external sources.

There was no statistically significant difference between the male and female groups in the average digital attitude score. On the other hand, the average score for the level of digital device usage was high in females (4.62) and males (4.47), and this result was statistically significant. By age group, there was a statistically significant difference in both digital attitude and digital device usage level. Those in their 20s had the highest average digital attitude score of 4.03 and digital device usage had an average correlation score of 4.75, and the higher the age, the lower the score. It can be seen that the digital literacy competency score of the older age group is relatively low. This result suggests that there is a need to focus on school support for high-age students who lack of digital literacy and digital competencies.

3.2. Digital Literacy Competency and Experiences of Practicum Course Taking

The digital competency level of all respondents was investigated by classifying eight items in the digital attitude area and eight items in the digital device usage area. 76.6% of the respondents gave a positive answer of 'yes' or higher to the questions asking about their digital competencies. More than 60% of the respondents answered that they could operate digitally without much difficulty for almost all items. On the other hand, the most negatively responded item, 'Able to edit and produce digital contents' (40.7%) indicated that subjects hardly know how to use digital media tools or that they are difficult to use, indicating a low level of digital device usage directly related to practicum courses.

Comparing the difference in digital literacy levels according to one's experience of taking this study's media practicum, students with experience of the practicum courses showed higher overall scores than students without experience of the courses. There was a more positive response to the new digital devices in general, especially when respondents had to confront a problem, that would lead to them searching the Internet to solve

the problem by installing a new app or software; the degree to which students solved problems in this way was caused by whether the student had taken the media practicum/practical course or not. The difference in average scores showed a statistically significant difference.

Table 1. Differences in Digital Attitude Levels Depending on Experience in Practical Courses

Digital Attitudes	Yes		No Experience		F
	Mean	Standard Deviation	Mean	Standard Deviation	
I tend to adapt well to new digital devices without fear	3.84	1.016	3.71	0.955	.075
I am willing to experiment with new digital devices	3.77	0.996	3.73	0.742	7.003
I feel comfortable using unfamiliar digital devices	3.35	1.028	3.20	1.005	.610
I enjoy using digital devices to do new things	3.71	0.961	3.76	0.969	.002
I am confident in my ability to utilize new digital devices	3.71	0.981	3.49	1.003	.084
I can figure out how to use digital devices well	3.72	0.944	3.51	1.028	1.374
When I encounter a problem, I can solve it myself by searching the Internet or using manuals	4.14	0.844	3.66	1.175	14.778*
When I install an app or software, I read the instructions first rather than relying on others	3.92	0.916	3.51	1.143	6.129*
*p<.05, **p<.01, ***p<.001					

In the area of digital device utilization, students who had experience taking the practical courses showed overall higher scores than those who had not. In particular, it was found that access to Internet websites and services was higher based on whether or not the subject had a practical course experience in using smartphone apps as tools for the completion of their assignment. In addition, students who took practical courses on digital content editing and production technology, which are directly related to the courses of the Department of Media Arts & Sciences, also showed the lowest scores compared to other items.

Table 2. Differences in the level of digital device use according to the experiences

Digital Devices Utilization	Yes		NO		F
	Mean	Standard Deviation	Mean	Standard Deviation	
I can open a personal account and log in to any internet website/service I want.	4.66	0.832	4.07	1.191	27.771**
I can use apps for tools such as calculator, calendar, and address book on my smartphone	4.83	0.633	4.61	0.919	12.871*
I can search for necessary apps on my smartphone and install, delete, or update them	4.86	.544	4.56	0.950	30.661
I can communicate using messengers (KakaoTalk, Instagram, etc.) or send photos and files	4.89	0.456	4.80	0.601	4.497
I can write necessary documents or data using a digital device	4.70	0.742	4.41	0.921	13.505
I can edit and create digital content (text, image, photo, video, etc.)	4.12	1.142	3.88	1.345	4.117
You can hold/participate in a meeting using a non-face-to-face remote meeting app (Google Meet, Zoom, etc.).	4.48	1.024	4.07	1.490	18.887
Can utilize smart watches, smart refrigerators, and IoT devices that work with smartphones	4.18	1.306	3.78	1.475	2.980
*p<.05, **p<.01, ***p<.001					

Overall, students who had the experience of the practical courses showed higher scores in both the digital attitude score and the digital device usage score than those who did not take the practical course. It can be seen that the relationship between course attendance and digital literacy is high. In the field of digital attitude, students with experience in taking these practical media courses showed a can-do attitude for solving problems related to digital devices more independently. In the field of digital device usage, however, with regard to digital content production and editing, despite the experience of taking the practical courses, students showed the lowest correlation score compared to other items. Therefore, it is necessary to operate practical courses to improve related digital literacy capabilities.

3.3. Assignment Performance Behaviors and Course Satisfaction

In order to investigate performing practicum assignments according to digital attitude and digital competency level, and whether there is a difference in satisfaction with practicum subjects, 381 participants who responded that they had taken practicum subjects were surveyed for digital attitude. Based on the average values of ($M=3.77$, $SD=.784$) and use of digital devices ($M=4.58$, $SD=.578$), cross-tabulation was conducted by dividing the group into below-average and above-average groups. The most difficult thing in performing assignments was different according to the degree of digital attitude. As shown in Table 3, it was confirmed that there was a difference at a statistically significant level in the aspect of difficulties experienced in performing assignments according to the digital attitudes.

Table 3. Aspects of difficulty in performing assignments according to digital attitudes

Aspects of Difficulty in Assignments	Below-average group	Above average group	Overall	χ^2
Others (Specify)	10	20	30	24.382***
	5.0%	11.2%	7.9%	
Lack of information utilization skills to collect information and data related to tasks	29	25	54	
	14.4%	14.0%	14.2%	
Difficult to understand and use digital technology such as digital editing program tools	98	51	149	
	48.5%	28.5%	39.1%	
Camera shooting and recording production are difficult	30	25	55	
	14.9%	14.0%	14.4%	
It is difficult to compress data, etc.	3	2	5	
	1.5%	1.1%	1.3%	
Difficulty communicating online	12	20	32	
	5.9%	11.2%	8.4%	
Not enough time	20	36	56	
	9.9%	20.1%	14.7%	
Total	202	179	381	
	100.0%	100.0%	100.0%	

* $p<.05$, ** $p<.01$, *** $p<.001$

In terms of the degree of digital device utilization competency, there was also a statistically significant difference between the above-average and below-average groups. As shown in Table 4, for more than half (50.7%) of the group with below-average digital device utilization competency, using digital technology, using techniques such as camera shooting and recording production (14.5%), and task-related data collection (13%) were found to be difficult. On the other hand, the group with above-average digital device utilization competency answered that they had difficulty using digital technology (32.5%), but this percentage was not higher than that of the below-average group.

Respondents with high digital device literacy (above average) did not experience any difficulty in camera shooting, recording production, and task-related data collection in performing these practical courses, compared to those with below average digital device literacy. It can be seen that personal factors such as lack of time can become a bigger obstacle. There was no statistically significant difference when it came to solving problems for

the respondents, when performing assignments, based on their level of digital device utilization competency. More than half of the students were receiving help from outside acquaintances or external sites when faced with difficulties in performing practice assignments. There was no statistically significant difference in the support that was considered necessary for carrying out practice tasks between the groups. They both recognized ‘provision of educational videos on the use of digital tools’ as the second most necessary support tool.

Table 4. Aspect of Difficulty in Assignments according to Digital Device Utilization

Aspects of Difficulty in Assignments	Below-average group	Above-average group	Overall	χ^2
Others(Specify)	7	23	30	16.071**
	5.1%	9.5%	7.9%	
Lack of information utilization skills to collect information and data related to tasks	18	36	54	
	13.0%	14.8%	14.2%	
Difficult to understand and use digital technology such as digital editing program tools	70	79	149	
	50.7%	32.5%	39.1%	
Camera shooting and recording production are difficult	20	35	55	
	14.5%	14.4%	14.4%	
It is difficult to compress data, etc.	2	3	5	
	1.4%	1.2%	1.3%	
Difficulty communicating online	11	21	32	
	8.0%	8.6%	8.4%	
Not enough time	10	46	56	
	7.2%	18.9%	14.7%	
Total	138	243	381	
	100.0%	100.0%	100.0%	
*p<.05, **p<.01, ***p<.001				

Specifically, the majority of the group with a below-average digital attitude found difficult understanding and using digital editing program tools (48.5%), followed by camera filming and recording production (14.9%), and information utilization such as task-related data collection (14.4%). On the other hand, the above-average digital attitude group answered the difficulty of using digital technology highly (28.5%), but the percentage was not higher than the below-average group. It was found that personal factors such as lack of learning time, rather than difficulty with digital technology use, were the main obstacle to the difficulty in performing the practical media courses for the above-average digital attitude group, compared to those with low digital attitude competence (the below-average group).

There was no statistically significant difference in how to solve problems when performing practicum assignments based on the respondents’ degrees of digital attitude. In other words, both the above-average and below-average groups were overwhelmingly dependent on external websites and help from outside acquaintances to solve difficulties when performing tasks. This can be understood as the school not being able to find the support it needs, or the support provided not helping students to perform the assignments for the media practicum courses. With regards to the support required to perform tasks according to the degree of digital attitude, there was no significant difference between the below-average group and the above-average group, and both groups answered ‘use of digital editing programs and special lectures’ as the most necessary support and ‘provision of educational videos on the use of digital tools’ as the second most necessary support.

Finally, satisfaction with the practicum courses among the two groups was compared and analyzed according to the digital attitude score. As a result, it was found that the satisfaction level of the below-average digital attitude group was statistically significantly lower than that of the group with the above-average digital attitude score. In addition, the satisfaction level with the practicum course among the group with the below-average digital device utilization score was statistically significantly lower than that of the group with the above-average digital device utilization score. Similar to the results of digital attitude analysis, it was found that the practice courses provided by KNOU were not sufficiently satisfactory for the expectations of students with

low digital device literacy. Also, the lack of digital capabilities and the lack of support to supplement them can be assumed to be the main causes of the low satisfaction rates. This can be interpreted to mean that the level or composition of practicum courses currently provided by the department may be appropriate for those with a high digital attitude. Thus, it is assumed that the main cause of low satisfaction rates is the lack of capacity and support students have to properly perform their media practicum.

4. Discussion and Conclusion

During the COVID-19 pandemic, students at distance universities had to adapt to a certain level of individual digital literacy in order to access online courses and make correct usage of digital technologies in learning. Although distance universities have provided various digitally-oriented supports by providing standardized education tools to a broader audience at low cost, without time and place restrictions (Kasımoğlu, Bahçelerli, & Çelik, 2022), simply using computers and digital devices does ensure a high level of digital literacy nor of performance for students. This was especially true for students enrolled in media related practicum courses. As such, the purpose of this study was to explore and evaluate the students' learning experiences in such practicum courses according to the level of digital literacy competency using specifically those enrolled at the Department of Media Arts & Sciences at KNOU through an online survey.

The findings show that motivation-wise for participating in practicum courses, female and older students showed higher interest in learning about their practical aspects. Students in their 20s and 30s clearly exceeded those in their 40s or older in their engagement with 'external sites/external acquaintances' to overcome practicum assignment questions and issues. Such respondents generally showed a strong bias for using digital devices to solve problems and do their assignments. In terms of competency, 60% of the respondents said they had no problem using digital devices to create digital content while 40% said either they did not know how or that it was too difficult.

There was no statistically significant difference in the average score between male and females regarding digital attitudes, but the digital device usage level was slightly higher in females than in males. By age group, there was a statistically significant difference in both digital attitude and digital device usage level. Average score of digital attitude and digital device usage was the highest for respondents in their 20s, with the score decreasing with age. The results indicate that the digital literacy competency scores of the older-age groups are probably relatively low. Comparing the level of digital literacy competency with regards to their experiences in taking a practicum course in media, students who had taken such a course showed higher overall digital literacy scores than students who did not. Specifically, a statistically significant difference was observed in the level of problem solving by 'searching the Internet when a problem occurred', 'the degree of independent problem-solving by installing a new app or software', and 'whether or not there was a practical course experience in using a smartphone tool app'. Overall, students of practicum courses showed higher scores in both digital attitude and level of digital device usage, indicating a high correlation between the enrollment in practicum courses and digital literacy competency.

One of the most important findings was that students who enrolled in media practicum courses also had the lowest score in digital content editing and production skills, aspects directly relevant to doing their assignments. The result indicates that the ability to produce creative digital content using editing devices and software programs requires a high level of digital competency among many other digital capabilities. This finding also indicates that assignment topics that require digital filming and editing without full engagement or explanations can be problematic for students with low levels of digital literacy, meaning it is probably necessary for instructors to grasp the basic digital literacy competency level of their respective students and to tailor assignments which are suitable for the various digital literacy levels. Furthermore, we highly recommended providing various learning tools needed for digital video and editing techniques, which were considered the most difficult by the respondents with regards to doing their assignments, so that students who have high digital attitude competency but lack the digital device utilization skill, are not turned away from media practicum courses.

As shown in the research results, students with high levels of digital competency showed willingness to solve problems related to digital devices with more independence and confidence, whereas learners with low digital competency had lower scores in digital attitudes and more difficulty in using digital technology. It should be noted, however, that the degree of reliance on external websites and external acquaintances for help with difficult tasks was high for both groups. These findings imply that students are not finding the support they need from school or that the support provided is insufficient to their needs, a signal that improvements in the practicum

course support system are necessary. Attention should also be paid to the fact that it is difficult for students to utilize information related to video and recording production, and task-related data collection. These findings also suggest that the level and/or composition of the practicum courses currently provided by the Department of Media Arts & Sciences may be appropriate for those with high digital attitudes, but may be insufficient for those students with low digital competency scores for them to fully understand or be satisfied with the subjects. To sum up, a student's digital competency level can affect the smooth performance in practicum courses in distance education, and the factors that affect satisfaction or dissatisfaction can differ according to their level of digital competence. Thus, it is necessary to help digitally less-competent students who are reluctant to take practicum courses by supporting them with programs or special lectures geared toward improving their digital skills before the actual term begins. Above all, it is crucial to provide educational videos on the use of digital tools including filming and non-linear editing procedures, or to devise methods for online real-time support from instructors.

Finally, this study has following limitations. First, although a survey was conducted targeting students of the Department of Media Arts & Sciences, the number of respondents for the survey was only 423, which limits the generalization of the results to only the students in the department. Next, in the case of practicum courses, individual digital abilities per each subject may require different levels of digital competencies, so the student's problem-solving approach or prerequisites for support in learning may be different. Third, digital competencies according to demographic characteristics could not be analyzed in depth for every item, and the cross-analysis between the presence or absence of the media practicum course experience and the average group was limited. As such, problems according to gender and age and customized support plans could not be sufficiently discussed in this paper. However, despite these limitations, the study is significant for the future findings in that it explored the relationship between media-related practicum courses and levels of digital competence, thereby identifying factors that can improve the operation of practicum courses and proposing teaching methods for better supporting and strengthening the digital competencies of students.

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117-Promoting Openness and Active Participatory Through Appropriate Learning Design

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Abstract

Like other open-distance universities, Open University Malaysia is designed to make education accessible to learners regardless of geographic location, pace or time constraints. Open University Malaysia delivers course materials and resources online so learners can study at their own pace from anywhere with internet access. Open University Malaysia believes in offering flexibility by fostering openness, a personalised learning pathway to increase active participatory through appropriate learning among open-distance learners. In this research paper, researchers explored the learning design concept by capturing the experience of developing and testing self-instructional learning materials. The work presented here is based on the delivery part of a capacity-building project involving self-instructional learning materials, focus group sessions and module evaluation. The researchers formed nine focus groups that comprised 37 participants among the full-time academic staff from four faculties at Open University Malaysia. The faculties are the Faculty of Technology and Applied Science, the Faculty of Education, the Faculty of Social Sciences and Humanity and the Faculty of Business Management. The learning outcomes within a course are spelt out in the learning materials and supported through content and instructional design strategies. The researchers present the action outcomes based on the experience. Eight stages of self-instructional training module development which are writing capital building module, Turnitin report, content review by experts, instructional design, readability test, language editing, desktop publishing and proofreading. The findings revealed that the alignment between the content, delivery, support and assessments is vital because it is designing the proof of the learning outcomes achievement. The practical suggestions are to increase active participation through personalised learning pathways and open-distance educational philosophy. The Erasmus+ programme funded this research project advancing equity and access to higher education through open-distance learning. The research is significant in the instructional learning design area to support open-distance learners, who are adult learners engaging in lifelong learning.

Keywords: *Openness, learning design, self-instructional materials, learning outcomes, active participation.*

1. Introduction

The shift towards more open and accessible educational practices is a recent development in higher education institutions such as Open University Malaysia (OUM). Open accessible and educational practices are a set of practices that support open and flexible access to education. In this method of learning, learners are free to access and exchange educational resources and information which enables them to discuss with their peers and facilitators online regarding their course materials. The primary objectives of open access and practices are to increase access to high-quality education for learners from all backgrounds, regardless of location, situation, or institutional affiliation.

According to Paskevicius and Irvine (2019) promoting greater openness among learners enabled them to access the variety of perspectives and interpretations their peers made regarding the course material. The online course resources and instruments provided by OUM allow students to learn at their pace from any location with an internet connection. Online delivery at OUM requires e-tutors to facilitate instruction across diverse groups of learners in ever-present learning environments. In order to enhance active participation

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through appropriate learning among diverse open-distance learners, OUM believes in providing open and flexible learning experiences through cultivating openness and a tailored learning experience. According to Roberts (2022), learners must transparently demonstrate their learning in personally meaningful ways that integrate curriculum and competencies. Allowing learners to participate in this style of learning enables them to retain information, redistribute the course materials, and foster a culture of cooperation and sharing among peers. Besides that, open and accessible educational practices could reduce the costs of education for learners, increase visibility, facilitate global collaboration, and encourage lifelong learning.

2. Method

In this pilot capacity-building programme, a case study approach was used, with full-time academic staff as the target population. The pilot was divided into three phases. The first phase began with the development of six learning materials. In the second phase, the materials were tested by sharing them with the participants of focus groups. After the focus groups tested the materials, the final phase measured the success of the pilot programme with a summative assessment that required the learners to create an open educational resource (OER) using Canva. Each group represented a specific field of study.

The focus group sessions were modelled after the Flip classroom model which required learners to read the learning materials before the session. In the focus group session, participants were first asked to reflect and share their experiences relating to the content via a guided discussion before working together on the designed activity. This approach was designed to ensure participants' understanding of the learning materials before engaging in the activity. This would allow for deeper and more meaningful conversations and collaboration on the activity and to better identify key issues and challenges related to the content.

The first focus group attended seven sessions. These sessions were subsequently reduced until the mode eventually was shifted to workshop mode with one pre-workshop session during the third phase. This allowed the focus group to get to know each other and build rapport before tackling the activity. It also allowed the group to provide more meaningful feedback on the activity as they had already become familiar with the topic.

In the second phase, nine focus groups were formed among the full-time academic staff from four faculties, i.e. Faculty of Technology and Applied Science (FTAS), Faculty of Education (FOE), Faculty of Social Sciences and Humanities (FSSH) and Faculty of Business Management (FBM). Each faculty was further narrowed down and segregated into a respective field such as Health Science, Information Technology, Early Childhood Education, Education, Islamic Studies, Psychology/Counselling, Finance/Accountancy and Business/Marketing. Table 1 summarises the focus groups and participants who were involved during the second and third phases.

Table 1. Summary of the Focus Groups and Participants

Group	Focus Group	Faculty	Field	Participants
1	Focus Group 1	FTAS	Completed Others	5
2	Focus Group 2	FTAS	On-going Health Science	4
3	Focus Group 3	FTAS	Information Technology	4
4	Focus Group 4	FOE	Early Childhood Education	4
5	Focus Group 5	FOE	Education	4
6	Focus Group 6	FSSH	New Group Islamic Studies	4
7	Focus Group 7	FSSH	Psychology/Counselling	4
8	Focus Group 8	FBM	Finance/Accountancy	4
9	Focus Group 9	FBM	Business/Marketing	4
Total				37

3. Findings

The findings in this paper are discussed in three parts based on the three phases mentioned in the previous section. Phase I concerns the development of six self-instructional learning materials: the process, the feedback, and the

way forward. This is the main focus of this paper. Phase 2 looks into the focus group sessions where discussions were focused on the content of the learning materials, and experiential learning. Phase 3 studies the creation of authentic assessment by asking participants to depict the achievement of selected learning outcomes (summative assessment) by creating an OER using Canva for a selected course that is taught by the participants.

3.1. Phase I

Phase I was challenging at the onset of the project due to changes to the original members of the project which led to some delay in the project delivery. Nevertheless, the nine stages in this phase were carried out successfully with the last stage being carried out in the post-development process in Phase 2.

3.1.1. Self-instructional Learning Material Development Process

While the university has been producing modules since 2001, the modules or self-instructional learning materials produced in the project were developed externally with the exception of the introducing instructional design elements and desktop publishing stages (refer Figure 1.1); and it involved two additional processes: Readability Testing, User Experience Testing (Evaluation 1). In addition, the content review stage in this project consisted of two parts: content review, and quality control review (which includes in-house style review). These stages were found to be important in the development of self-instructional learning material. The readability test was incorporated to ensure that the readability of the materials was adjusted to match the readability level of the targeted readers (college graduates) using the Flesch Reading Ease Score. Meanwhile, the User Experience Test (known as Evaluation) was carried post-production stage and included the hour taken to read a module. In general, all modules were tested to have an average of one hour-reading time. It is important to acknowledge that the actual reading hour would differ from one reader to another. Quality control was to ensure that the style of content delivery followed the pre-determined in-house style was key to Quality Assurance, particularly in a process where external experts were involved.

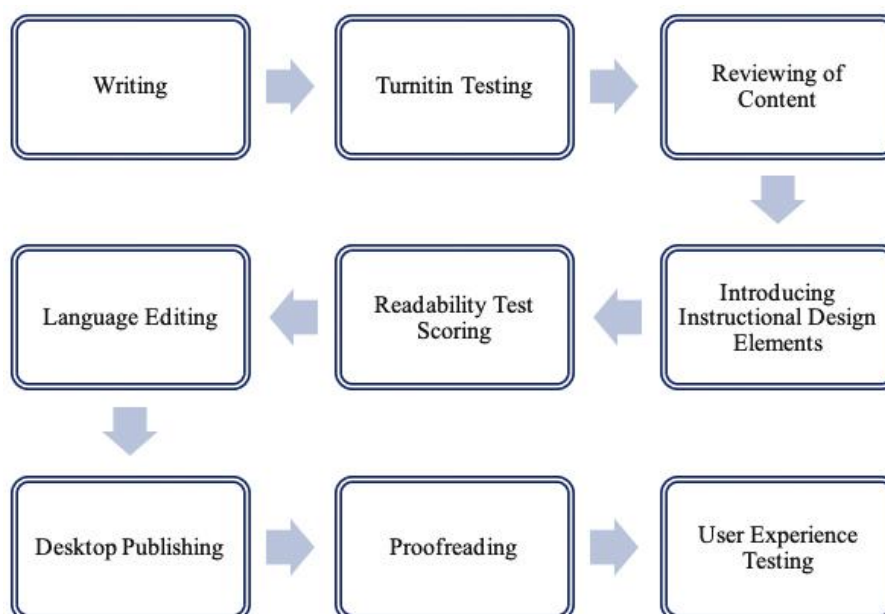


Figure 1. Development of Self-Instructional Learning Material

Following the above development process, the module was published in pdf format and shared with the participants after the preliminary session. The flipped classroom modal was adopted to ensure that the focus group sessions involved active engagement, equal participation and experiential learning.

3.1.2. Feedback on the Developed Self-Instructional Learning Material

The scores received for the first module from the first five groups (a total of 21 respondents) are shown in Figure 2. There were 9 items (1. The flow within the chapter is excellent, 2. The chapter is clearly written, 3. The content in the chapter is pitched at the right level, 4. The content in the chapter captures my interest to learn, 5. The Instructional Design elements in the chapter are evident, 6. The Instructional Design elements in

the chapter are effective, 7. The content in the chapter is aligned with the stated learning outcomes, 8. The self-check questions are useful in identifying my achievement of the targeted learning outcomes, 9. The activity in the module helps to deepen my learning process) in addition to a question on the actual reading hour and one open-ended question.

The highest average scores from the 5-point Likert Scale are 4.19 and 4.18; which refers to the alignment of the learning outcomes to content and self-check. Meanwhile, the lowest average score is 3.67 which refers to the effectiveness of the learning design. These scores are grouped into three classes high, medium, and low in Table 2. Only one item is classified as low, or rather the lowest. In addition to the two items (7 and 8) identified as the highest scores, items 1, and 2 measuring flow and clarity in the modules are also classified as high scores. This points to the importance of the quality control measure (in the content review stage). Other items identified as medium scores refer to level, interest, presence of ID element, and activity. There appear to be differences between the scores from participants from FTAS compared to participants from the FOE, particularly concerning scores of the effectiveness of ID elements and activity. This difference is explored further in another paper. The higher scores on the alignment of the learning outcomes to content and self-check remain the same between both faculties.

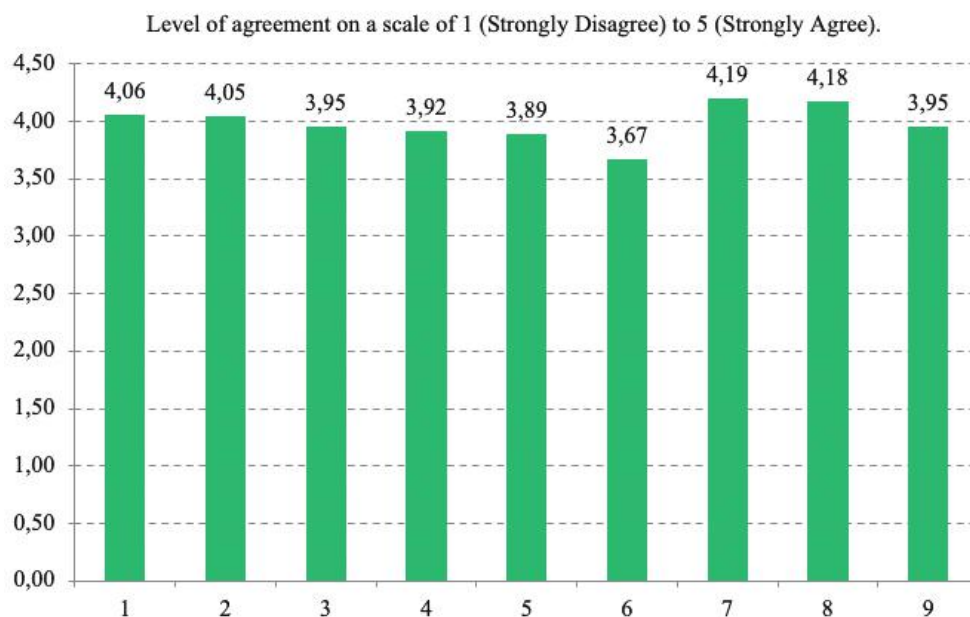


Figure 2. Evaluation 1 Scores on the 1st Self-instructional Learning Material (titled Learning Theories)

Table 2. 5-point Likert Scale Score on 9 items of Evaluation 1

Classes	Module 1
High	Items 1, 2, 7, 8
Medium	Items 3, 4, 5, 9
Low	Item 6

Following the above findings on modules, several actions were taken as continuous improvement and way forward efforts. This is discussed in the next sub-section.

3.1.3. What's Next?

The development of self-instructional learning material is a process that requires attention at every stage; mostly editing from the writer. Each stage is designed to improve the quality of the material to meet the targeted learning outcomes and largely the programme outcomes. Ideally, self-instructional learning material should suffice for a self-directed learner to achieve the targeted learning outcomes independently. Reality is not ideal. Therefore, facilitation through online forums, video conferencing, and/or other means is provided.

Notwithstanding, the development of self-instructional learning material must be targeted to achieve the aforementioned ideal. Hence, the need for continuous user experience testing. In addition, it is important that capacity development effort such as this is further pursued in order to extend the benefits of the project. Hence, the modules are embedded in a newly designed learning space that is supported by a learning analytics framework. In addition, several efforts particularly in improving the activity/ assessment, instruction design elements, and more are initiated by offering the courses to other participants through different programmes. This opens up five areas of study: creative content, creative learning space, creative use of technology, learning analytics, and a smart learning environment.

3.2. Phase 2

Phase 2 was equally challenging with delays due to the challenges brought about by the COVID-19 pandemic; workload in the fully online ecosystem, and organisational restructuring. These were found to be a common problem faced by research teams from other regional institutions. Evaluation 2 which consisted of 6 items and one open-ended question was used to measure the participant's experience of the focus group sessions. The responses from 8 participants from Group 1 (from FTAS) for their first group session are shown in Figure 4. The highest scores were found for item 3 (The learning experience gained during the session), and 5 (The feedback given during the session). The responses were generally very positive with the lowest mean is only 4.00. This observation however is not true for all courses. There are several factors that influence the responses. Item 1 is used as a point of reference to compare the responses on the face-to-face session versus the view on the self-instructional learning material. The facilitator is another equally important factor that influences the responses in this evaluation. This is a relation that is hard to predict, and the responses of a facilitator may also vary from one group to another. In some cases, it is also the course itself, that is the subject matter with differing interests and familiarity that may influence the responses. Actions required in this instance are also more delicate.

The design of the Evaluation 2 tool can be redesigned to measure how well the sessions bring about the experiential learning of the participants in the session. While this varies from one participant to another, an exploration will perhaps help in introducing strategies that can enrich the sessions. Recording and analysing the sessions would also enable the identification of workable strategies.

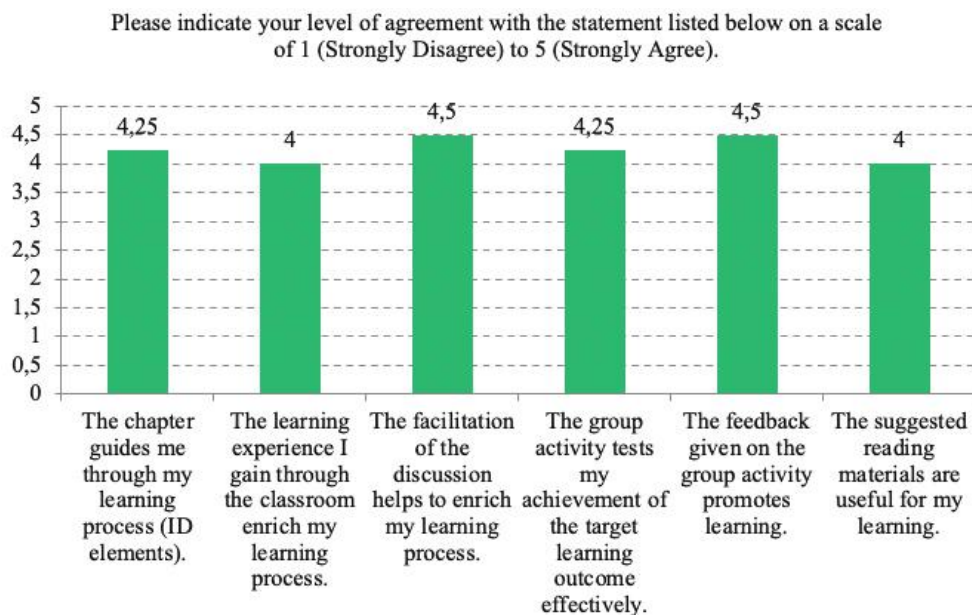


Figure 3. Evaluation 2 Scores on the Focus Group Session on the First Course (titled Learning Theories)

3.3. Phase 3

Phase 3 is, in fact, a summative assessment, allowing each participant to test: (i) their comprehension, (ii) their ability to translate what was learnt to action, (iii) the quality of OER that they have created (Evaluation 3), (iv) the user's (learner's) experience (Evaluation 4), and (v) actual impact of the OER (Report). Responses from Evaluation 4 and Report are beyond the scope of this paper, and it is not discussed here. Evaluation 3 has 5

items and one open-ended question. The highest mean scores were observed for items 1, 4, and 5: on how well the OER matches the learning outcomes targeted for their course, and on the suitability of Canva for creating OER as a supporting learning material. The participants are of the opinion that they could improve their efforts to promote critical thinking. However, they were least impressed with their ability to meet the design criteria that they learnt in Course 4.

Following this phase, efforts have been taken to create two Online Skill-based Workshops (new format): Creating OER Using Canva, and Protecting and Sharing OER Using Creative Commons Licenses. Efforts are also in place to promote the visibility of the participants' work through a newer project on the virtual gallery.

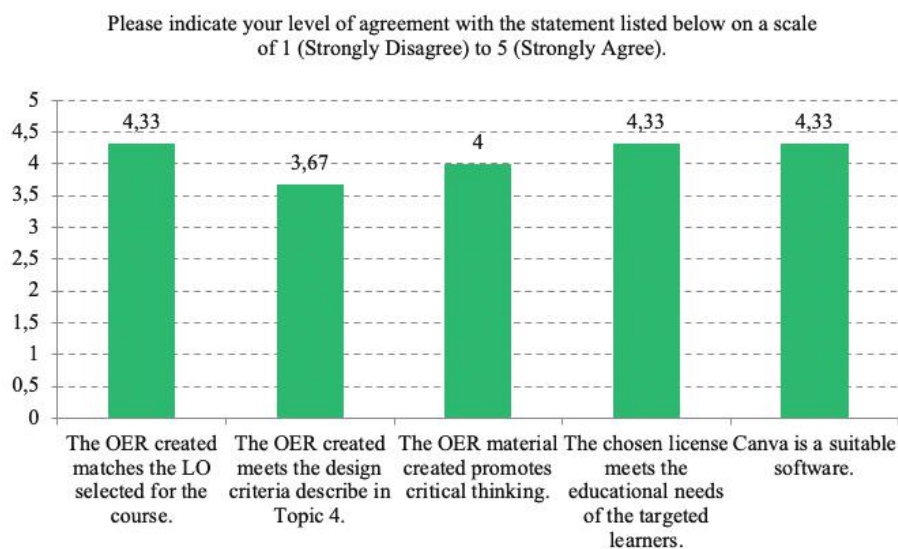


Figure 4. Evaluation 3 from Group 1 (FTAS)

4. Discussion and Conclusion

Openness in education refers to a philosophy and practice that focus on providing educational resources, materials, and practices freely and openly accessible to everyone. Willey and Green (2012) associated the term openness with open educational resources (OER), open access, and open teaching. The project allowed the researchers to work with the participants by sharing rather than facilitating, thus promoting greater openness to ideas and initiatives. Opportunities to create and share were observed to motivate participants. This is important as the participant's efforts are huge.

Why OER? OER are educational materials (course textbooks, research articles, videos, assessments, simulations, and more) that are either licensed under an open copyright license or in the public domain. In both cases, everyone will enjoy free access to the OER and zero-cost permissions to engage in the "5R" activities when using the OER (Willey and Green, 2012). 5R refers to:

- Revise - adapt and improve the OER to meet educators' needs better.
- Remix - combine or mix the OER with other OER to produce new materials.
- Reuse - use the original or the new version of the OER in various contexts.
- Redistribute - make copies and share the original OER or the new version with others.
- Retain - keep the educational materials permanently.

At present, the functions of OER are explored through other programmes. One example is the use of OER to provide an overview (the big picture) in a course. Cronin (2017) describes open educational practices as "collaborative practices that include the creation, use, and reuse of OER, as well as pedagogical practices employing participatory technologies and social networks for interaction, peer-learning, knowledge creation, and empowerment of learners" (p. 4).

The Cape Town Open Education Declaration (2007) emphasised that with the expansion of openly licensed educational materials, open education extends beyond mere open educational resources. It also encompasses the utilisation of open technologies to support cooperative and adaptable learning, as well as the open exchange

of teaching methods, enabling educators to access the expertise of their peers. Additionally, it has the potential to encompass novel methods of assessment, accreditation, and collaborative learning. Learners do value free resource access (Bliss et al., 2013) and OER does not adversely affect learning outcomes (Fischer, et al., 2015; Hilton, 2016). Educators also conveyed that OER provides increased flexibility in designing learning materials due to the potential for adaptation and modification as desired by educators and learners (Rolfe, 2017). These findings show that OER has the potential to be transformative in education. A theme that will be pursued through a new project.

Researchers have contended that investigations into openness within education should also focus on how openness contributes to the facilitation of innovative educational approaches (Jung, et al., 2017). Apart from presenting openness as an alternative to conventional learning, it is imperative to delve into the consequences of educators' engagement in designing OER. Numerous instructors are incorporating open technologies and knowledge into their teaching methods, influencing their pedagogical approaches. Some educators undergo transitions where their formerly confined teaching environments shape their design of open education (Paskevicius & Irvine, 2019b). Furthermore, involving students as co-creators of knowledge alongside their educators (Masterman, 2016) can effectively enhance the spread of innovative ideas, and open windows for newer forms of assessment.

Learning design offers a structured approach to articulating and outlining the intentions embedded within educational content (Scanlon et al., 2015). The importance of learning design is intricately linked to its capability to improve different facets of the educational process through effective instructional methods and evaluations. It takes into consideration pedagogical principles, technological tools, and the diverse needs of learners to create cohesive and purposeful learning outcomes. The shift has transitioned from concentrating solely on content and its presentation to emphasising intricate learning processes, the design of learning environments, and the utilisation of student data within these settings. Additionally, there is a drive to enable educators and potentially learners to take on roles as learning designers, involving the creation of learning environments and innovative teaching methods. This also entails fostering their introspection about their teaching practices as an integral part of their professional growth. (Wasson & Kirschner, 2020). Hence, learning design serves as a strategic framework for structuring and organising learning activities, resources, and assessments, while openness brings transparency, collaboration, and innovation to the educational process. This concept will be explored further through an extension of the present work.

This research aimed to contribute to the understanding of open and accessible educational practices in higher institutions and reveal comprehensive insight into learners' experiences and perspectives about open educational curriculum contents and delivery, as well as assessments that support their learning. The findings of this study show that the alignment between the curriculum content, delivery, support and assessments is important in open and distance learning because the alignment will become the evidence of students' learning outcomes achievement. Personalised learning pathways and an open-distance educational philosophy are suggested as practical approaches to encourage active involvement among the learners. Through open-distance learning, this Erasmus+ research project may advance equity and access to higher education. The study is important for the field of instructional learning design because it supports open-distance learners, who are adult learners engaging in lifelong learning. human resource development at OUM for it to sustain itself as the leader in ODL in Malaysia.

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118-Guidelines for Designing Engaging and Appealing Visual Content Design for Online Learning to Enhance Learners' Experience

Nurul Fizah Mohamad Nusran¹

Abstract

Introduction - The rapid advancement of technology has transformed the landscape of education, particularly with the proliferation of online learning platforms. Additionally, the COVID-19 outbreak has opened the way for online learning to grow more rapidly. Many educational institutions nowadays are choosing and slowly adopting online learning as a flexible and accessible delivery platform to meet the needs of learners. **Problems** -However, there are numerous challenges with online learning, including issues in content delivery and how it is being presented. To create engaging and appealing content is one of the problems that are most faced by educators or instructors in delivering their content to the learners in which most of them have a minimal technical and design experience. It is challenging to develop content which not only covers the curriculum but also engages the learners. Moreover, the Cognitive Load Theory (CLT) emphasised that learners have limited working memory capacity and how the content has been designed can impact cognitive load. To enhance effective engagement learners to connect and comprehend with the content in online learning environments, the use of visual design has become crucial. **Objective** – Thus, the purpose for this paper is to propose a guideline for educators or instructors to facilitate designing engaging and appealing visual content design for online learning environments. **Methods** – A literature analysis was conducted to examine the definition of visual content, the content design, the role and importance of visuals, factors that affect the effectiveness of designing content in online learning. Then the course content is created based on the proposed guidelines, tested with 27 students. **Findings** – Learners strongly agreed and enjoyed learning using visual content. By following these guidelines, educators or instructors can create visually appealing online learning content that captivate learners, promote knowledge acquisition, and foster a positive and engaging learning environment. Ultimately, effective visual content design enhances the online learning experience, supporting learners in achieving their educational goals.

Keywords: *Visual content, online learning, content design, appealing content.*

1. Introduction

The rapid advancement of technology has transformed the landscape of education, particularly with the proliferation of online learning platforms. Additionally, the COVID-19 outbreak has significantly raised the use of online learning platforms to growth rapidly in recent years. The online learning demand has been increasing due to the capability to reach global audiences, unique functionality, accessibility, and flexibility in the long run (Azhari and Ming, 2015). Therefore, it is not impossible that online learning will become the primary learning platform in education in the future. Many educational institutions nowadays are choosing and slowly adopting online learning as a flexible and accessible delivery platform to meet the needs of learners. In Malaysia, many private and public educational institution have begun to recognise the importance of online learning either it is conducted fully online or blended learning. Based on the news reports, the Malaysian universities, colleges, polytechnics are using Massive Open Online Courses (MOOCs). This shows a positive growth of educational development that in line with the Malaysian Ministry of Education under the Malaysian Education Blueprint 2015–2025 (Higher Education) has introduced initiatives in making the online learning as an integral component of higher education and lifelong learning.

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Emerging technologies and learning platforms have allowed students access to learning resources in various formats, interactive tools for collaborative works, web-based activities, and scaffolding tools for information searches, self-assessment, monitoring, receiving feedback and progress tracking (Laurillard, 2012). Furthermore, Horton (2003) defined online learning as the use of digital technologies and the internet to create experiences that teach our educators or instructors or learners at their own pace and in their own environment. With these features, enable learners to carry their content with them and access it from any location at any time. As more educational institutions are offering online learning, it is crucial to the institutions to provide facilities that adhere to standard to ensure the learners enhance learning experience and achieve the educational goals. As noted by Angeliki, Asimina, and Eleni (2005), in general effective online learning should have characteristics; successful in reaching learning objectives, easy capability, consistent and accurate message, easy to use, entertaining, memorable, relevant and reduce training cost.

Essentially, online learning requires educators or instructors to provide teaching materials and developing learning content (Ally, 2008) and it is not simple task. It is challenging to produce curriculum-aligned content that will keep learners engaging. Gurung (2021) in his research shows, online teaching methodology required more time in preparing learning content as they have to prepare the entire subject in electronic form. One of the challenges that educators or instructors faced the most when delivering their knowledge to learners is the creation of engaging and appealing content, as the majority of them have little experience with technology or design. In addition, information should be remembered and clear, brief, and easy to grasp (Angeliki, Asimina, and Eleni, 2005). Most previous studies on the effectiveness of online learning have discovered many interesting findings. However, most studies on online learning have rarely examined how to guide and design or the sequences of the context and content. Examples are the design of interfaces, the design and sequencing of examples and exercises, and the best methods of explaining contexts (Panyajamorn, Suanmali, Kohda, Chongphaisal, & Supnithi, 2018) and the content design as well as how the content being presented.

Thus, this research aims to develop guidelines for designing engaging and appealing visual content design for online learning to enhance learner's experience. Consequently, this proposed guideline will help educators or instructors to make decision which strategy of effective visual content to use to support learners in achieving their educational goals.

2. Background and Literature Review

Online learning has become more popular in recent years and it provides advantages for both learners and universities. In developed countries such as Australia and Korea, learners are having option to have flexible time for learning because it is more convenient for them to access the teaching materials (Selvanathan, Hussin, & Azazi, 2020). Universities benefit as well from the implementation of this learning method, which is more cost effective with a large audience and no physical infrastructure requirements (Misko et al., 2004). Online learning referring to the courses delivered partially or fully online, in a synchronous or asynchronous manner (Gedik et. al., 2013). Online learning significantly increases the access to learning anywhere and anytime, improves the quality of teaching and learning, and reduces the learning cost (Goyal, 2012).

However, there are numerous challenges with online learning, including issues in content delivery and how it is being presented. Lister (2014) emphasises that content structure and how content is presented should be considered while designing online learning in order to enhance student learning. An appropriate design will allow learners to engage their learning (Dahalan et. All, 2013). Creating engaging and appealing content is one of the most difficult tasks that educators or instructors face when delivering their content to learners, which most of them have a minimal technical and design experience. It is challenging to develop content which not only covers the curriculum but also engages the learners (Kebritchi et al., 2017). In Malaysia, the growth of online learning development is slow compared to the other countries due to a number of factors. Hafiza Abas (2020) stated the factors that effect of this development including of technical problems as well as internet access, lack of teaching resources and less engaging learning contents.

According to the Cognitive Load Theory (CLT) emphasised, that learners have limited working memory capacity and how the content has been designed can impact cognitive load (Sweller et al., 2019). Sweller et al. (2019) define cognitive load as the mental effort required by learning tasks that affects the learner's ability to process new information as well as store it in long-term memory. Thus, they propose a set of strategies for structuring visual and graphic information to help manage the intrinsic load associated with the material itself as well as the extraneous cognitive load introduced by the instructional techniques used. The use of

visual content and design has become crucial in online learning environments to improve effective engagement learners to connect and comprehend with the content. Visual is becoming one of the most important factors that influences users' affective experiences and their emotional bonds in online environments.

2.1. Visual Content

One of elements that plays a vital role in enhancing the effectiveness and learners' experiences in learning on online platform is the use of visuals. Visual is one of the forms that is used for presenting information which allow displaying a certain situation and presenting information in an organised manner through the use of visual component. Creating visual to explain is likely to enhance students' spatial thinking skills, skills that are increasingly needed in the contemporary and future world (Tversky & Bobek, 2014). This visual can be presented in the form of graphic, video, illustration also can include signs, typography, drawing, design, infographics, industrial design, advertising, animation, color, diagrams, sketches, charts, photographs, objects, models, maps, slide presentation, animation and electronic resources are often used to illustrate and explain concepts (Alfi, 2011; Smith, 2005; Wilmot Li & Berthouzoz, 2011). Graphics are among visual that can be used to explain difficult concepts, ideas, and procedures. Graphics make information more visual, such as showing a comparison of data, making it easier to understand (Yldrm, elik, Yldrm, & Kaban, 2016). As a result, a single graphic can convey information that would normally require several pages of text.

Incorporating visual content and adhering to aesthetic aspects during online learning development can improve not only the visual appearance of course content, but also how students react to and interact with those courses (Reyna, 2013). As mentioned by Sánchez-Franco, Villarejo-Ramos, Peral-Peral, Buitrago-Esquinas, & Roldán (2013), visual aesthetic in online learning associated with learning and productivity learners. This aesthetic aspect includes methods of deliberately arranging the content to appeal to the senses or emotions of the user, or the act of creating something that does not exist such as layout, line, font size and colour scheme (Batiha, Al-Slaimeh & Besoul, 2006, Nobaew, 2020). The choice of colour is not only can make appealing content, it is also creating moods and the way they are combined is very important (Reyna, 2013). Colour are typically used for three purpose: visual, emotional or symbolic (Pentak & Roth, 2004). Reyna (2013) recommend to use a neutral colour scheme and white or soft background colours when creating a learning content. The contrast colour between soft background and dark fonts encourages readings, engages learners and learning experience.

2.2. Content Design

Designing on the web is very different from designing for printed books. Online content can be organised in a variety of ways to make it simple for learners to understand. Semantic chunking is a powerful strategy which is used to deliberate breaking of text into more identifiable, meaningful unit (Henderson. M & Henderson. L, 2006). A semantic chunk can encompass a paragraph, sentence, phrase, or even words linked together graphically. The concept of semantic chunking involves the manner in which graphics and text collaborate to enhance the process of constructing meaning (Williams, Williams, & Tollett, 2006).

2.3. The Power of Visualisation

The visual components play a vital role in the utilisation of online learning, influencing the effectiveness of the learners' educational experience. Visuals have the ability to attract learners, simplify complex concepts and improve knowledge retention. Researches in education suggest that incorporating visuals into teaching leads to enhanced learning outcomes (Stokes, 2002) due to the various benefits that visual offer than text (Dewan, 2015). The improvement of the visual displayed on the screen will create a lively and joyful environment which increase learner's satisfaction (Eitel, Scheiter, & Schüler, 2013). According to Che Ibrahim et al., (2021) stimulation content in the form of images can have a greater impact since they can boost learner's memory and imagination in addition to increasing their interest in studying. Clark & Mayer (2016) and Levin (1981) in their research on visual elements have highlighted that visual memory and retention surpass the effectiveness of traditional text-based memory. Appropriate visual effects can stimulate readers' curiosity, interest and motivation. The significance of visual design within online context has grown due its capacity makes online learning interesting (Ghai & Tandon, 2021). When users discover the virtual components engaging, it affects their mental disposition and facilitates an improved comprehension of the material (Chávez et al., 2021; Sweller et al., 2019).

According to Sharma, Bhosle, & Chaudhary (2012), a significant 75 percent of the information processed by the human brain originates from visual communication. This is because the brain can process images at a rate 60,000 times faster than text. Additionally, Eisenberg (2014) highlights that visuals account for 90 percent of information transmitted to the brain, a factor that contributes to enhanced content memorisation. The use of content visualisation is considered as an effective teaching method for converting text-based courses into visual-based courses in order to improve memorisation and generate better performance and learning experiences (Vanichvasin, 2020). Alshaykha (2022) highlighted that the visual sense is humans' primary sensory input, and the appropriate visual components are linked to the influence on learning outcomes and lasting retention of knowledge in online learning.

3. Methodology

In order to create guidelines for creating visual content that improves the learning experience for students involves reviewing on analysis of prior research on the visual classification and types of learning content, which is then combined with visual aesthetic elements to make learning content appealing and enhance learner experience. These guidelines have been used for develop learning content for the course Information Technology and Environment which were then evaluated by 27 learners who enrolled to this course.

The process of designing and transforming learning content into a visual format for online learning has been recognised, with the utilisation of studies that has been done by Levin et. al (1987) and Clark & Lyons (2011) introduced visuals can be classified into seven categories based on their functions. The seven visual classifieds including organisational, transformational, interpretational, relational, representational, mnemonic and decorative. Moreover, Clark (2002) has identified five different types of learning contents; facts, concepts, processes, procedures and principles. Then these types of learning contents are integrated with visual classification serves as a guide to convert information into a visually comprehensible form for enhanced learning understanding.

The Table 1 provides suggestions for the utilisation of visuals based on the relevant types of content.

Table 1. The Guidelines of The Use Visual Transformation Based on Content Type

Visual Classification	Content Types	Description	Visual Support
Organisational	Fact	Organised visual information help users understand the series, structure, information level, and the coherence of its information.	Real photograph or illustrations of specific forms, screen, equipment
Transformational	Process, procedure, principles	Transformative visual depict motion or changes across time	Drawing, realistic illustration, animation sequence, video
Interpretational	Concept, process, principle	Interpretive visual information can assist users in comprehending challenging and unclear content	Animated flowcharts or diagrams showing the various steps in the process
Relational	Process	Visual information that has been organised to give learner's understanding of the subject matter and to make it easier for them to understand the relationships between distinct parts or variables	Chart, graph, video or animated demonstration to shows the connection of function of each part in specific process
Representational	Principles, procedures, concept	Provide a visual depiction of textual information being introduced to strengthen learners understanding	Videos or diagrams demonstrating the execution of tasks requiring distant application
Mnemonic	Fact, concepts, Process	The utilisation of tools like patterns or letters, concepts, or connections to aid in recalling information. This technique assists learners in recalling facts from memory by examining images that symbolise these facts.	Typography, infographic, animated typography that represent meaning

The organisational visuals are employed to clarify factual information. Well-structured visual data aids users in comprehending the sequence, arrangement, depth of information, and the cohesion within its content. For example, the use of photo to depict the arrangement of circuits and components within a motherboard. Transformational graphics are visual that depict movements occurring across time. These sorts of visuals are especially effective in illustrating the stages of a process, principles or procedure such as explaining on how central processing unit (CPU) of the computer works. While interpretive visuals are suitable for concepts, processes, and principles. They aid users in grasping complex and unclear content. These visuals can take the form of animated flowcharts or diagrams, illustrating the different steps within a process. This interpretive visual can be used to explain how the programming language operates and interacts within system software. Relational visuals involve the arrangement of visual data to enhance learners' comprehension of the topic and facilitate their grasp of relationships between different components or variables. For example, the relationship between data hierarchy and storage capacity can be shown in diagram or chart. Mnemonics visual are arrangements or connections of letters in the alphabet that are utilised to assist in remembering information. For example, the word RAM, which each alphabet represents; R - Random, A - Access and M - Memory. Decorative visual serve the purpose of enhancing the content's visual appeal and sparking intrinsic motivation, even though they are not directly related to the learning content.

Apart of transforming content to the visual form, it should incorporate aesthetic aspects that contribute of the factors that influence system perceive usability (Mbipom & Harper, 2009; Tractinsky, Katz & Ikar, 2000). Table 2 contain the suggestion of aesthetic aspect that can make the content more effective.

Table 2. *The Suggestion Visual Aesthetic*

Visual aesthetic	Authors	Suggestions
Colour	Reyna (2013), eLearning (2021)	<ul style="list-style-type: none"> • Recommend a neutral colour scheme and the use of white or soft background colours • The contrast colour between soft background and dark fonts encourages readings, engages learners and learning experience. • No more than three different colours • Use shades of the same colour
Font	Reyna (2013), eLearning (2021)	<ul style="list-style-type: none"> • Avoid using different fonts, different sizes and different colours on the same page • Use bold typefaces sparingly to avoid losing the attention • Use only two different font styles • Keep high contrast colour from the background colour • Keep sentence short
Layout	Reyna (2013), eLearning (2021)	<ul style="list-style-type: none"> • Make it easy to seen • Highlight important elements • Use the concept balance • Consistency

The use colours activate the visual senses and promote the retention of information. Utilising colour could enhance the visual appeal of a presentation. The combination of neutral colour scheme such as beige, taupe and cream are the example colour enhances the display of learning materials for learners. Limit the use of up to three different colours. Refrain from incorporating an excessive number of colours in learning content, as it can lead to learner distraction. Select a maximum of two different fonts and ensure a significant contrast between the background and text colours to increase readability. Maintain concise content length. Keep information short and to the point, and utilise bold typefaces wisely to guide readers and keep their attention from wandering. In order to ensure content clarity for learners, it's important to maintain a consistent layout arrangement. Capture learners' focus by incorporating principles of both symmetrical and asymmetrical balance. Figure 1 shows the overview of the guidelines for designing engaging and appealing visual content design for online learning.

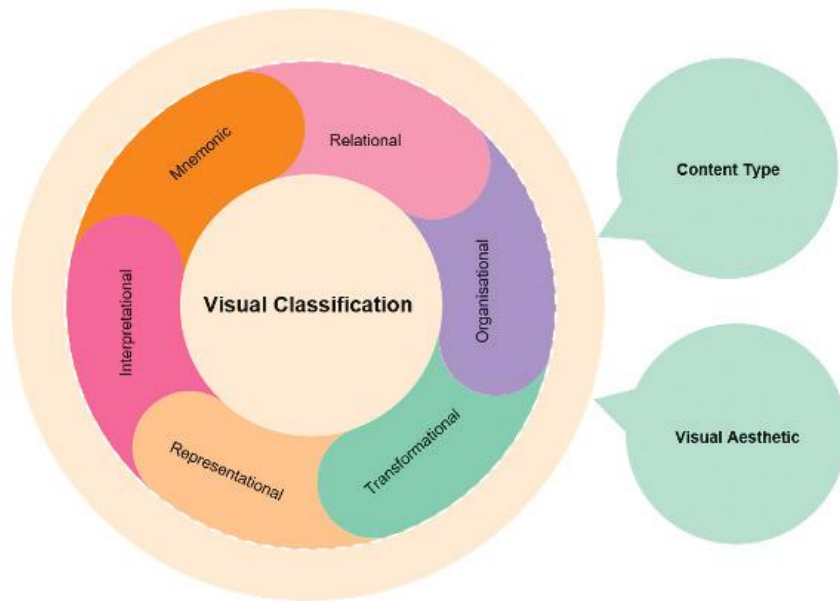


Figure 1. Guideline for Designing Engaging and Appealing Visual Content Design for Online Learning

4. Findings

The questionnaire has been design using Google Form application and distributed through the learning management system to fill up by the learners enrolled the course of Information Technology in Environment. This survey included a total of 27 participants, with 12 male (44.5%) and the remaining 15 female (55.5%) learners.

The questionnaires consist of five primary criteria used to assess the learning content developed in accordance with the proposed guidelines. The first criteria assess the visual content helping in the enhance their learning experience. The analysis of the data indicates that 70% (Figure 2) of learners strongly agree that visual content enhance their learning experience as 65% of these learners do not have background in Information Technology.

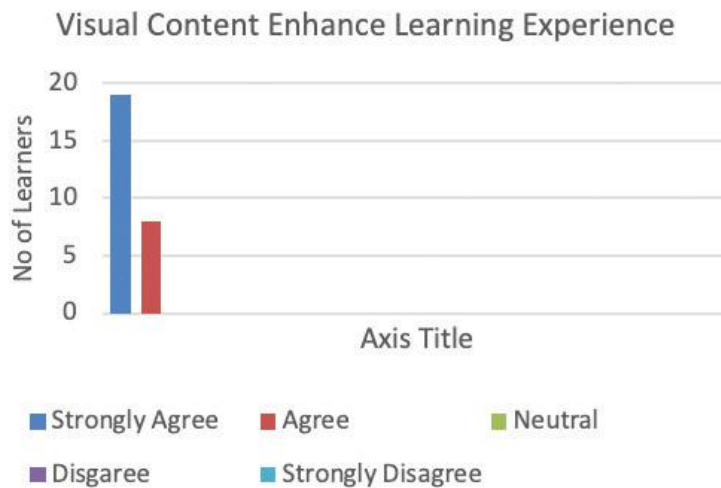


Figure 2. Criteria 1 – Visual Content Enhance Learning Experience

The second criteria is visual can increase memorability learners to remember the content delivered. The analysis shows in Figure 3, reveals that 81% of learners strongly agree that integrating visuals into learning materials aids them in memorizing information more effortlessly, particularly when dealing with content related to processes, facts, and concepts.

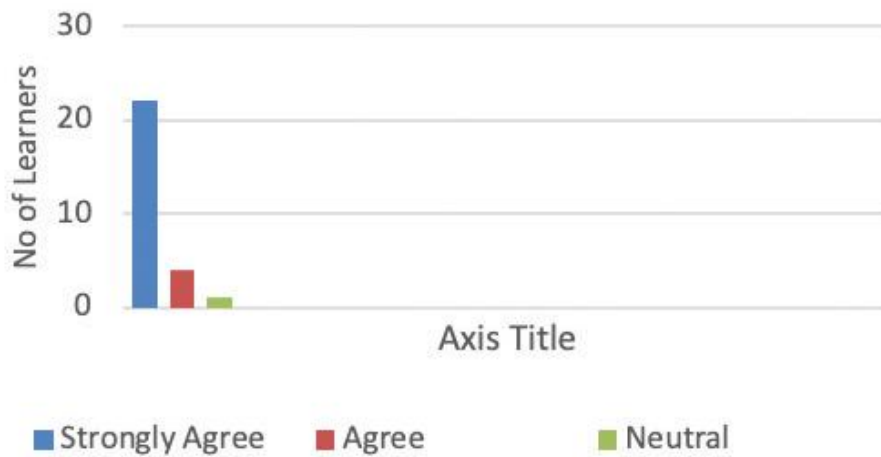


Figure 3. Criteria 2 – Visual Content Increase Memorability

The third criteria assess on visual content focuses on its informative and facilitate learning. Figure 4 shows that 74% of learners strongly agree that visual content is highly informative and effectively assist their learning as compared the use of text-based presentation.

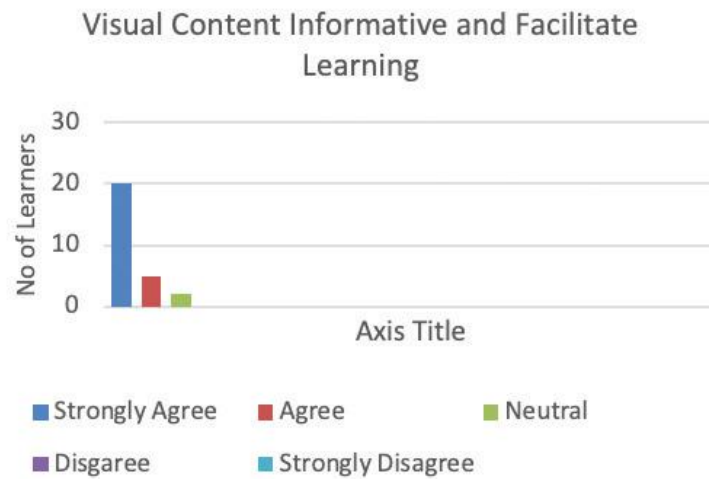


Figure 4. Criteria 3 – Visual Content Informative and Facilitate Learning

The fourth criteria evaluate the visual content can save their learning time. The following Figure 5 shows that 88% of learners strongly agree that incorporate visuals into learning content can save their learning time as visuals can summarise and condense explanation.

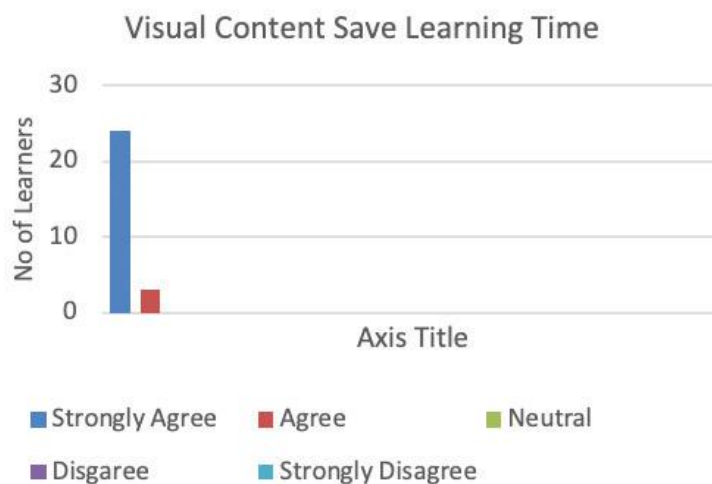


Figure 5. Criteria 4 – Visual Content Save Learning Time

The last criteria is assess on the presentation and structure learning content can assist in grasping the content more effortlessly. The Figure 6 shows that 85% of learners concur that when learning content incorporates a blend of colors, layout, and fonts, it becomes more readable and comprehensible.

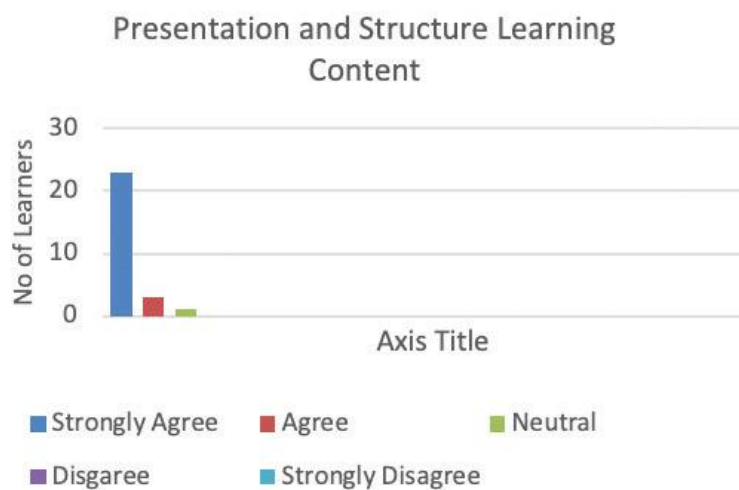


Figure 6. Criteria 5 – Visual Content Save Learning Time

5. Conclusion

The findings indicate that learners find enjoyment and quick comprehension in learning content that adhere to the features of online learning which comprises learning content that are memorable, coherent, concise, and readily graspable. By following these guidelines, educators or instructors can create visually appealing online learning content that captivate learners, promote knowledge acquisition, and foster a positive and engaging learning environment. Ultimately, effective visual content design enhances the online learning experience, supporting learners in achieving their educational goals.

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122-Application and Effectiveness Evaluation of Personalized Learning Support System Based on Knowledge Services in Open University

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Abstract

Open university education plays a significant role in pursuing educational inclusiveness and flexibility. However, due to the diversity of learners and their learning needs, providing personalized learning support has become a crucial challenge in open university teaching. Knowledge-based personalized learning support systems offer a new approach to address this issue. Taking the BASICS OF COMPUTER APPLICATIONS course as a case study, this research explores the application and effectiveness evaluation of a knowledge-based personalized learning support system in open university teaching. Firstly, by building a knowledge service platform and a personalized learning recommendation system, learners can access personalized learning resources and pathways based on their interests, learning styles, and progress. The system analyzes learners' learning behaviors and data to provide tailored learning suggestions and feedback. Secondly, this research evaluates the effectiveness of the knowledge-based personalized learning support system. By comparing the learning outcomes, satisfaction, and motivation of learners between the traditional teaching mode and the knowledge-based personalized learning support system, the effects of the system on improving learning outcomes and experiences are assessed. The research results demonstrate that the knowledge-based personalized learning support system effectively meets the individualized needs of learners and enhances their learning outcomes and motivation. Lastly, this research discusses the application prospects and challenges of the knowledge-based personalized learning support system in open university teaching. While the system can provide personalized learning support to learners, it still faces issues such as teacher training and protection of learning data privacy during implementation. Further research and practice will contribute to refining the system and provide insights for the personalized development of open university teaching models. In conclusion, the knowledge-based personalized learning support system offers an innovative approach to meet the personalized needs of learners in open university education. With continuous advancements in technology and research, it is anticipated that this system will be widely applied in the future, making significant contributions to the improvement and development of open university teaching models.

Keywords: Knowledge Service, Personalized Learning Support, Effectiveness Evaluation, Learning Motivation.

1. Introduction

Open university education plays a pivotal role in addressing the imperative for widespread and flexible education. However, the diverse nature of learners and their varying educational needs presents a significant challenge. Delivering personalized learning support tailored to individual students within open university education becomes crucial. The conventional one-size-fits-all teaching model struggles to meet the distinctive requirements of each learner. This article delves into the concept of personalized learning support, focusing on its significance and challenges within the realm of open university education.

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1.1. Personalized Learning Support System based on Knowledge Services

Personalized learning support is the application of educational technology to cater to the unique needs of learners ^[1]. It involves tailoring learning resources, strategies, and feedback to align with individual learning styles, preferences, and paces. The goal is to enhance learning outcomes and motivation. In modern education, the role of personalized learning support is pivotal. It transcends the limitations of traditional pedagogical approaches by acknowledging the diversity of learners' abilities, interests, and backgrounds. By providing tailored learning experiences, personalized learning support cultivates deeper engagement, encourages self-directed learning, and fosters a sense of ownership over the learning process ^[2].

The introduction of personalized learning support systems based on knowledge services marks a transformative development in the educational landscape ^[3]. These systems leverage the integration of knowledge resources and technology to provide learners with highly individualized learning experiences. By capitalizing on the power of data analysis and artificial intelligence, knowledge service-based systems identify each learner's strengths, weaknesses, and preferences. This information informs the creation of bespoke learning pathways and recommendations. The significance of such systems within open university education is profound. They address the challenge of catering to diverse learners by customizing educational content and approaches. The traditional constraints of time, location, and standardized curriculum are transcended. Learners are empowered to take ownership of their learning journey, making education more accessible and relevant ^{[4][5]}. As knowledge service-based systems evolve, they promise to revolutionize how education is imparted and experienced.

1.2. Value of Personalized Learning Support in Open University Education

In the context of open university education, personalized learning support holds immense value. The diverse cohort of learners, with varying backgrounds, schedules, and learning preferences, demands a flexible and customized approach. Personalized learning support bridges this gap by providing tailored resources and pathways. Learners can engage with the content at their own pace, delve deeper into areas of interest, and seek additional support where necessary. This not only enhances learning outcomes but also augments learner satisfaction and motivation. Moreover, personalized learning support aligns with the principles of open university education by providing equitable access to education ^[6]. Learners, regardless of their geographical location or personal constraints, can benefit from quality education customized to their individual needs. This embodies the essence of open education by facilitating lifelong learning and catering to diverse learner profiles ^[7].

In conclusion, the backdrop of open university education underscores the importance of catering to diverse learner needs through personalized learning support. The introduction of knowledge service-based systems presents an innovative approach to overcoming these challenges. The subsequent sections of this article will delve deeper into the design, implementation, effectiveness evaluation, and future prospects of personalized learning support systems based on knowledge services. Through this exploration, we aim to illuminate the potential transformation of open university education through the fusion of personalized learning and knowledge services.

2. Knowledge Services and Personalized Learning Support

The synergy of knowledge services and personalized learning support represents a transformative approach in contemporary education. This section explores the definition and characteristics of knowledge services, and how they underpin the construction of personalized learning support systems.

Knowledge services encompass the fusion of knowledge resources and added-value services to cater to diverse user needs. These services harness information, expertise, and technology to deliver tailored solutions, characterized by responsiveness, adaptability, and user-centricity. Building personalized learning support systems based on knowledge services involves crucial elements ^[8]. An extensive knowledge repository spanning digital libraries, multimedia content, and interactive tools is pivotal. Data analytics and machine learning algorithms are employed to comprehend learners' preferences and patterns, informing a recommendation engine for personalized learning paths and resources ^[9]. Interactive interfaces ensure seamless user engagement.

Constructing an effective personalized learning support system based on knowledge services entails integrating various essential elements. These elements synergize to provide learners with tailored experiences that cater to their individual needs and preferences. Table 1 outlines the key elements in building such a system.

Table 1. Key Elements

Element	Description
Comprehensive Knowledge Repository	Curating a diverse collection of resources, including e-books, videos, articles, and interactive simulations, to cater to different learning styles and preferences.
Data Analytics and Machine Learning	Utilizing learner data to identify patterns, strengths, and weaknesses, enabling the system to make intelligent recommendations for personalized learning pathways and resources.
Recommendation Engine	Developing an algorithmic engine that suggests appropriate learning materials, activities, and assessments based on individual progress and learning preferences.
User-Friendly Interface	Designing an intuitive and user-friendly interface that facilitates easy navigation, enabling learners to access resources, track progress, and receive feedback seamlessly.
Adaptive Assessment	Integrating dynamic assessments that adapt to learners' proficiency levels, ensuring challenges are appropriately matched to their capabilities and promoting growth.
Real-time Feedback Mechanism	Implementing a mechanism for learners to receive instant feedback on their performance, allowing them to adjust their learning strategies and address knowledge gaps.
Customizable Learning Paths	Allowing learners to customize their learning journey by selecting topics of interest and adjusting the pace of learning according to individual preferences.

These elements work in tandem to create a holistic personalized learning support system. The system leverages knowledge services to offer a tailored educational experience that enhances engagement, comprehension, and overall learning outcomes.

In the context of open university education, knowledge services find meaningful applications. Consider the BASICS OF COMPUTER APPLICATIONS course as an illustrative case. A knowledge-service-driven personalized learning support system offers a diverse range of resources, such as video lectures, e-books, and coding exercises. Learners can select resources aligned with their learning style and pace. As learners progress, the system dynamically adjusts recommendations based on their performance. This personalized approach caters to diverse learning needs, fostering engagement and comprehension. The significance of knowledge services in open university education is underscored by their potential to transcend geographical barriers. Learners from varied backgrounds and locations can access tailored content and expert guidance, ensuring equitable access. Moreover, knowledge services promote lifelong learning by offering timely updates and evolving content, aligning with the dynamic nature of contemporary knowledge.

3. Design and Implementation of Personalized Learning Support System based on Knowledge Services

The effective design and implementation of a personalized learning support system based on knowledge services require a comprehensive approach that integrates key components seamlessly. This section delves into the construction of a knowledge services platform, the principles behind a personalized learning recommendation system, and the collection and analysis of individual learner data.

3.1. Construction of Knowledge Services Platform

Creating a knowledge services platform involves assembling a repository of diverse learning resources and offering personalized features that cater to learners' unique requirements [10]. This platform comprises two essential functions: (1) Integration of Learning Resources and Personalized Recommendations: The platform aggregates a range of learning materials such as articles, videos, quizzes, and interactive content. Leveraging data analytics, the system assesses learners' engagement, preferences, and performance to generate personalized recommendations. This ensures that learners receive content aligned with their interests and learning styles, fostering deeper engagement.

(2) Customization of Learning Paths and Personalized Navigation: The platform empowers learners to create individualized learning paths. Learners can select topics of interest, set their pace, and navigate through the curriculum seamlessly. A personalized navigation feature assists learners in efficiently progressing through the course, ensuring an optimal and tailored learning experience.

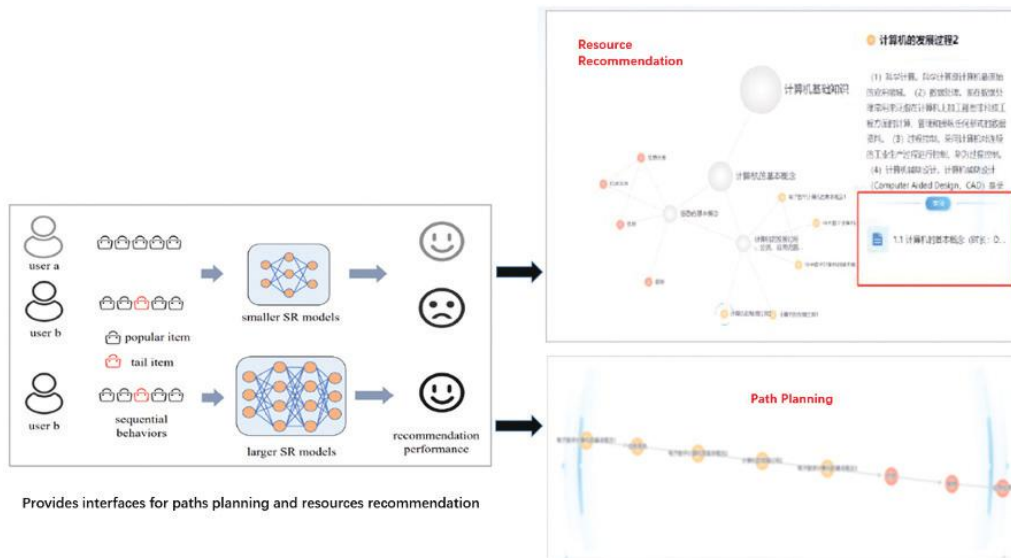


Figure 1. Working Scenarios of Knowledge Services Platform

The system features an interface for devising personalized resource and pathways, ensuring learners access recommended content aligned with their goals and preferences, as shown in Figure 3.1.

3.2. Principles of Personalized Learning Recommendation System

A personalized learning recommendation system relies on data-driven insights to guide learners toward appropriate resources [11] [12]. The system operates based on the following principles:

- (1) Data Collection: Learners' interactions with the platform, such as resource selection, time spent, and quiz performance, are collected as data points.
- (2) Data Analysis: The system employs data analytics and machine learning algorithms to identify patterns and preferences in learner behavior. This analysis forms the basis for generating personalized recommendations.
- (3) Recommendation Generation: By correlating learner data with content attributes, the system suggests learning resources that align with individual learning styles, proficiency levels, and interests.
- (4) Real-time Adaptation: The recommendation system continuously adapts to learners' progress and preferences, updating recommendations as learners engage with the platform.

3.3. Collection and Analysis of Individual Learner Data

By gathering individual learner data on learning habits, preferences, assessment outcomes, and progress, the system constructs individual student profiles. These profiles enable a deeper understanding of each learner's unique characteristics, guiding personalized educational strategies, as shown in Figure 3.2.



Figure 2. An Example of Individual Student Profiles

A well-designed personalized learning support system based on knowledge services integrates a comprehensive knowledge repository with personalized recommendations and adaptable learning paths. Data analysis drives a dynamic recommendation system that tailors content to learners' needs. The collection and analysis of individual learner data further enhance customization, promoting engagement and learning outcomes.

4. Effectiveness Evaluation and Research Findings

In the period of 2022-2023, the online course BASICS OF COMPUTER APPLICATIONS underwent a significant refactor with the implementation of a knowledge service-based personalized learning support system. The course attracted a substantial enrollment of over 30,000 participants.

4.1. Analysis and Comparison of Traditional Teaching and Knowledge Service-Based Personalized Learning

A rigorous analysis was conducted, comparing the outcomes of the traditional teaching approach with those achieved through the knowledge service-based personalized learning support system. To facilitate this comparison, student data from both the traditional online course (conducted concurrently in 2023) and the personalized learning support system were collected and compared. The analysis encompassed the following aspects:

- (1) **Comparative Analysis of Learning Achievements:** A detailed comparison of learning achievements was conducted, assessing metrics including assessment scores, completion rates, and overall academic progress. This Comparative analysis of Learning Achievements resulted in Table 2.

Table 2. Comparative Analysis of Learning Achievements

Metrics	Traditional Teaching	Personalized Learning Support
Assessment Scores	77.35	81.51
Completion Rates	52%	80%
Overall Academic Progress	58%	72%

- (2) **Survey and Comparison of Learning Satisfaction:** The online course BASICS OF COMPUTER APPLICATIONS has been thoughtfully designed to accommodate a Course Satisfaction Questionnaire section, dedicated to collecting valuable insights from participants. This specific section offers learners the opportunity to provide feedback on their contentment with the course, interaction quality, and overall satisfaction with their learning experience. Leveraging the data derived from this dedicated questionnaire, we have designed table 3 to objectively assess and compare the levels of learning satisfaction under the two teaching methodologies:

Table 3. Survey and Comparison of Learning Satisfaction

Metrics	Traditional Teaching	Personalized Learning Support
Course Content	3.4 (out of 5)	3.5 (out of 5)
Interaction Quality	3.2 (out of 5)	4.4 (out of 5)
Overall Satisfaction	3.1 (out of 5)	4.2 (out of 5)

- (3) **Quantitative Assessment of Learning Motivation:** The evaluation of learning motivation was undertaken through an intricate analysis of platform data, including browsing patterns of online learning resources, access to personal learning spaces, engagement with course materials, progression rates, assessment scores, and assignment performance. Leveraging the algorithms embedded within the knowledge service-based personalized learning support system, a quantitative assessment of learning motivation was carried out, focusing on critical factors such as commitment, persistence, and enthusiasm, as shown in Table 4.

Table 4. Quantitative Assessment of Learning Motivation

Metrics	Traditional Teaching	Personalized Learning Support
Engagement	3.2 (out of 5)	4.1 (out of 5)
Persistence	3.0 (out of 5)	3.9 (out of 5)
Enthusiasm	2.7 (out of 5)	4.0 (out of 5)

Note: The table presents quantitative assessment scores for learning motivation factors. Scores range from 1 to 5, with higher scores indicating stronger motivation.

The metrics within this table quantitatively capture the learners' engagement, persistence, and enthusiasm. The data, utilizing the algorithms of the knowledge service-based personalized learning support system, highlights that learners engaging with the personalized system showcase significantly higher levels of motivation across these factors.

4.2. Analysis and Discussion of Research Findings

The research findings revealed pronounced differences between the two teaching approaches. Students engaging with the knowledge service-based personalized learning support system demonstrated higher assessment scores, increased completion rates, and improved overall academic progress compared to their counterparts in the traditional teaching model. Moreover, learner satisfaction surveys indicated elevated content relevance and interaction quality in the personalized learning context. The quantitative assessment of learning motivation further substantiated the positive influence of the knowledge service-based system, as students exhibited greater engagement, persistence, and enthusiasm in their learning journey. These outcomes underscore the efficacy of knowledge service-based personalized learning support systems in enhancing learning outcomes, satisfaction, and motivation.

5. Conclusions

This study has delved into the application and effectiveness evaluation of the knowledge service-based personalized learning support system in open university teaching. Through the case study of the BASICS OF COMPUTER APPLICATIONS course, we have demonstrated the significant potential of this innovative pedagogical approach in addressing individual learner differences, enhancing learning outcomes, and boosting learning motivation. The introduction of the knowledge service platform and personalized learning recommendation system empowers learners with a self-directed learning space, enabling them to access personalized learning resources and pathways based on their interests and learning styles. The analysis of learners' behavioral data and the provision of personalized learning suggestions further enrich their learning experience.

Comparative analysis between traditional teaching methods and the knowledge service-based personalized learning support system reveals clear advantages in terms of learning achievements, satisfaction, and motivation. Learners in the personalized learning environment achieve better learning outcomes and exhibit higher satisfaction and positive learning motivation. This underscores the effectiveness of the personalized learning support system in improving both learning outcomes and experiences.

Nevertheless, we recognize the challenges posed during implementation, such as teacher training and safeguarding of learning data privacy. These challenges necessitate further research and efforts to ensure that the knowledge service-based personalized learning support system can comprehensively enhance the quality and effectiveness of open university teaching.

In summary, this study provides robust support for the personalized development of open university teaching models. The knowledge service-based personalized learning support system offers learners a more flexible, autonomous, and individualized learning experience, guiding the way for innovation and advancement in future open university education.

6. References

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123-Systematic Literature Review: Factors Contributing to Effectiveness of Online Mathematics Learning in Indonesia

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Abstract

Indonesia, like other countries, during the Covid-19 Pandemic, learning was carried out online, including learning mathematics. The effectiveness of online mathematics learning is a question from learning researchers in Indonesia. Therefore, in various journal articles, it was reported about the effectiveness of online mathematics learning. This study aims to review the effectiveness of online mathematics learning in Indonesia published in a national journal. The method used in this research is Systematic Literature Review (SLR) by applying the PRISMA (Preferred Reporting Items for Systematic Reviews) model. The search results found 36 articles regarding the effectiveness of online mathematics learning. After being selected, 21 articles were obtained that fit the purpose of this study. From the 21 articles, 24 data were obtained related to the effectiveness of learning. The review of online mathematics learning journal articles in this study was carried out by grouping the contents of reports in these journals based on the effectiveness reported in the journal articles. The grouping includes the effect of implementing online mathematics learning on the effectiveness of learning based on (1) educational level, (2) technology used, and (3) geographical location of learning. Furthermore, the data were analyzed descriptively and tested for significance using PLS-SEM to see the effect of the level of education at which the learning was carried out, the technology used during learning, and the geographical location where the learning was carried out. PLS-SEM is used because it does not require much data and does not require strict analysis requirements. The results of the analysis show that (1) although the higher the level of education, the more effective the learning, the difference in effectiveness is not significant, (2) communication techniques that involve synchronous are more effective than those that use asynchronous or the application of both (both synchronous and asynchronous), but again the difference is not significant, and (3) online learning conducted on the island of Java (assumed to have complete infrastructure) is more effective than online learning outside Java island, however again and again the difference was not significant. Based on the results of this analysis, this research will present recommendations for effective online mathematics learning for implementation in the future.

Keywords: *Online learning mathematics, learning effectivity, PLS-SEM, SLR, PRISMA.*

1. Introduction

Since the outbreak of the Covid-19 pandemic, Indonesia has taken action to prevent the spread of the virus by carrying out many measures, one of which is adopting an online or online learning system as a substitute for face-to-face learning. The Ministry of Education has stipulated the necessity of implementing online or distance learning in schools through Circular Letter Number 4 of 2020 concerning implementing Education Policies in the Emergency Period of the Spread of Corona Virus Disease (COVID-19). One of the objectives of online learning during the Covid-19 emergency is to ensure that the teaching and learning process continues to run well and students are included in the curriculum.

Although it is a more flexible learning method, the effectiveness of online learning is still being debated. When compared with face-to-face learning, Nguyen (2015) concluded, "Overall, there is strong evidence to suggest that online learning is at least as effective as the traditional format, but the evidence is not conclusive. Online learning is a story that is still being written, and how it progresses will likely depend on those present. (p. 316).

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For online mathematics learning, doubts about the effectiveness of this learning still need to be answered. That is because learning mathematics has special characteristics. Therefore, learning mathematics online has different attributes from learning other subjects. Learning mathematics is different from learning other issues in several ways, some of which are: (1) emphasis on problem-solving, (2) requires logical thinking, (3) interconnectedness of concepts, (4) application of concepts, and (5) uses symbols and notation (OpenAI, 2023).

Online mathematics learning involves using information and communication technologies such as the Internet, social media, and learning applications. Online mathematics learning provides various learning opportunities; among other things, students have flexibility in time, place and opportunity to learn. Another option that can be obtained in learning mathematics online is that it can present a variety of interesting and innovative ways of learning, for example, through learning videos, mathematical games, and interactive mathematical simulations. In addition, in online math learning, teachers and students can access unlimited math learning resources, such as digital math books and apps. Nonetheless, learning mathematics online also has some challenges. One of them is the need for more interaction between teachers and students. For example, successful mathematics learning, especially for students in grades 1 – 6, often uses concrete manipulatives, namely the use of objects which can be touched and moved by students to introduce or reinforce a mathematical concept (Carbonneau, Marley, & Selig, 2013). The use of concrete manipulatives in online learning may be a challenge in itself. Thus, there are opportunities and challenges for the effectiveness of online mathematics learning that arise from the interaction between the characteristics of mathematics learning and the aspects of online learning.

Challenges and opportunities for the effectiveness of online mathematics learning raise challenging research questions on the efficacy of implementing online mathematics learning for mathematics learning researchers in Indonesia. During and after the Covid-19 pandemic, many research reports were found regarding the effectiveness of online mathematics learning in various journals in Indonesia. The research reports varied in the students involved based on their level of education. Several studies studied the application of online mathematics learning at the basic education level, for example, in research (Putry, K.P., Mardiaty, Panjaitan, 2021; Auliya Vilda Ghasya, Salimi, & Pranata, 2021), at the junior secondary education level (Arifin & Chotimah, 2021; Irmayanti, 2022), upper secondary education level (Rahma & Pujiastuti, 2021; Syarifuddin, Basri, Ilham, & Fauziah, 2021), and at higher education (Humalangi, Ismail, Ismail, & Isa, 2022; Herzamzam, 2021). In addition, the results of these studies also report on the various regions where learning is carried out, in Java or outside Java. Also, research reports vary in the type of communication used, asynchronously, synchronously, or asynchronously & synchronously.

This article does not compare online learning with face-to-face learning but attempts to explore the factors associated with or contributing to the effectiveness of online learning. More specifically, this article focuses on online education for mathematics. This article attempts to reveal the implementation of online mathematics learning during the Covid-19 pandemic based on research reports published in national journals in Indonesia. The research describes the effectiveness of online mathematics learning in terms of the level of education, the region in which knowledge is carried out, and the communication technology used in online learning. In addition, this article examines the significance of the associative relationship between the level of education, region, type of communication, and learning effectiveness. If rationally possible, the associative relationship can also be interpreted as the independent variable's contribution to the dependent variable.

2. Method

This research is a systematic literature review of online mathematics learning research reports published in accredited national journals in Indonesia. Indonesia's scientific journal accreditation system uses Sinta (Science and Technology Index), a scientific journal index portal managed by the Indonesian Ministry of Education. Journal searches using Google Scholar (<https://scholar.google.com>) use keywords in Indonesian, which can mean "Effectiveness," "Online mathematics learning," and "Distance learning in mathematics."

The search results obtained using Google Scholar are 22,300 publications. After reviewing based on publication time and relevance to the purpose of this study, 578 publications were selected. From these publications, only articles in journals were selected; 34 journal articles were obtained. Further checks relate to the reputation of the journal. The importance of the journal in Indonesia is based on SINTA accreditation. As many as 13 journal articles could not be processed because SINTA accredited them. Thus, I obtained 21 journal articles. The selected journals are presented in Appendix 1.

The selected journals, as many as 21 journal articles, involved 1174 students from elementary school to universities. Each article also reports the region where online mathematics learning is implemented. In addition, it is also said the type of communication that is applied in the lesson. Each selected journal was then reviewed to obtain data in the form of:

- Kind of communication (1=Asynchronous, 2=Synchronous, 3=Both asynchronous & synchronous)
- Level of education (1=Elementary school, 2=junior high school, 3=senior high school, 4=higher education)
- Region (0=Java, 1=non-Java)
- Effectivity (counted by percentage as reported in the journal articles or transformed from qualitative data)

Effectivity in this study is defined as the achievement of the objectives of an activity. Several articles report that the intended purpose is for student understanding of a topic in learning (Kusumaningrum & Wijayanto, 2020; Irmayanti, 2022; Melisa & Zulkarnaen, 2022). Several articles report learning mastery as a goal related to effectivity (Putry, K.P., Mardiaty, Panjaitan, 2021; AMINULLAH, 2021). Other articles report effectivity as a response in the form of an attitude or assessment of learning.

Effectivity in this study was calculated as the percentage of achievement of learning objectives. Some research reports report effectiveness qualitatively, for example, quite effective or less effective. For this reason, rules are needed to interpret the narrative. Supriadin & Sakti (2021), for example, uses the following classification: (1) very effective, 80% through 100%, (2) quite effective, 60% through 79%, (3) less effective, 50% through 59%, and (4) not effective, 0 through 49%. Considering that the data in this study are not too scattered, in this study a simpler rule was used, namely:

- Ineffective, less than 40%
- Moderate, between 40% and 60%
- Effective, more than 60% (Nurhayati & Sugilar, 2023).

The effectiveness interval will also be used to qualitatively interpret the effectiveness score as a percentage of the analysis results in this study. Following are some examples of determining the effectiveness score based on the conclusions in the journal articles in this study.

Indonesian	English	Effectivity Score
"Subyek penelitian pada umumnya (hampir 75% subyek penelitian) tidak mampu memahami materi perkuliahan dengan baik". (Kusumaningrum & Wijayanto, 2020), (p. 138)	Research subjects in general (almost 75% of research subjects) needed to help understand lecture material properly.	25
"Namun, jika dilihat dari respon siswa WhatsApp dirasa kurang efektif jika digunakan untuk pembelajaran daring matematika. Jika dilihat dari hasil belajar siswa, hasilnya pun cenderung menurun karena keterbatasan siswa dalam bertanya dan kurangnya penyampaian materi yang disampaikan oleh guru." (Nurfaizah, Raharjo, & Saleh, 2021) (p. 113)	However, from the students' responses, WhatsApp could have been more effective for online mathematics learning. When viewed from student learning outcomes, the results also tend to decrease because of the limitations of students in asking questions and the need for more delivery of material delivered by the teacher.	20

The data in this study consisted of a unit of analysis in the form of 21 journal articles. Nonetheless, there are two reports containing three factors and two factors, respectively, namely research reports from Nurfaizah, Raharjo, & Saleh (2021) and (Melisa & Zulkarnaen, 2022) involving elementary school, junior high school or senior high school at once. Thus, the number of analysis units in this research is 24 units of analysis. Each branch of study contains four variables: level of education, kind of information, region, and effectiveness. Each variable has a value in the form of a number. The data is then processed to analyze the quantitative description of energy based on the level of education, kind of communication, and region variables. In addition, a significance test was also carried out on associations between variables using PLS-SEM.

3. Findings

a. Factors Associated with Effectivity

Table 1 displays effectiveness in terms of level of education. The significance of online mathematics learning for Elementary Schools, Junior High Schools, Senior High Schools, and Higher Education has an average score of 51.61, 55.72, 47.40, and 51.28, respectively. High school juniors occupy the highest average. The level of education for junior high school also has the largest sample size of 8 and the highest maximum effectiveness value of 94.30. Senior High School occupies the lowest average effectiveness with a mean = 47.40 with a sample size of 7, the data distribution (std. deviation) = 20.11. The efficacy of online mathematics learning based on educational level is 47.40 to 55.72, which can be interpreted as less effective. Nonetheless, each level of education has a school that is reported to have the highest score above 80, which means it is very effective, namely 84.84 for the Elementary School level, 94.30 for Junior High School, 80.00 for Senior High School, and 81.48 for Higher Education. Thus, online mathematics learning makes it possible to reach a very effective level even though, on average, it is still relatively ineffective.

Table 1. Effectivity by Level of Education

Level of Education	Mean	N	Std. Deviation	Minimum	Maximum
Elementary School (Grade 1 – 6)	51.61	3	32.45	20.00	84.84
Yunior High School (Grade 7 – 9)	55.72	8	23.45	20.00	94.30
Senior High School (Grade 10 – 12)	47.40	7	20.11	20.00	80.00
Higher Education	51.28	6	21.30	26.00	81.48
Total	51.67	24	21.78	20.00	94.30

The types of communication used in online mathematics learning include asynchronous, synchronous, and asynchronous & synchronous. Table 2 shows that the use of asynchronous & synchronous tends to be more effective, with an effectiveness score of = 59.60 compared to only asynchronous (49.50) and synchronous only (50.97). Online mathematics learning that uses asynchronous communication is mostly reported in journals, namely as many as 12 reports, while only synchronous and asynchronous & synchronous are 8 and 4 reports, respectively, in the journal. In general, online mathematics learning has an effectiveness range of 49.50 to 59.60 based on the type of communication used. That means that it is classified as moderately effective.

Table 2. Effectivity by Kinds of Communication

Communication Tech.	Mean	N	Std. Deviation	Minimum	Maximum
Asynchronous	49.50	12	24.87	20.00	94.30
Synchronous	50.97	8	17.57	26.00	80.00
Asynchronous & Synchronous	59.60	4	23.35	27.00	81.48
Total	51.67	24	21.78	20.00	94.30

Regions in Indonesia still need to be more cohesive regarding internet infrastructure. Regions on the island of Java generally have better infrastructure than areas outside Java. Table 3 shows that there are indeed differences in the effectiveness of online mathematics learning between learning conducted in Java and outside Java. On average, from 7 reports in journals for online mathematics learning in Java, it achieved an effectiveness score of 60.23, while the score for outside Java was 48.14, as reported by 17 research reports. The score for the effectiveness of online mathematics learning can reach 94.30, which is effective. On average, mathematics learning in Java achieves an effective label with an average score of 60.23.

Table 3. Effectivity by Region

Region	Mean	N	Std. Deviation	Minimum	Maximum
Java	60.23	7	25.26	20.00	94.30
Non-Java	48.14	17	19.93	20.00	81.48
Total	51.67	24	21.78	20.00	94.30

b. Compounding factors Associated with Effectivity

Table 4 shows the associative relationship between the effectiveness of online mathematics learning, the communication used, and the area where the learning takes place. It can be seen from the table that the use of both asynchronous and synchronous communications implemented in Java is better than outside Java. In Java, the implementation of asynchronous communication scores 58.35 compared to 40.65 outside Java. For synchronous implementation in Java, it has a score of 71.54, while outside Java, it is 48.03. It's a shame there are no research reports regarding the use of asynchronous & synchronous in Java, so there is no comparison with outside Java, which achieves a score of 59.60.

Table 4. Effectivity by Communication Technology * Region

CommunicationTech.	Region	Mean	N	Std. Deviation	Minimum	Maximum
Asynchronous	Java	58.35	6	27.13	20.00	94.30
	Non-Java	40.65	6	20.89	20.00	75.50
	Total	49.50	12	24.87	20.00	94.30
Synchronous	Java	71.54	1	.	71.54	71.54
	Non-Java	48.03	7	16.72	26.00	80.00
	Total	50.97	8	17.57	26.00	80.00
Synchronous & Asynchronous	Java	-	-	-	-	-
	Non-Java	59.60	4	23.35	27.00	81.48
	Total	59.60	4	23.35	27.00	81.48
Total	Java	60.23	7	25.26	20.00	94.30
	Non-Java	48.14	17	19.93	20.00	81.48
	Total	51.67	24	21.78	20.00	94.30

Table 5 shows that at the Elementary School education level, the use of asynchronous (52.42) is similar to synchronous (50.00). Both are at a less effective level. The number of journal articles reporting online mathematics learning in elementary schools is only 3. If the number of reports were greater, a clearer picture would be obtained regarding the compounding factors of education level and kinds of communication on effectiveness. The interesting thing is that implementing asynchronous communication in elementary schools can achieve a score of 84.84, which means effective.

At the junior high school level, with eight research reports in journals, the use of asynchronous & synchronous has the highest average score of 69.30, which is included in the effective category. Meanwhile, for the use of asynchronous only or only synchronous, it has an average effectiveness score of 54.41 and 50.00, respectively or is included in the moderately effective category.

At the senior high school level, learning that uses synchronous communication is the most effective learning, with an average of 58.07 or moderately effective. While learning that uses asynchronous has an average of 35.00 or is classified as ineffective.

At the higher education level, the use of asynchronous & synchronous achieved the highest average score, namely 81.48 or classified as effective. As for the use of only synchronous and asynchronous communication, each has an average score of 44.51 and 46.35 or is classified as moderately effective.

Table 5. Effectivity by Level of Education * Communication Technology

Level of Education	Kinds of Communication	Mean	N	Std. Deviation	Minimum	Maximum
Elementary School (Grade 1 – 6)	Asynchronous	52.42	2	45.84	20.00	84.84
	Synchronous	50.00	1	.	50.00	50.00
	Total	51.61	3	32.45	20.00	84.84
Yunior High School (Grade 7 – 9)	Asynchronous	54.41	6	26.92	20.00	94.30
	Synchronous	50.00	1	.	50.00	50.00
	Asynchronous & Synchronous	69.30	1	.	69.30	69.30
	Total	55.72	8	23.45	20.00	94.30

Senior High School (Grade 10 – 12)	Asynchronous	35.00	2	21.21	20.00	50.00
	Synchronous	58.07	3	19.20	44.23	80.00
	Asynchronous & Synchronous	43.81	2	23.78	27.00	60.63
	Total	47.40	7	20.11	20.00	80.00
Higher Education	Asynchronous	46.35	2	5.16	42.70	50.00
	Synchronous	44.51	3	23.93	26.00	71.54
	Asynchronous & Synchronous	81.48	1	.	81.48	81.48
	Total	51.28	6	21.30	26.00	81.48
Total	Asynchronous	49.50	12	24.87	20.00	94.30
	Synchronous	50.97	8	17.57	26.00	80.00
	Asynchronous & Synchronous	59.60	4	23.35	27.00	81.48
	Total	51.67	24	21.78	20.00	94.30

Online mathematics learning is more effective in Java than outside Java for almost all education levels, as seen in Table 6. At the elementary school education level in Java, the average is 52.42 compared to 50.00 outside Java. The biggest difference between Java and outside Java occurs at the junior high school level; in Java, it reaches an average of 65.09, while outside Java, it is 50.10. For the senior high school level, there are no journal articles reporting online mathematics learning in Java, but there are seven reports outside Java, with an average effectiveness score equal to 47.40, which is classified as ineffective.

Table 6. Effectivity by Level of Education * Region

Level of Education	Region	Mean	N	Std. Deviation	Minimum	Maximum
Elementary School (Grade 1 – 6)	Java	52.42	2	45.84	20.00	84.84
	Non-Java	50.00	1	.	50.00	50.00
	Total	51.61	3	32.45	20.00	84.84
Junior High School (Grade 7 – 9)	Java	65.09	3	25.51	47.09	94.30
	Non-Java	50.10	5	23.06	20.00	75.50
	Total	55.72	8	23.45	20.00	94.30
Senior High School (Grade 10 – 12)	Non-Java	47.40	7	20.11	20.00	80.00
	Total	47.40	7	20.11	20.00	80.00
Higher Education	Java	60.77	2	15.23	50.00	71.54
	Non-Java	46.54	4	24.27	26.00	81.48
	Total	51.28	6	21.30	26.00	81.48
Total	.00	60.23	7	25.26	20.00	94.30
	1.00	48.14	17	19.93	20.00	81.48
	Total	51.67	24	21.78	20.00	94.30

c. Tests of Significances

The previous discussion has discussed the differences in the effectiveness of online mathematics learning in terms of educational level factors (elementary school, junior high school, senior high school, higher education), region (Java, outside Java), kinds of communication (asynchronous, synchronous & asynchronous) in differentiating the effectiveness of online mathematics learning. In this section, we will discuss the inferential statistical significance of these factors in differentiating the effectiveness of online mathematics learning.

In Figure 1, the level of education has a path coefficient of 0.076 and a $p = 0.691$ value which is far greater than the alpha value set for significance, which is 0.05. Thus, the level of education does not affect the effectiveness of online mathematics learning. Likewise with the region, although it appears that online mathematics learning in Java is more successful than outside Java, it turns out that this difference is not statistically significant. The

path coefficient from region to effectivity = is 0.398, but the value of $p = 0.074$ is slightly higher than 0.05 as the significance value set in this study. The type of communication chosen in online mathematics learning also does not differentiate the effectiveness of the learning. The path coefficient of the type of communication on effectivity is 0.354, with a value of $p = 0.104$.

The communication type used differs in the areas where online mathematics learning is carried out, with a path coefficient value = 0.414 and $p = 0.003$. In the descriptive discussion, it has been stated that the three types of communication (asynchronous, synchronous, and asynchronous & asynchronous) are used outside Java, while in Java, many use only asynchronous (6 reports). The type of communication used also did not make a significant difference to usability based on educational level, namely path coefficient = 0.302 and $p = 0.093$.

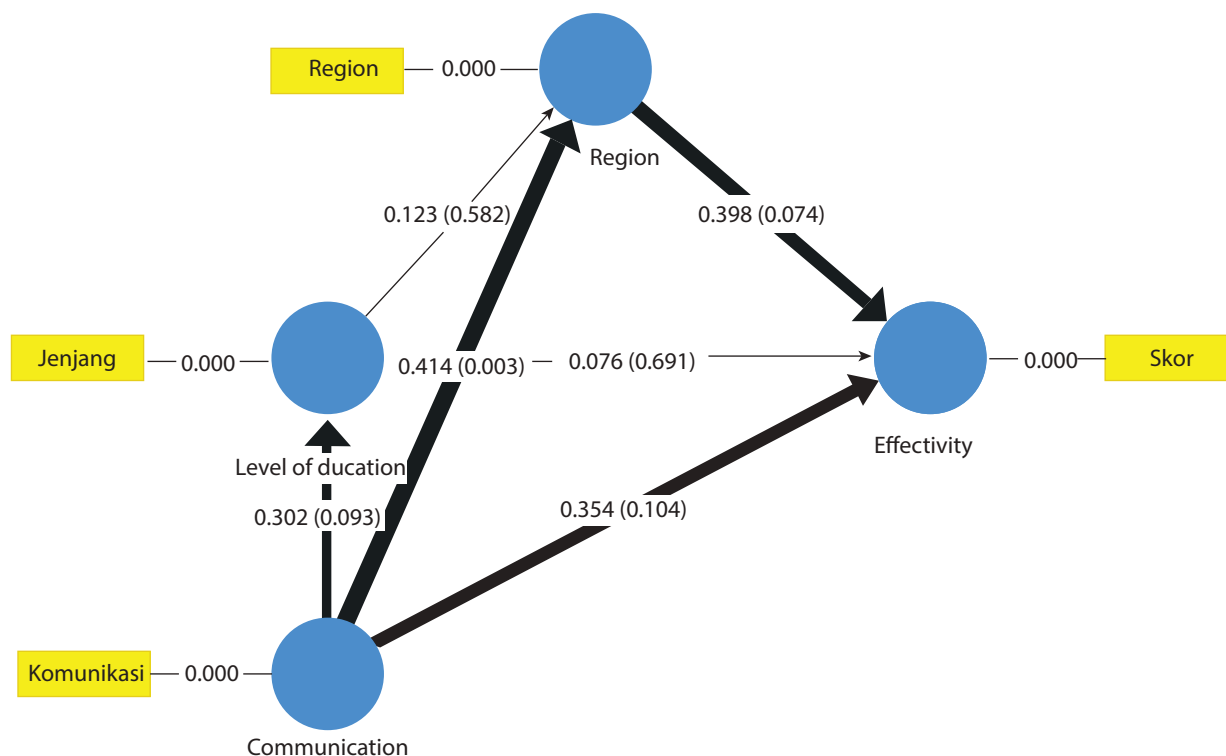


Figure 1. Associative factors to Effectivity

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Appendix 1

Kode	Authors/Tahun	Journal/ SINTA Index	Title	Conclusions	Effectivity
1	(Kusumaningrum & Wijayanto, 2020)	Kreano/S-2	Apakah Pembelajaran Matematika Secara Daring Efektif? (Studi Kasus pada Pembelajaran Selama Masa Pandemi Covid-19)	Subyek penelitian pada umumnya (hampir 75% subyek penelitian) tidak mampu memahami materi perkuliahan dengan baik (p. 138)	25.00
2	(Agustini, 2021)	MAJU/S-5	Efektivitas Pembelajaran Daring Pada Mata Pelajaran Matematika Selama Pandemi Covid-19 Di Mts. Swasta Nurul Amaliyah Tanjung Morawa	Dari hasil perhitungan persentase respon siswa terhadap pembelajaran daring pada mata pelajaran matematika adalah 52,91% dengan kriteria kualifikasi "kurang efektif". Hal ini terjadi karena siswa tidak termotivasi mengikuti pembelajaran daring (p.417)	52.91
3	(Nurfaizah et al., 2021)	ARITMATIKA: Jurnal Riset Pendidikan Matematika/S-5	Efektivitas Pembelajaran Matematika Berbasis Whatsapp Ditinjau Dari Hasil Belajar Siswa (Masa Pandemi Covid 19)	Namun, jika dilihat dari respon siswa WhatsApp dirasa kurang efektif jika digunakan untuk pembelajaran daring matematika. Jika dilihat dari hasil belajar siswa, hasilnya pun cenderung menurun karena keterbatasan siswa dalam bertanya dan kurangnya penyampaian materi yang disampaikan oleh guru. (p. 113)	20.00
4	(Krisna & Suryati, 2021)	PENDIPA Journal of Science Education/S-4	Efektivitas Pembelajaran Matematika Secara Online Di SMK TI Bali Global Denpasar Pada Masa Pandemi Covid-19	Kebijakan dan strategi ini cukup baik sehingga pembelajaran online di SMK TI Global Denpasar cukup efektif dan dapat berjalan dengan baik. (p. 216)	50.00
5	(Effendi, Fatimah, & Amam, 2021)	Teorema: Teori dan Riset Matematika/S-3	Analisis Keefektifan Pembelajaran Matematika Online di Masa Pandemi Covid-19	Pembelajaran daring di Prodi Pendidikan Matematika FKIP Universitas Galuh masih kurang efektif dilaksanakan dikarenakan dosen dan mahasiswa belum secara maksimal mempersiapkan diri dalam proses pembelajaran daring (p. 257)	50.00
6	(Putry, K.P., Mardiaty, Panjaitan, 2021)	Jurnal Serunai Matematika/S-5	Efektivitas Pembelajaran Matematika Secara Daring Di Masa Pandemi Covid-19 Terhadap Kemampuan Berpikir Kreatif Matematik Siswa Sekolah Dasar	Dengan demikian dapat disimpulkan bahwa pembelajaran matematika yang dilaksanakan dengan menggunakan pembelajaran secara daring terhadap kemampuan berpikir kreatif siswa sekolah dasar efektif (p. 21)	80.00
7	(Sugandi, Bernard, & Linda, 2020)	AKSIOMA: Jurnal Program Studi Pendidikan Matematika/S-2	Efektivitas Pembelajaran Daring Berbasis Masalah Berbantuan Geogebra Terhadap Kemampuan Penalaran Matematis Di Era Covid-19	Pembelajaran menggunakan model berbasis masalah berbantuan Geogebra pada pembelajaran daring lebih efektif daripada menggunakan model berbasis masalah maupun pembelajaran biasa terhadap kemampuan penalaran matematis siswa SMK (p. 1002)	80.00
8	(Humalangi, Ismail, Ismail, & Isa, 2022)	Jambura Journal of Mathematics Education/S-3	Efektivitas Pembelajaran Daring Program Studi Pendidikan Matematika Universitas Negeri Gorontalo	Dapat disimpulkan bahwa efektivitas pembelajaran daring di program studi pendidikan matematika Universitas Negeri Gorontalo tergolong efektif berdasarkan tiga aspek yaitu aspek perencanaan pembelajaran daring, aspek aktivitas pembelajaran daring serta aspek media dan fasilitas pembelajaran daring. (p. 144)	80.00

Kode	Authors/Tahun	Journal/ SINTA Index	Title	Conclusions	Effectivity
9	(AMINULLAH, 2021)	Jurnal Ganec Swara/S-5	Efektivitas Pembelajaran Matematika Menggunakan Sistem Daring	Efektifitas pembelajaran matematika menggunakan sistem daring setelah dilaksanakan selama 1 semester atau 14 pertemuan diperoleh nilai rata-rata mahasiswa sebesar 75,50 dengan target yang ditentukan 70. Artinya sudah efektif jika dilihat secara klasikal. (p. 1003)	75.50
10	(Arifin & Chotimah, 2021)	Jurnal Cendekia: Jurnal Pendidikan Matematika/S-3	Analisis Efektifitas Pembelajaran Matematika Secara Daring Siswa SMP di Kabupaten Bekasi Selama Masa Pandemi Covid-19	Berdasarkan gambar 3, sebanyak 57,1% siswa menjawab kurang efektif, 35,7% siswa menjawab efektif dan 7,1% siswa menjawab tidak efektif. Dilihat dari jawaban diatas bahwa pembelajaran matematika secara daring kurang efektif. (p. 2456)	35.70
11	(Auliya Vilda Ghasya, Salimi, & Pranata, 2021)	Jurnal Numeracy/S-4	Analisis Keterlaksanaan Pembelajaran Jarak Jauh Mata Pelajaran Matematika Di Kelas Tinggi Sekolah Dasar Pada Masa Pandemi Covid-19	Kesulitan siswa kelas IV, V dan VI sekolah dasar dalam mengikuti pembelajaran jarak jauh pada mata pelajaran Matematika adalah terkadang sulit memahami materi yang abstrak serta sudah merasa jenuh dengan pola belajar dari rumah (p. 54)	20.00
12	(Irmayanti, 2022)	Tarbiyah wa Ta'lim: Jurnal Penelitian Pendidikan dan Pembelajaran/S-4	Peningkatan Hasil Belajar Matematika dengan Metode Daring pada Pembelajaran Jarak Jauh	Hasil tes menunjukkan ketuntasan dalam pencapaian KKM 78 hanya pada 89 siswa (49,2%), artinya ada 92 peserta didik (50,8%) yang tidak mencapai KKM. (p.66) Tes hasil belajar di akhir siklus II, sebanyak 58,56% (106 dari 181 siswa) meraih nilai ≥ 78 yang berarti mencapai KKM. (p. 71)	53.88
13	(Melisa & Zulkarnaen, 2022)	Jurnal Pembelajaran Matematika Inovatif/S-3	Dampak Pembelajaran Jarak Jauh Terhadap Konsepsi Siswa Kelas Xii Smk Pada Materi Statistika	Persentase kesulitan siswa sebanyak 68 subjek dalam memecahkan soal statistika dengan kategori tinggi yaitu pada indikator kedua sebesar 73%. (p. 551)	27.00
14	(Herzamazam, 2021)	Edukatif: Jurnal Ilmu Pendidikan/S-4	Pembelajaran Jarak Jauh menggunakan Aplikasi Zoom pada Matakuliah Pendidikan Matematika SD 1	Data penelitian menunjukkan bahwa sebanyak 27 orang responden menunjukkan bahwa (1) sebanyak 3 jawaban mahasiswa mengaku sulit memahami saat pembelajaran online menggunakan zoom, (2) sebanyak 2 memahami hanya sebagian saat pembelajaran dan 22 memahami dan mampu mengaplikasikan materi dengan baik pembelajaran, hal ini dilihat dari paparan mahasiswa saat presentasi dan diskusi latihan soal dalam kehidupan sehari-hari dalam matematika. (p. 2671)	81.48
15	(Tute, Kristianus Jago; Suryani, 2021)	AKSIOMA: Jurnal Program Studi Pendidikan Matematika/S-2	Efektivitas Pembelajaran Jarak Jauh di Masa Pandemi Covid 19 Pada Mahasiswa Pendidikan Matematika Universitas Flores	Proses pembelajaran yang dilakukan saat ini cukup efektif meskipun masih ada beberapa hambatan dalam pembelajaran jarak jauh seperti masalah interaksi sosial dosen dengan mahasiswa dan ekonomi mahasiswa belum siap (p. 2845)	50.00

Kode	Authors/Tahun	Journal/ SINTA Index	Title	Conclusions	Effectivity
16	(Djeni, D., Nasikhah, 2022)	Al-Fikru: Jurnal Pendidikan Dan Sains/S-4	Efektifitas Pembelajaran Daring Dengan E-Modul Terintegrasi Google Education Pada Mata Pelajaran Matematika Kelas VIII	The results showed that the implementation of google education integrated e book is effective with interest Mathematics subject increasing 55,6% on the first meet, the second meet to be 83% (p.44)	69.30
17	(Harahap, Ahmad, & Lumbantobing, 2022)	JURNAL MathEdu (Mathematic Education Journal)/S-5	Efektivitas Pembelajaran Daring Berbasis Youtube Terhadap Kemampuan Pemecahan Masalah Matematika	Penerapan pembelajaran daring berbasis YouTube efektif terhadap KPMM siswa dilihat dari nilai rata-rata n-gain sebesar 0,90 yang berada pada kategori "Tinggi" serta ketuntasan belajar siswa terbukti dengan tuntasnya 17 siswa dengan nilai rata-rata 94,3. Berdasarkan hasil penelitian di atas, peneliti menyimpulkan bahwa Efektivitas Penerapan Pembelajaran Daring Berbasis YouTube dapat Meningkatkan KPMM Siswa di SMP Negeri 4 Padangsidimpuan. (p.77)	94.30
18	(Rahma & Pujiastuti, 2021)	JOHME: Journal of Holistic Mathematics Education/S-3	Efektivitas Pembelajaran Daring Matematika Pada Masa Pandemi Covid-19 Di Kota Cilegon	Didapatkan bahwa hasil menunjukkan rata-rata 60,6365% atau masuk kedalam kategori cukup efektif (p.10)	60.63
19	(Yustitia & Kusmaharti, 2021)	Elementary School: Jurnal Pendidikan Dan Pembelajaran Ke Sd-An/S-4	Efektivitas Pembelajaran Matematika Secara Daring: Studi Kasus Pada Mahasiswa Pgsd Saat Pandemi Covid-19	Data hasil tes sejalan dengan hasil kuesioner yang menyatakan bahwa 74% subyek penelitian tidak paham dengan materi yang dipelajari. (p. 255)	26.00
20	(Zahrah & Pujiastuti, 2021)	AKSIOMA: Jurnal Matematika dan Pendidikan Matematika/S-4	Efektivitas Pembelajaran Daring Menggunakan Googleclassroom Pada Mata Pelajaran Matematika Di SMA	Setelah perhitungan rata-rata dari ketiga indikator, disimpulkan bahwa penggunaan Google Classroom pada pembelajaran daring pada mata pelajaran SMA dikategorikan cukup efektif, dengan rata-rata yang dihasilkan 44.23% (p.284-285)	44.23
21	(Sudiarta, Diputra, Nayun, & Sutanaya, 2021)	Suluh Pendidikan (Jurnal Ilmu-Ilmu Pendidikan)/S-6	Efektivitas Pembelajaran Matematika Secara Daring Di Masa Pandemi Covid -19 Terhadap Kemampuan Berfikir Kritis Siswa	Pembelajaran matematika secara daring masih cukup efektif dilaksanakan untuk menumbuhkan kemampuan berpikir kritis siswa di masa pandemi covid-19 (p.42)	50.00

127-Online Project Learning for E-Volunteering

Tsuneo Yamada¹

Abstract

COVID-19 Pandemic brought about the interruption of volunteering activities for assistance in real space with its tremendous loss and misfortune. As a countermeasure, e-volunteering activities disseminated rapidly, and innovative cases were reported in both domestic and international contexts. The author has offered a graduate course focusing on the relation between information society and volunteering activities from 2018 as the chief instructor. The course started as “Volunteering Activities in Information Society” and evolved into “Cyber-volunteering” in the midst of the pandemic. The course is provided twice a year, that is, in both First and Second semester and 183 students (includes repeaters) enrolled and 145 of them were awarded credits in 2018-2023. As the objectives of the course are to acquire not only academic knowledge but skills necessary for the operation and management of volunteering, a project-oriented group learning was adopted. As the course was a full online course in an asynchronous mode, only basic functions of LMS were available for the group learning. While e-bulletin board was prepared, neither video conference nor other groupware were accessible. The task of the group work was to author and present a proposal of an innovative volunteering activity in which utilizes ICTs in advanced fashion in real or virtual environments, that is, e-Volunteering. Each work was evaluated from five viewpoints, that is, technology, needs, resources, publicity and project management by instructor and peers. Jigsaw Method (developed by Elliot Aronson in 1971) was revised and used as project learning strategy and the five areas of the viewpoints were also Experts’ roles allocated to each group member. While the course was not popular because it was neither easy nor flexible, the rating of their satisfaction was not worse. The themes chosen were “supporting elderly persons (8)”, “volunteers at schools and for younger generation (6)”, “Japanese language education in community and supports to overseas tourists (5)”, “supporting refugees in damaged areas (3)”, “international cooperation (2)” or others (5). The longer-term educational effects of the online program are the issues remained and continuous surveys are expected.

Keywords: Project learning, Group learning, Cooperative learning, e-Volunteering, Online learning.

1. Introduction

In the midst of COVID-19 Pandemic, e-learning and ICT-enhanced education spread rapidly in the world and more teachers and students were familiar with online learning. They also noticed the potentiality of digital transformation (DX) in education which realize the new ideas and values such as Diversity, Equity and Inclusion (DEI, EDUCAUSE, n.d.). COVID-19 Pandemic brought about the interruption of volunteering activities for assistance in real space with its tremendous loss and misfortune. As a countermeasure, e-volunteering activities disseminated rapidly, and innovative cases were reported in both domestic and international contexts.

1.1. The Open University of Japan as a Distance University

The Open University of Japan (OUJ) was established in 1983 as an authorized “correspondence” university which uses broadcasting (TV and Radio) in addition to conventional media such as mails, telephones, and face-to-face mode classrooms at 50+ regional study centers. OUJ is managed under the auspices of the Ministry of Education, Culture, Sports, Science and Technology (MEXT) and the Ministry of Internal Affairs and Communications (MIC). OUJ is supported by MEXT as the national center for lifelong learning in Japan. As a unique open university in this country, OUJ has contributed to Japanese open education and Open Educational Resources (OER) movements (cf. Iwanaga & Yamada, 2022; Yoshida & Yamada, 2010). Furthermore, OUJ officially started asynchronous online courses with a Learning Management System (Moodle) in 2015 and

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synchronous online courses with a videoconference system (Zoom) in 2023. The number of the asynchronous online courses is 47 (undergraduate level) and 35 (graduate level) as of 2023 Spring term.

OIJ has Faculty of Liberal Arts for undergraduate education and the Graduate School of Master’s and Doctoral Programs for graduate education. The numbers of students in undergraduate courses, Master’s and Doctoral Programs were 81313, 3666 and 78 each as of May 2023.

1.2. E-Volunteering as a New Volunteering Activity in New Normal

In this study, e-Volunteering is defined as “ICT-enhanced volunteering in both real and virtual (cyber) space”. Cyber space is intimately connected with real world and the activities in both cyber and real spaces are influenced mutually. e-Volunteering contains not only virtual activities on the Web but real activities enhanced and mediated by Internet and ICT. Cyber-volunteering, virtual volunteering, online volunteering, or digital volunteering are the synonyms. Yamada (2018, 2019) classified e-Volunteering (“Cyber-volunteering”) as in Table 1.

Table 1. Varieties of e-Volunteering (“Cyber-volunteering”): Volunteering X ICT

Volunteering			
		Objective/Target	Method/Measure
ICT Use	Objective/Target	[Category 1] Dissemination and Learning of “Volunteering X ICT”	[Category 2] Implementation of ICT Use-related projects through volunteering
	Method/Measure	[Category 3] Enhancement of volunteering by ICT Use	[Category 4] Solution of new or unsolved issues by “Volunteering X ICT”

1.3. 21-Century Skills and Cooperative Learning

In teaching about or with volunteering in educational institutions, the goals are often controversial. They can be regarded as motivation and attitude issues or as systematic processes based on some competency model. The skills and competences which are expected to the volunteers are often common with those referred in Key Competencies, Transformative Competencies (OECD, 2019) or 21-Century Skills (Binkley et al., 2011). In addition, volunteer activities and service learning are suggested as effective environments to cultivate the abilities.

Yamada (2018, 2019) showed an example of Cyber-volunteer’s competency model (Figure 1)

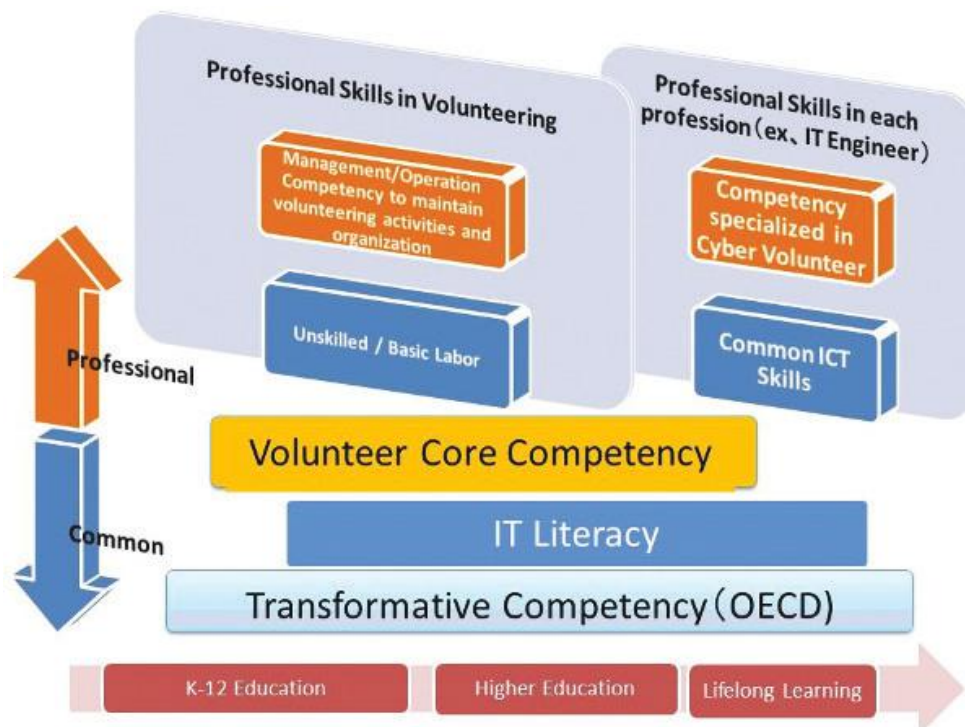


Figure 1. An example of Cyber-volunteer competency (e-Volunteer) model

2. Ouj Courses on Volunteering

In many courses in multiple departments, “volunteer” and “volunteering” are referred. In Informatics department, one TV broadcasting course in undergraduate level and one online course in graduate (Master) level had the terms “volunteer” or “volunteering” in the course titles (Table 2).

Table 2. Volunteering-related courses in Informatics Department at OUJ

Course title	Semester	Number of Enrolled	Number of Accredited	Completion Rate
Undergraduate courses (TV)				
The Century of International Volunteers (2014-2019)	2014-1 to 2019-1	3708	2542	0.6855
International Volunteering in Information Society (2019-2023)	2019-1 to 2023-1	2236	1740	0.7781
Graduate Courses (Online)				
Volunteering Activities in Information Society (2018-2021)	2018-1 to 2021-2	138	108	0.7826
Cyber-volunteering (2022-)	2022-1 to 2023-1	45	37	0.8222

* All of the courses were in Japanese, and no language supports were prepared except Japanese closed caption.

The graduate courses are designed as the advanced level of the undergraduate courses. While TV courses are based on video lecture and less interactive, online courses are based on Learning Management System (LMS) and afford multimedia and interactivity.

3. Practice of Online Group Learning for e-Volunteering

In the graduate courses, in order to acquire not only the knowledge on theoretical backgrounds and the latest practices of e-Volunteering but the necessary skills and competences to plan and operate volunteering activities, an online group learning design was implemented. At the group learning, remote students shaped a couple of 5-6 person groups and cooperated to author each proposal plan for innovative volunteering project.

3.1. Syllabus of “Cyber-Volunteering” (2022-)

The syllabus of the latest graduate course, “Cyber-volunteering”, is shown in Table 3. The online course was controlled by a LMS (Moodle) and the formative assessment, which consisted of quizzes, reports and the peer review of the outcomes of groupworks, was adopted.

Table 3. The Syllabus of “Cyber-volunteering” (2022-)

#	Lesson Title	Paced/Self-paced	Lecture video	Quizzes or students' feedbacks	Group works*
1	Volunteering in Information Society 2022	Self-paced	YES	YES	
2	Theories of Volunteerism	Self-paced	YES	YES	
3	Theories of Information Society	Self-paced	YES	YES	
4	Competency Model of Volunteers	Self-paced	YES	YES	
5	Case Study: Regional Development and Volunteers	Self-paced	YES	YES	
6	Case Study: Megadisaster and Volunteers	Self-paced	YES	YES	
7	Case Study: Internet Crime and Troubles	Self-paced	YES	YES	
8	Case Study: Learning Supports	Self-paced	YES	YES	
9	To understand Group Learning	Paced	YES	YES	
10	Group Learning 1: Examine Goals and Solutions of the Project	Paced	YES	YES	Home
11	Group Learning 2: Refine and Assess Solutions of the Project	Paced	YES	YES	Home
12	Group Learning 3: Information Sharing among Groups	Paced	YES	YES	Expert
13	Group Learning 4: Publicity and Fund-raising	Paced	YES	YES	Both
14	Group Learning 5: Evaluation of the Project	Paced	YES	YES	Both
15	Presentation and Peer Review	Paced	YES	YES	Peer-Review

* Group works consisted of the activities at each home group (Home) and those at each expert group (Expert). “Both” means those at Home and Expert groups.

The 2-credit course was allocated for fifteen weeks in each semester. While, from Lesson 1 to 8, students can start anytime in any order, that is, in self-paced, from Lesson 9 to 15, they should keep the pace in a scheduled fashion in order to maintain group activities.

3.2. Instructional Design for Group Learning: A Jigsaw Method and e-Bulletin Board

To prepare a cooperative learning environment, the Jigsaw method developed by Elliot Aronson [Aronson, E. (n.d.)] was introduced. The task of the group work was to author and present a proposal of an innovative volunteering activity in which utilizes ICTs in advanced fashion in real or virtual environments, that is, e-Volunteering. The roles of the “experts” were 1) Technology, 2) Needs Survey, 3) Human Resource Management and Fund Raising, 4) Publicity and 5) Project Management and Evaluation (Leadership), which were also the viewpoints in the evaluation by peers and instructor.

For the cooperative learning activities, only e-Bulletin board of Moodle was permitted. Although some students requested to use other public Social Networking Services (SNSs), groupware and/or video conference system, the matured technology was adopted from the viewpoints of accessibility and equity.

4. Findings in Project-Oriented Group Learning

4.1. Selected Themes as the Group Outcomes

The outcomes of the group activities were proposal documents of an innovative e-volunteering activity. Table 4 shows the list of the proposal titles.

Table 4. The list of the titles of the group works

Semester	# Enrolled	#Accredited	# of Home Groups	Titles of Group works
<i>"Volunteering Activities in Information Society" (2018-2021) **</i>				
2018/01	35	27	6	<ul style="list-style-type: none"> • Matching portal for International Volunteers • Operation of elderly person watching system by volunteers • Online assistance to damaged area by providing survival / living information • Supports public participation of foreign residents by matching between volunteer organizations and foreign residents communities • Strengthen the community's potentials of autonomous disaster prevention by utilizing ICT • Offering special experiences on Japanese local culture to overseas tourists
2018/02	17	12	2	<ul style="list-style-type: none"> • Educational supports of low-come families utilizing senior talents • Protection and care of roaming old persons
2019/01	11	9	2	<ul style="list-style-type: none"> • Supports of participants in sports events • Supports of elderly persons' volunteering by ICT
2019/02	16	11	2	[Missing data]
2020/01	16	14	4	<ul style="list-style-type: none"> • Sharing useful information in disasters • ICT-use literacy training for elderly persons • Advancement of agriculture and village community in developing countries • Enlightenment of countermeasures to cybercrime
2020/02	18	14	3	<ul style="list-style-type: none"> • Network of volunteers on foreign language traslation and environmrntal issues • Online supports in maternal and child health • Council for digital divide issues in elderly persons
2021/01	17	15	3	<ul style="list-style-type: none"> • Supports of elderly students' community at OUU • Web site to facilitate information collaboration among school volunteers • ICT-enhanced Japanese language learning for foreigners
2021/02	8	6	1	<ul style="list-style-type: none"> • e-Volunteering for Japanese language learning of foreigners
<i>"Cyber-volunteering" (2022-)</i>				
2022/01	18	17	3	<ul style="list-style-type: none"> • Learning support services for junior high school students who have less opportunities of social success in future • Supports of Young-carers • Volunteers to develop voice guidance maps
2022/02	15	13	3	<ul style="list-style-type: none"> • Development and delivery of educational content on ICT utilization in Elementary and Middle schools • Matching portal connecting students and elderly persons • ICT volunteering to disseminate Sato-yama and Sato-umi (village-vicinity natutral environments) to younger generation
2023/01	12	7	2	<ul style="list-style-type: none"> • Voluntering to support elderly persons in utilizing smart phones • Project to decrease suicides

* Gray cells show the period of COVID-19 Pandemic in Japan.

** *"Volunteering Activities in Information Society" (2018-2021)* was the preceding subject of *"Cyber-volunteering" (2022-)* and the design of group learning was almost identical.

Comparing with pre-Corona era, the interests changed more to domestic issues than global issues. The themes chosen were supporting elderly persons (8), volunteers at schools and for younger generation (6), Japanese language education in community and supports to overseas tourists (5), supporting refugees in damaged areas (3), international cooperation (2) or others (5).

4.2. Participation in the Discussion

The numbers of the posts to the e-bulletin boards were variable among students or home groups (Figure 2). As not a few students had a job, the time they could use for the study was limited; The retired could access more freely and often to the boards. Figure 3 shows the relationship between the numbers of the posts to the Home Group threads and those to the Expert Group threads in individuals (n=38, from 2022 1st Semester to 2023 1st Semester). The more minute data analyses focusing micro processes and multiple factors are required.

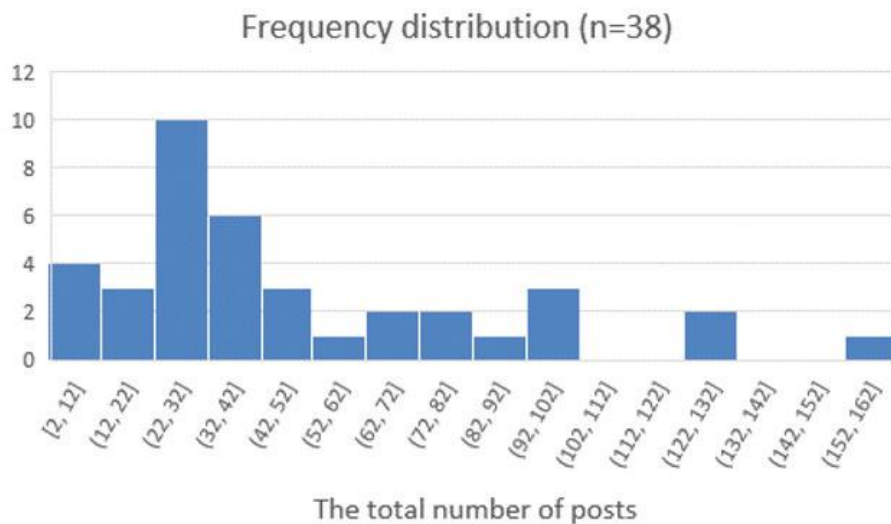


Figure 2. The frequency distribution of the students in the three semesters (n=38, from 2022 1st Semester to 2023 1st Semester) on the total number of posts

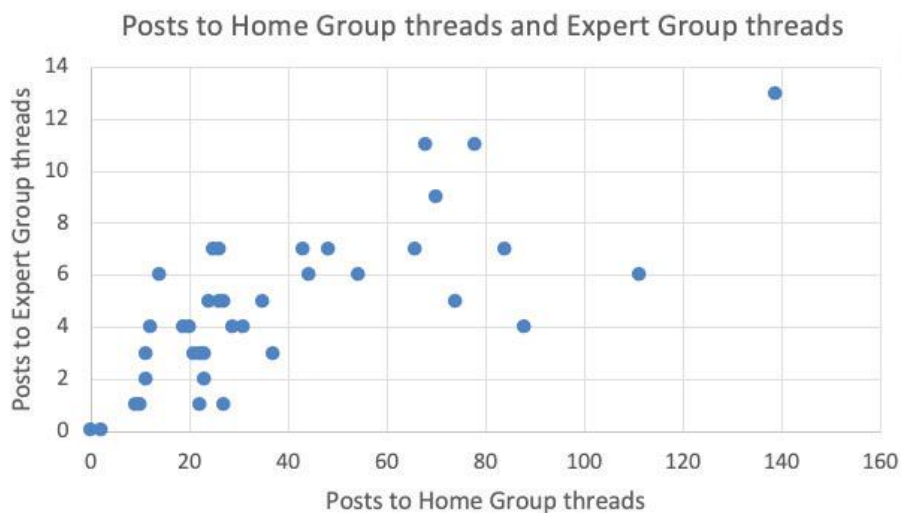


Figure 3. The relationship between the numbers of the posts to the Home Group threads and those to the Expert Group threads in individuals (n=38, from 2022 1st Semester to 2023 1st Semester)

Figure 4 shows the number of total posts to e-Bulletin boards had no clear correlation with the peer review results of the outcomes of group works (5-grade Likert scale, 0.2-Poor, 1.0-Excellent).

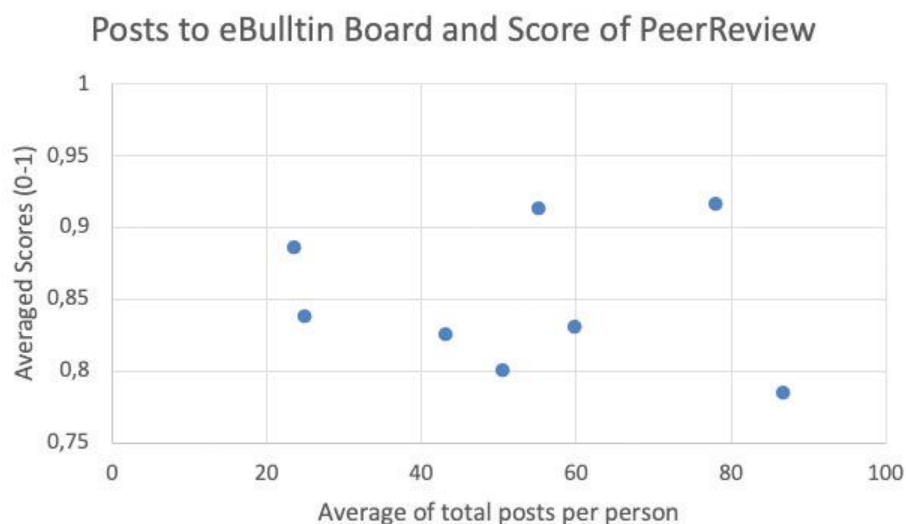


Figure 4. The relationship between the numbers of the posts and the results of peer review

5. Discussion and Conclusion

While the courses were not popular because it was neither easy nor flexible, the rating of their satisfaction was not worse.

In New Normal era, strategies of international volunteering activities should be re-examined not only from the viewpoint of countermeasures to the next Pandemic but that of Sustainable Development Goals (SDGs) and Carbon Neutrality. e-Volunteering and the digital ecosystem, which share various distributed resources in global scale, can be one of the efficient and feasible solutions.

In these courses, online project learning on e-Volunteering was introduced and showed the effectiveness to cultivate volunteer core competency. In the future, experiences in the virtual group learning will be beneficial in cooperative learning in multilingual and pluralistic contexts beyond the borders and in cultivating 21st century skills (Binkley et al., 2011) and transformative competency (OECD, 2019). The longer-term educational effects of the online program are the issues remained and continuous surveys are expected.

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129-The Role of the University of the Philippines Open University Upou in Delivering Online Capacity Development Program for Public Servants

Juvy Lizette Gervacio¹

Abstract

The rapid developments in ICT usher in new challenges as well as opportunities for the higher education sector. The adoption of digital learning is becoming more prevalent as more Universities realize the advantages that technology can bring. Moreover, there is also an increasing demand for capacity development through online learning due to the need to upskill and re-skill workers to address the demands of future work. One of those that needs continuous capacity development are the public servants who are employed either in the private sector but serve the general public to achieve greater good. The Asian Development Bank (2021) noted that the modernization of civil service systems is bound to improve the delivery of public services. They cited the use of online learning applications as a means of upskilling public servants. Governments can contract firms that produce education programs or courses for public servants, or the government itself can create their own course content for its public servants. Hence, there is a need to look into the capacity of organizations in implementing online education programs. This paper aims to determine the effectiveness of the UP Open University as an organization offering online capacity development programs for public servants. Specifically, it aims to: 1) discuss the indicators of organizational effectiveness to implement online education; b) determine the effectiveness of the UPOU as an institution offering the Master of Public Management (MPM) Program for public servants; c) identify the strengths and challenges of the organization as an Open University ;d) determine future prospects of the MPM Program and e) provide recommendations to open universities that want to embark on the capacity development programs. The research entails a review of reports, news articles and government websites that are relevant to the study. Moreover, results from the interviews of key informants will also be utilized in this study.

Keywords: Online Education, Capacity Development, Organizational Effectiveness

1. Introduction

Online education is a tool for capacity development. It is often referred to as e-learning which is the use of ICT in teaching and learning. Sangra, et. al (2012) defines “E-learning as an approach to teaching and learning, representing all or part of the educational model applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning” (p.152).

The development of capacities of public servants is important. They play an important role in the development of better futures through the achievement of Sustainable Development Goals (SDGs). Hence, governments should take effort to develop their capacities to also prepare them for the challenges of the future.

The Asian Development Bank (2021) also asserted that the modernization of civil service systems is bound to improve the delivery of public services. Such modernization, however, can only be facilitated through investment in technology. They also cited the use of online learning applications as a means of upskilling public servants.

In the Philippines, the University of the Philippines Open University (UPOU) is the premier University that offers online education. Its brand of online education is referred to as Open and Distance e-Learning (ODeL). As early as 2001, UPOU went online through the use of the Integrated Virtual Learning Environment (IVLE) to facilitate online connectivity of learners and teachers.

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2. Objectives

This paper aims to determine the effectiveness of the UP Open University as an organization offering online capacity development program for public servants. Specifically, it aims to: 1) discuss the indicators of organizational effectiveness to implement online education; b) determine the effectiveness of the UPOU as an institution offering the Master of Public Management (MPM) Program for public servants; c) identify the challenges and strengths of the organization as an Open University ; and d) determine future prospects of the MPM Program and e) Provide recommendations to open universities that want to embark on the capacity development programs.

3. Methodology

The research is partly a product of the researcher's PHD thesis submitted to the Universitat Oberta de Catalunya, Barcelona, Spain. It entails a review of reports, news articles and government websites that are relevant to the study. Moreover, results from the interviews of key informants from UPOU and MPM Program were analyzed. There were 11 key informants from UPOU which included University officials. On the other hand, there 18 research respondents from the MPM Program who served as lecturers, tutors, course developers and consultants. The data were then analyzed and processed for purposes of the study.

4. Framework of the Study

The researcher reviewed several frameworks on capacity development. It is apparent that most of them were created to suit specific capacity development programs but not Online Education. After a review of several frameworks, the researcher adopted the Capacity Development Results Framework (CDRF) developed by the World Bank Institute to promote a systematic approach to CD. The team that formulated the framework emphasized that it could be customized according to the country's needs (Otoo, Agapitova, & Behrens, 2009).

Thus, for this study, there are six indicators of effectiveness of organizational arrangements; namely: 1) clarity of mission with respect to DG; b) achievement of outcomes that lead directly to attainment of the DG; c) operational efficiency; d) financial viability; e) supportiveness of stakeholders; and f) adaptability in anticipating change (Otoo et al., 2009).

Moreover, it also incorporated 12 important indicators for e-learning organizations by Jung et al. (2010); namely: a) vision, mission, values, and/or goals; b) assessment and evaluation; c) Educational resources; d) Leadership, governance, and administration; e) Finance; f) IT infrastructure; g) Teaching and learning; h) Curriculum and course development; i) Student support; j) Faculty and staff; k) Internal QA system; and l) Research.

The indicators are described below:

- a. Clarity of mission, vision and goals - The organization has a clear vision, mission and goals aligned to what it wants to achieve; and its mandate is recognized by relevant stakeholders.
- b. Achievement of Outcomes (The organization achieves its functions in teaching, research, extension and public service. It develops educational resources, delivers quality teaching and learning programs, conducts research, public service and provides faculty/staff and student support)
- c. Financial Viability (The organization secures its finances to operate and has a sound financial management system)]
- d. Support of stakeholders (The organization maintains the support of stakeholders and conducts regular consultations with them
- e. Adaptability in anticipating change (The organization monitors the internal and external environment to encourage innovation, manage knowledge and adapt to new technologies)

5. Results and Findings

Open Universities recognize their role in building better futures, especially in the attainment of Sustainable Development Goals (SDGs). However, although Online Education is recognized as a development tool for capacity development, there is a need to determine the effectiveness of an institution to implement online learning.

5.1. The University of the Philippines Open University (UPOU)

The UPOU was established in 1995 and is envisioned as a leader in teaching and learning in the digital age, helping to equip Filipinos with the knowledge and skills they need for life and work in the 21st century. Its mission is to provide Filipinos everywhere access to quality higher education through innovative methods of teaching and learning that are designed to be responsive to their needs as well as to national development priorities.

Republic Act 10650 or the Open Distance Learning Act intensified the role of UPOU which is to assist relevant national agencies, higher education institutions, and technical and vocational institutions in developing their distance education programs through training, technical assistance, research and other academic programs.

5.2. The MPM Program

One of the first programs offered by UPOU was the Master of Public Management (MPM) Program of the Faculty of Management and Development Studies which admitted its first batch of students in the second semester of AY 1997-1998. The Program is designed for policymakers, administrators, and managers of public, private, and non-governmental organizations; practitioners in local government and administration; and other individuals interested in good governance, and public policy and administration (<https://fmds.upou.edu.ph/academics/post-bac/mpm/>).

The MPM Program has three areas of specialization; namely: Public Policy and Program Administration (PPPA); Local Government and Regional Administration (LGRA); and Voluntary Sector Management (VSM).

5.3. Effectiveness of UPOU in delivering online education

Based on the interviews conducted to UPOU and MPM lecturers, there seem to be a congruence that UPOU is effective as a capacity development organization offering online education. The highest rating is given to indicator on clarity of mission, vision and goals with 4.73 for UPOU KIs and 4.61 for the MPM respondents. The biggest difference is on Financial Viability since most of the MPM KIs have little knowledge on the financial aspect of UPOU.

Table 1. Rating on the Indicators of Organizational Effectiveness of UPOU, UPOU and MPM Key Informants

Indicators of Organizational Effectiveness	UPOU (N:11)*	KI	MPM KI (N:18)*
A. Clarity of mission, vision and goals (The UPOU has a clear vision, mission and goals aligned to what it wants to achieve; and its mandate is recognized by relevant stakeholders.)	4.73		4.61
B. Achievement of Outcomes (The UPOU achieves its functions in teaching, research, extension and public service. It develops educational resources, delivers quality teaching and learning programs, conducts research, public service and provides faculty/staff and student support)	4.18		4.44
C. Financial Viability (The UPOU secures its finances to operate and has a sound financial management system)			
E. Adaptability in anticipating change (The UPOU monitors the internal and external environment to encourage innovation, manage knowledge and adapt to new technologies)	4.36		3.94
D. Support of stakeholders (The UPOU maintains the support of stakeholders and conducts regular consultations with them)	4.0		4.39
E. Adaptability in anticipating change (The UPOU monitors the internal and external environment to encourage innovation, manage knowledge and adapt to new technologies)	4.45		4.39

*Strongly Agree – 4.21 – 5.00; Agree – 3.41 – 4.20; Undecided – 2.61 – 3.40; Disagree – 1.81 – 2.60; Strongly Disagree – 1.00 – 1.80

Figure 1. shows a clearer picture of how similar the answers are between the two groups.

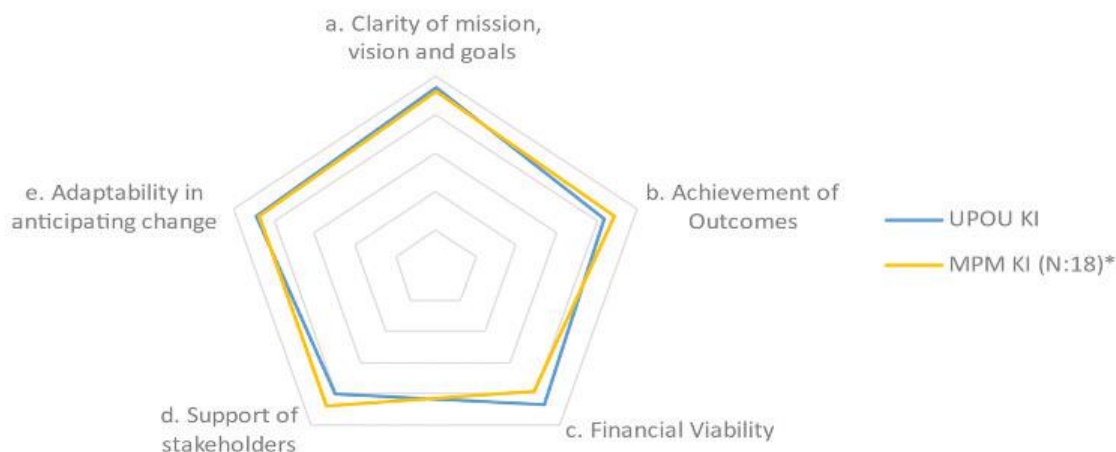


Figure 1. Comparison of the Responses of the Key Informants

The researcher also asked for the explanation of their answers and they are summarized below:

- Clarity of UPOU’s vision, mission and goals. The UPOU and MPM key informants strongly agreed that UPOU has a clear vision, mission and goals available through the website. It has also a clear charter though “The University of the Philippines Charter of 2008 with tripartite functions of teaching, research and public service.”
- Achievement of Outcomes. The UPOU key informants gave a lower rating of 4.18 (agree) compared to the MPM key informants with 4.44 (strongly agreed) in terms of the achievement of outcomes in the areas of teaching, research, extension, and public service. It has developed learning resources for open access and developed training programs for Higher Educational Institutions (HEIs) in ODeL including research.
- Financial Viability. The UPOU key informants gave a rating of 4.36 (strongly agree) on the financial viability of UPOU while the MPM respondents a lower rating of 3.94. They claimed that the finances of the UPOU being part of the National University are “viable coupled with a sound financial management system suited to a set-up of an open university.”
- Support of stakeholders. The UPOU respondents gave a rating of 4.0 (agree) on the support of stakeholders compared to a higher score of 4.39 (strongly agree) for the MPM key informants. The University maintains a strong relationship with its partners at the local and international levels. The UPOU is also recognized as the National Center of Excellence in Open Learning and Distance Education for its achievements in this field and its vital role in pushing the frontiers of learning in service to the Filipino nation. The University works with the Commission on Higher Education (CHED), Technical Education and Skills Development Authority (TESDA), and other institutions as part of fulfilling its role as mandated by the law.
- Adaptability in anticipating change. The key informants from UPOU gave a score of 4.45 for UPOU’s adaptability in anticipating change compared to 4.39 for the MPM informants which “strongly agree.” The respondents said that at the higher university governance level, “scanning the environment and the current and emerging trends are assessed to enable the University to respond and plan accordingly.” This is important to make necessary adjustments in its degree programs and include more recent changes in the demands for new skills and competences, conduct relevant webinars, publications, research projects.

Some mentioned that the University is an “innovator of change.” It initiates changes in its operations - academic and non-academic - using new technologies. It also introduces innovations in its research and public service, teaching approaches, and academic programs.

5.4. Strengths and Challenges of UPOU as an ODeL institution

When the research participants were asked on the strengths of the UPOU as an institution, they have noted several attributes of the UPOU such as its tradition of “honor and excellence” which helps UPOU in gaining

acceptance and recognition not only in the country but in the Asian region. UPOU also values “openness and innovation” and recognizes diversity, making it adaptable to any disruption.

The UPOU also claims to have a pool of knowledgeable and flexible human resources and has developed strong networks with other organization.

On the other hand, the challenges that were identified include the lack of human resources. For example, during the interview, there was only one full time faculty member for the MPM Program while the rest are all lecturers. There is limited opportunity for discussion and exchange of ideas. The other challenge is related to lack ICT infrastructure and learning materials. Since lecturers are tasked to utilize open educational resources, it is often left for them to review available materials. They also noted that other good materials are not accessible openly.

The other challenge is the “idea” that online education is inferior to residential mode of education. Hence, UPOU needs to address this as well. The respondents also identified the need to continuously develop the capacities of teachers in online teaching and learning.

6. Conclusion and future prospects of the MPM Program and UPOU

The paper concludes that Online Education can be an effective tool in lifelong learning of public servants. There are also various strategies that can be used and if done properly, then the learning outcomes and required competencies can be achieved.

Open Universities play a key role in ensuring better futures by developing the capacities of people in terms of upskilling, re-skilling and lifelong learning. Thus, there should be a constant review of its capacities as well as effectiveness in order to determine what needs to be enhanced and improved. There are indicators that can be utilized to determine their capacities and it is important to review them to make education sustainable.

The study also reveals that Open Universities and online education can also be helpful in developing the capacities of public servants who play a major role in the implementation of sustainable development goals (2030). With this in mind, there are possible prospects that the UPOU is now undergoing. One is to create and offer more micro credential courses not only for public servants but for others who are interested. Moreover, there is also the development of augmented and virtual reality to be able to enhance the learning experience of learners. The MPM Program of the UPOU will also utilize these innovative approaches to further enhance the learning of public servants.

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130-Innovations in ODL Through Virtual Reality Technologies

Chen Zhen¹, Wang Yu²

Abstract

Abstract—ning (ODL) mode in past, lacks the necessary interactivity, experience, vivid sense and reality sense, which leads to the low degree of student participation. As a result, it is difficult to achieve basic training such as work analysis, phenomenon description, data excavation and sorting. The “virtual” is the counterpart of the “real”, which adds a new dimension to perception. This paper studies the Open and Distance Learning (ODL) mode of art history, creates virtual reality teaching resources, constructs historical scene nodes with “virtual reality” technology, guides students to participate in exploration, observes and compares works in the virtual reality environment, and realizes teaching interaction. The results indicated that “virtual reality” technology adds a new dimension to open learning courses and could become an option in the future. “Virtual reality” technology can provide high quality, accessible online learning for mass open distance learning courses, and solve the problem of low participation rate among people with less education..

Keywords: *Virtual reality, E-Learning, Art theory, Innovation, Art history*

1. Introduction

With the rapid development of science and technology, people’s reading and viewing habits are constantly changing, and the digital and visual information broadcasting mode gradually occupies a dominant position, marking the arrival of the era of visual culture. Under the influence of visual culture, today’s art history education will gradually change from the traditional reading mode dominated by words and pictures to a more diversified and digital interactive learning mode. In recent years, various teaching methods have emerged in endlessly, and virtual reality technology has begun to enter the field of education and teaching. Virtual reality technology has formed a complete scientific system and gradually been accepted by the public since its emergence at the end of the 20th century. This paper applies virtual reality technology to the college art history course in distance education, and is committed to opening up new possibilities of distance online art history teaching. It uses virtual reality to create and restore the historical environment and works of art in the art history, create an immersive appreciation experience, make up for the shortcomings of traditional online learning, and let students who study through distance online way more intuitively understand the works described in the art history in the virtual environment, At the same time, the new interactive learning method can also effectively stimulate students’ interest in the course of art history, and realize the art history learning based on students’ experience and expression.

2. The Application of Virtual Reality Technology in Distance Education

In March, 2020, the American Association for information technology in Higher Education released the 2020 EDUCAUSE horizon report: teaching and Learning Edition, taking XR (AR, VR, Mr, haptic) as an emerging technology and practice, and predicting that its application to distance learners will become the future development trend [1]. ZHAOYIMING and others have clustered nine themes for the application research of virtual reality education, and the keyword “remote” is one of the nine themes [2]. Virtual reality has developed into a 4I feature, that is, immersion, interactivity, conceivability and intelligence [3], which is conducive to reducing the distance of interaction between teachers and students in the network teaching system [4], integrating people’s cognitive world and perceptual world in a deep level, and becoming an ideal technology form to realize the seamless integration of online information technology and teaching content. The integration of virtual reality and online education is

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another leap in the development of modern distance education, which can realize the multi-channel experiential interaction of multi-terminal three-dimensional immersion perception environment, and fundamentally change the learning field and teaching methods of distance education.

2.1. Application of Virtual Reality Technology in Distance Education

Since the 1990s, virtual reality technology has been systematically applied to the field of distance education.

At present, its application in distance education mainly includes the following two ways:

1. Virtual campus. The concept and technology of virtual reality are applied to the establishment of online teaching system to realize a virtual campus. The teaching management organization and talent training places of virtual campus, such as campus, classroom, laboratory and other online teaching environment, are replaced by computer simulation environment; The University evaluates the learners' learning situation through the network and gives them corresponding degrees or certificates; Students can select the courses they need to study through network query, and use hypermedia textbooks with online numerical value, text, graphics, sound and image to study university majors, and carry out practice and scientific research; Virtual campus allows learners to integrate into the learning environment provided and become a part of the environment. The system can adjust the relationship between teaching and learning according to learners' different needs, which is conducive to "teaching students according to their aptitude". The online platform of Jiangsu Open University in China can provide learners with almost all educational equipment and resources, and it also gives learners more freedom on the premise of achieving certain teaching goals.
2. Teaching implementation. Virtual reality technology can provide students with a vivid and realistic learning environment. Students can become a participant in the virtual environment and play a role in the virtual environment, which will play a positive role in mobilizing students' learning enthusiasm, breaking through the key and difficult points of teaching, and cultivating students' skills.

2.2. Application of Virtual Reality Technology in Distance Education

The application of virtual reality technology in distance education is mainly in four aspects.

1. Knowledge learning. Knowledge learning means that distance education students use virtual reality system to learn all kinds of knowledge. Virtual reality system can reproduce the change process of natural phenomena or things that cannot be observed in real life, provide students with vivid and realistic perceptual learning materials, and help students solve the knowledge difficulties in learning. For example, to show students complex physical phenomena such as nuclear fission and semiconductor conductive mechanism for observation and learning. In addition, virtual reality system can make abstract concepts and theories intuitive and visualized, which is convenient for students to understand. For example, when learning the concept of acceleration, students can observe the change of acceleration when changing the gravity and direction of the object through virtual demonstration, Enable students to deepen their understanding of the concept of acceleration.
2. Explore learning. Virtual reality technology can virtualize various hypothetical models put forward by students in the process of learning, and the results or effects of this hypothesis can be observed intuitively through the virtual system. For example, in the virtual chemical system, students can combine different molecules according to their own assumptions, and the computer will virtualize the combined substances.
3. Virtual experiment. Using virtual reality technology, we can also establish various virtual laboratories, such as geography, physics, chemistry and biology laboratories. In the "laboratory", students can do various experiments freely.
4. Skill training. The immersion and interactivity of virtual reality enable students to play a role in the virtual learning environment and devote themselves to the learning environment, which is very conducive to students' skill training. Using virtual reality technology, a variety of skill training can be done, such as military combat skills, surgical skills, teaching skills, sports skills, car driving skills, fruit tree cultivation skills Electrical maintenance skills and other vocational skills training. Students can practice repeatedly until they master the operation skills.

Basic elements of virtual reality art history teaching project design

Virtual reality technology is an important achievement in the development of contemporary science and technology, and plays an important role in all walks of life. In the field of education and teaching, especially in disciplines and courses with strong practicality, as well as high-risk, high-cost and high-consumption practical

teaching, we should design and apply corresponding virtual reality teaching projects, create highly simulated learning situations, and design interactive functions of real-time feedback, so as to stimulate students' interest in learning, mobilize students' initiative to participate in experiments, and improve the learning effect. The interactive design of virtual reality allows students to communicate with learning objects in virtual situations, observe and be familiar with the appearance, structure and other properties of 3D simulation learning objects through virtual roaming function, and also conduct virtual operations on learning objects through actions, gestures, voice and other interactive ways, so as to master the functions and applications of learning objects, so as to improve the operation skills in reality, This plays a great role in promoting the cultivation of applied talents.

3. Distance Online Learning Resources of Art History Course Based on Virtual Reality

3.1. Structure of Virtual Reality Online Learning Resources for Art History Course

Because the online learning resources integrating virtual reality scenes have gone beyond the scope of traditional resources, the pure learning object attributes of art history learning resources have been dissolved in the embodied cognitive space, and the learning field characteristics of online learning resources have been highlighted. The field characteristics of resources enable learners to master knowledge, acquire skills and transfer learning in the process of situational learning. The structure of virtual reality online learning resources of art history is shown in Figure 1. Virtual reality online learning resources integrate learning content, learning environment and learning activities, and integrate content embodied cognition, multi-sensory context and multi-channel interaction. The specific elements of the structure include:

1. Three-dimensional dynamic holographic exploration content of art works. The specific performance of the learning content is the transformation from the abstract symbol of thinking to the process of embodied manipulation: first, the three-dimensional visualization of specific knowledge points. The target artwork is displayed in a three-dimensional realistic form. Learners can rotate 360 degrees, arbitrarily scale knowledge objects, disassemble knowledge objects, and explore the complete and detailed composition of objects; The second is to dynamically demonstrate the internal logic of abstract concepts, scientifically decompose the components of concepts, clarify the interaction mode of each component of concepts, develop the mapping form of interaction object model and interaction space, and dynamically show the external display process of abstract concept thinking; The third is to scientifically explore the occurrence mechanism of discipline principles, and use the objective world laws revealed by discipline principles to discover, analyze and solve problems in continuous trial and error, so as to experience the complete discovery process and operation mechanism of scientific principles; The fourth is the simulation training of tolerance repetitive operation skills. Learners can be completely immersed in the skill training situation. Even if the order is reversed and the error operation is made, the corresponding results can be displayed and the risk can be avoided. Even if the operation is repeated many times, it can be reset as before, saving costs and improving efficiency.

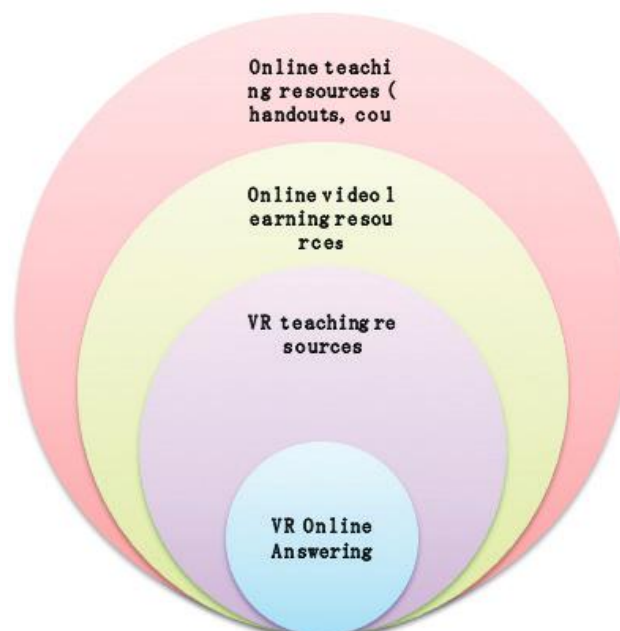


Figure1. Structure of online learning resources

2. Reconstruction simulation environment of virtual and real fusion of historical scenes. Virtual reality environment is essentially a secondary creation based on the fusion of virtual reality and reality. At present, in order to solve the bottleneck problem of immersion perception processing in the process of technology development, we have started to focus on new models of virtual reality fusion, such as hybrid reality, mediated reality, and fused reality. Specifically, the learning environment can be explained as follows: first, the core of real knowledge can be expressed by relying on virtual conception scenes. The knowledge expressed by virtual reality is objective and scientific real knowledge, but the form or scene of expression can be multimodal; The second is to generate real sensory response based on virtual interaction feedback. Learners have many forms of virtual interaction in virtual scenes, but the effect of virtual interaction can be truly fed back to learners through vision, hearing or touch; Third, based on the panoramic fine depiction, it transcends the real sensory limit, and the virtual scene can represent the holographic mirror image from micro to macro, so that learners can have a surreal immersive sensory experience; The fourth is the creation of the blending situation of reality led or virtual led. Reality led means that the virtual image is integrated into the real environment to realize the scene reconstruction of the real environment. Virtual led means that the real object is integrated into the virtual environment to realize the more realistic virtual scene reconstruction.
3. Interactive experience activities of physical and mental integration. Based on the reconstituted environment of virtual and real integration, learners peel their bodies into the remodeled second identity, and complete the transformation from a real learner to a “virtual learner”. The salient features of this learning activity include: first, multimodal “real” activity situations, which can simulate the real activity process and process and reconstruct the activity process. In addition, according to the needs of learners, a variety of types of activity situations can be preset for learners to choose; Second, multi trigger self-efficacy, the process of activities can be set up a variety of feedback methods, enhance learners’ learning motivation, students and learners form a benign interaction; The third is the falsification of deep logical thinking. Based on deductive thinking logic, learners can design a variety of different forms of activities, enter activities many times, and examine the universality of concepts or principles from multiple perspectives. As a result, learners’ immersion in virtual reality scenes to achieve the learning activities of physical and mental integration is manifested in the deep psychological experience of the integration of body and mind, such as “flow experience”, that is, the state of complete selflessness, devotion and concentration realized by learners in the process of virtual reality immersion activities; “Empathy”, that is, learners once again identify with the new identity of self virtual avatar, fully map emotions into learning activity scenes, and obtain empathic psychological experience..

3.2. Courseware of Virtual Reality Teaching Project

Virtual reality can enhance people’s real understanding of the observation objects that can’t be touched in practice. Virtual art objects can be placed in a space at the same time through computer three-dimensional technology to realize the enhancement of reality. Because of the relevance with the real world, the interaction is more natural.

From the academic and technical point of view, virtual reality technology makes real-time rendering of computer-generated virtual pictures, forming a complementary picture. In other words, virtual reality technology is also a technology that seamlessly connects digital information and virtual environment. At the same time, it can generate three-dimensional and two-dimensional picture information with the help of computer, and integrate the real environment, so as to deepen the understanding of relevant things for the experimenter.

Virtual reality courseware has reconstructed the form of traditional courseware by creating simulation scenes, associating knowledge objects, and setting interactive modes from the volume of class learning, and has also changed the online learning mode based on courseware. The development and application of virtual reality courseware resources have attracted wide attention, such as Cai Hua’s discussion of engineering drawing courseware [5], Wu Qiang’s development of “space teaching” courseware [6], Xiao Yang’s production of medical multimedia courseware [7], and so on. The current research focuses on multi-disciplinary coverage, curriculum system development, interdisciplinary knowledge design, etc.

The basic process of virtual reality courseware design includes: (1) front end analysis, including learning characteristics analysis, learning needs analysis, learning objectives determination and learning content organization; (2) Scene script design, knowledge point attachment object design, knowledge point performance

scene design, knowledge point connection mode design, interaction mode design, evaluation design, etc; (3) Operation structure design, courseware navigation roaming design, multi-channel interactive strategy design, prompt and help strategy design, etc; (4) Courseware development, including graphics and image processing tools, 3D model construction tools and virtual reality development tools; (5) Courseware testing, improve and revise the courseware content, model, scene, interaction, etc., and finally release for use.

The mainstream software of virtual reality courseware development includes: unity3d, unreal engine, VR platform and so on.

4. The Significance of Applying Virtual Reality Technology in Art History Course of Distance and Open Education

In open and distance education, the adoption of augmented reality technology can open up a new situation for education and teaching mode. The field of education and teaching has innovative significance for the development and research of augmented reality.

1. Enhance learning initiative

The rapid development of Internet technology has promoted the progress of information technology industry and created new opportunities for open education. Especially in the construction of art courses, the adoption of VR technology has enhanced the reality of interaction, enhanced the viewer's experience, and achieved better teaching results.

For example, in the course of architecture in the history of art, through the development of mobile app, students can learn through the mobile client no matter where they are and what environment they are in. After scanning and identifying the graphic signs, they can watch the relevant micro lecture, the three-dimensional live model of domestic and foreign architectural sites, and the disappeared ancient architectural restoration model through the mobile screen. At the same time, There are also content explanations about architecture and architectural history. Students can more intuitively understand the important representative architectural works in the history of famous art. By rotating the model, they can also observe the architectural characteristics of different buildings from different angles, and extend this method to the internal structure of buildings, so as to make learning more intuitive and profound. To a certain extent, this is an innovation and subversion of the traditional teaching mode, which greatly improves the interest of learners and turns boring passive learning into purposeful active learning.

Especially in design courses, it can provide learners with more intuitive and profound cognitive experience. For example, learning the history of ancient Egyptian art can bring the viewer to a virtual ancient Egyptian temple building through virtual reality technology; Learning Buddhist sculpture art can make a virtual Temple link, restore some sculpture works through 3D technology, and make people feel immersive through virtual reality technology; Virtual art objects can make people perceive the design characteristics of art objects in an all-round and three-dimensional way; There is also art appreciation. You can bring the sculptures and ancient porcelain relics of the world museum to your eyes, and use virtual reality technology to let people see their true colors. The application of virtual reality technology makes the art design course have a better development and construction prospect.

2. Establish multidimensional interactivity

Based on virtual reality technology, the innovation of books is also a new direction. It takes traditional paper books as the carrier. By scanning the two-dimensional pictures of books, students can appear an interactive three-dimensional model on the current page to realize the interaction between virtual and reality. It is no longer hard to remember through the traditional reading mode, but can break the restrictions of time and space through augmented reality, and carry out multi-dimensional cognition and communication of knowledge points, so that learning and reading can change from abstract understanding to intuitive feeling. It has greatly stimulated learners' interest and provided more imagination space for the experimenter.

5. Conclusion

Virtual reality has significant application benefits and great development potential in reshaping the structure of learning resources, teaching organization mode and system platform architecture. The further promotion of virtual reality reshaping distance online education also needs to make efforts in the following aspects:

Develop a virtual reality online learning resource system based on distance and open learning mode, and promote the wide application of virtual reality online learning resources. Although virtual reality online learning resources have created different categories, the traces of imitating two-dimensional resources are obvious, and the agglomeration benefits of resources are not significant. Therefore, the following measures need to be taken: first, design and develop new categories of resources, change the inherent understanding of the passive supply of traditional online resources, and change to the idea of active and intelligent service for learners; The second is to create a simplified and modular development environment, fully draw on the relatively mature commercial development platform, and specifically create a virtual reality online learning resource development environment for the field of distance and open education; The third is to explore the resource service system architecture, and make a layout for the integrated development of virtual reality online learning resources from the macro strategic perspective of the whole process of resource service; Fourth, encourage school enterprise cooperation and joint development, make full use of the technological advantages of enterprises, support colleges and universities to set up special engineering centers, and timely apply the most cutting-edge technology to resource development.

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131-A Model and Application of Monitoring Community Education Development Based on the Data-Driven Decision Making-A Case in the Jiangsu Province of China

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Abstract

The aim of this study is to utilize available data in order to construct a model for monitoring the progress of community education development (CED). This will be accomplished by conducting a case study in a specific region of China to gain insights into the current state of community education development. To achieve these research goals, we have designed a conceptual cyclic model for monitoring community education, incorporating the concept of DDDM, traditional education performance monitoring and evaluation, as well as considering China's national conditions and regional characteristics of community education development. Additionally, the CIPP theory has been combined with a focus on the four dimensions of community education (Context-Input-Process-Output) to create a comprehensive community education monitoring system. Furthermore, we have designed a measure for calculating the community education development index (CEDI), which uses a combination of method for Technique for Order Preference by Similarity to the Ideal Solution (TOPSIS) and Information Entropy Weight (IEW). Finally, using Jiangsu province in China as a case study, we have employed the community education monitoring and evaluation indicators system to analyze the current situation and distinctive features of community education development. The findings from the data analysis of the application cases have revealed the following: (1) the number of participants has a significant impact on the development of community education in a given region; (2) there is a noticeable regional imbalance in community education development, with the economic level being a key influencing factor; (3) the pursuit of large-scale development without careful considerations remains a prominent characteristic of Chinese community education at this stage. Through this case study mentioned above, the study also demonstrates the effectiveness of combined use of the TOPSIS and IEW as a monitoring approach for CED.

Keywords: Community education, DDDM, TOPSIS & IEW, education monitoring.

1. Introduction

With the reform of the economic and political system, the overall social atmosphere tends to be more open, democratic, and modernized. The growing demand for diversified education exerts reverse pressure on the society, and community education is gradually shifting from "Supply-Driven" to "Demand-Driven" (Kirscheer & Valcke, 1994), bearing the responsibility of providing more diversified precision education services. Accelerating the establishment of a lifelong learning system has become a strategic goal of the government and a necessary requirement for educational development in China. Simultaneously, community education itself is facing two-way pressure for innovation and development. Under such circumstances, a timely, scientific and objective grasp of the development status and level of community education is the key basis for accurately locating social education problems, optimizing the allocation of educational resources, and realizing scientific decision-making. According to the existing research and practice, relying on data to drive educational reform and realize innovative development is the natural trend of the advanced evolution of current social development and the development of digital transformation. Supported by a foundation of new infrastructure for education,

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education is moving towards a data-driven paradigm of evaluative decision-making and providing a practical basis for funding allocations, accountability, etc. Two research questions were addressed in this study: Firstly, what does the digital monitoring model for community education development look like under the concept of a data-driven paradigm? The second is how to give full play to the value of data to realize the digital monitoring model of community education?

2. Review of Research

2.1. The Concept of Community Education and the Process of Its Digital Development

Community education has its origins in European community institutions, American participative democracy, and Latin American “popular education.” (Yong Zhang, 2023) In many special cases, terms such as adult education, lifelong learning, and informal learning are also often used as synonyms for community education (Connolly, 2010). The National Adult Learning Organization AONTAS defined community education as: a process of empowerment, social justice, change, challenge, respect and collective consciousness. It is within the community and of the community, reflecting the developing needs of individuals and their locale. It builds the capacity of local communities to engage in developing responses to educational and structural disadvantage and to take part in decision-making and policy-formation within the community. It is distinct from general Adult Education provision, due both to its ethos and to the methodologies it employs (AONTAS, 2004). With the deepening of the integration and development of education and society, community education gradually has more connotations. From the point of view of mechanism, community education is an education system in a certain region, where the government coordinates and the society participates to promote the coordinated development of education and society (Twelvetrees, 2017); From the point of view of education management system, community education is committed to the effective allocation and utilization of the various resources available within a community, including human, physical, and financial resources. Additionally, it highlights the importance of cooperation and coordination among different institutions and agencies (Clark, 1977). From the perspective of the organizational form of community education, community education activities are commonly conducted through entities known as Community Learning Activity Centres (CLACs), which are frequently referred to as Non-Formal Education Organisations (NFEOs). These establishments primarily focus on providing occupational training, developmental education, as well as community and lifelong learning opportunities (Asna & Sendy, 2022). Educational quality assurance, as an essential research area in education, is closely related to accountability and program evaluation. Among other things, program evaluation involves the continuous monitoring of educational services and the feedback of the results to the different publics so that corrective measures or innovative changes can be made in light of the results (Madaus & Stufflebeam, 1984). The need for community education to focus on program evaluation is all the more important given that community education arises among the people and serves the people. Based on this, our aim in evaluating community education is to ensure that the community education services provided are both reasonable and successful. In this study, we defined community education monitoring as: The monitoring goal of community education development is to evaluate, monitor, and analyse all aspects of community education development so as to realize reasonable planning and scientific development of community education.

Community education developed more recently in China in response to Learning Society and Lifelong Education policy (Yong Zhang, 2023). From the perspective of organizational entities, the development of community education mainly relies on community education institutions at all levels and the public welfare learning website resources developed by education authorities at all levels to carry out learning. From the perspective of development stage, community education in China has gone through three stages of development: “community supports schools” (Price, 1976), “schools give back to the community” and “schools and communities promote and integrate each other”. With the continuous evolution of the digitalization process, community education in China has initially formed a distinctive four-level online education network system of “Province-City-County-Township” based on the public welfare digital learning platform. The digital learning community derived from the digital platform has gradually developed into a key position for the development of community education. Driven by education modernization and social digitalization, the digitalization of community education has gradually been integrated into community modernization governance and has become a key content.

2.2. Data-driven Education Monitoring Research and Practice

Data-driven decision making (DDDM) has become prevalent in education in many parts of the world (Cosner 2014; Datnow et al. 2013; Mandinach & Gummer 2013; Schildkamp et al. 2014). DDDM is the process

by which educational administrators and teachers collect and analyse data to guide a range of educational decisions (Ikemoto & Marsh, 2007). For too long, educators have made decisions under the assumption that problems lay in certain areas. The assumed educational problems have not been identified by actual facts, and therefore, the educational reform action would address a problem that may or may not exist (NCREL, 2006). DDDM looks to eliminate this methodology and help educators identify and combat the real problems that are occurring.

Influenced by the concept of DDDM, Educational monitoring driven by data and feedback is increasingly playing an irreplaceable role in improving instructing and teaching (Schildkamp & Archer, 2017). It is necessary to build a scientific education educational indicator systems to realize data monitoring and make use of its decision-making premise. Since educational indicator is a statistic revealing something about the education system's health or performance (Oakes, 1986), most international organizations have constructed their own educational indicator systems. Among them, the educational indicator systems of international organizations such as OECD(OECD , 2003), UNESCO (Johnstone & UNESCO-IIEP, 1981), the World Bank, and the European Union(Communities, 1999) are the most representative. OECD's educational monitoring indicator system is based on human capital theory, based on the "Input-Process-Output" model of economics, and has established and gradually improved the "Context-Input-Process-Output" concept model, that is, the CIPP model, provides multi-level, three-dimensional and instant information query or decision-making query services for different stakeholders. In addition, OECD collaborated with multiple monitoring agencies developed a big data monitoring platform, and focused on introducing educational monitoring tools to dynamically monitor and guide educational development. However, its impact mainly covers the optimal allocation of educational resources in basic education, school teaching reform, and counseling decisions for public school selection. Based on the concept of education for all, UNESCO designed a education monitor indicators system including five major parts, including educational resources, educational needs, enrollment & participation, educational internal efficiency, and educational output, under the theoretical framework of balancing educational demand and supply models, then regularly publish the "Global Education Monitoring Report". The World Bank provides education development indicators in The World Development Indicators (WDI) designed to observe global development, mainly including education inputs, participation in education, education efficiency and completion, education outcomes(World Bank, 2005). The above institutions, based on their different development concepts and characteristics points, built a system of educational indicators with different characteristics, and regularly published special topics report.

On the practices of educational monitoring driven by data, there are currently successful examples of data-driven educational monitoring in the field of education. Most of the existing practices are based on the basic role of data monitoring, giving full play to the application role of data monitoring in risk warning, decision-making and personalized intervention in the education process. For instance, Purdue used the Predictive Student Success Algorithm (SSA) to develop course signals that allow instructors to harness the power of learner analytics to provide real-time feedback to a student(Arnold & Pistilli, 2012). Austin Peay State University used learning analysis technology to construct a degree compass (Degree Compass) personalized course recommendation system, which aims to help students choose appropriate courses according to their needs(Whitten, Sanders & Stewart, 2013).

2.3. Discussion of Relevant Research

It can be seen from the existing literature that most of the research on community education focuses on the discussion of ideas and practice models(Fletcher,2018;Saepudin,2019;Fenner,2023). From the research level of educational performance, most studies focus on the performance of primary and secondary schools or higher education(Sutherland, Joumard & Nicq, 2007; Tandberg & Hillman, 2014), less attention has been paid to outcomes and performance in community education. This phenomenon is likely to be due to the various forms of community education and the lack of necessary monitoring and evaluation index systems. The evaluation of community education has also progressed dramatically and is no longer simply concerned primarily with measurable outcomes but with process, stakeholder roles, values, and quality (Kells, 1992). The digitization process of community education has provided data soil for its monitoring development.

To date, several educational evaluation methods have been recorded. The Delphi technique, originally formulated by Dalkey and Helmer (1963), is a widely recognized and commonly employed approach to attaining consensus by soliciting expert opinions within specific subject domains, for instance, within the realm of educational research(Liu et al. 2021; Hassanain et al.2022). The Delphi technique's outcomes are subject to

the influence of personal preference and expectation due to its reliance on expert judgement. The analytical hierarchy process (AHP) was initially introduced by Saaty (1980). For an extended period of time, it has been employed in the assessment of educational excellence (Fan et al. 2022; Su et al. 2021). Some researches have also used Dephi in combination with the AHP method (Shen et al. 2019; Yonghong et al. 2012). The determination of AHP weighting primarily relies on the decision-makers, who engage in pair-wise comparisons to establish a foundation for assessing the relative importance of two indices. Hence, personal preferences exert an influence on the evaluation of the subject matter. Principal component analysis (PCA) is a valuable technique in the field of multivariate statistics, as well as in education (Simonacci & Gallo, 2017). It is worth noting that PCA does not incorporate arbitrary elements or subjective decisions into its analysis. Principal Component Analysis (PCA) has the ability to diminish the relative importance of original indices, resulting in more precise ranking outcomes as the number of indices decreases. Additionally, data weighting can be objectively conducted as it continuously adapts to the evaluation data. However, principal component analysis (PCA) is only suitable for conducting a comprehensive assessment of large datasets. The aforementioned methods are flawed due to either biased opinions or incomplete presentation of details. Hence, we endeavour to employ the information entropy weight (IEW) to acquire the weight in an unbiased manner, and subsequently utilize the TOPSIS (Technique for Order Preference by Similarity to Ideal Solution) approach to comprehensively and impartially assess CED. Hence, the primary objective of this research is to investigate a more impartial approach for assessing the CED. A more refined assessment methodology was developed and implemented within the context of a specific case study. The findings of our study indicate that IEW and TOPSIS methods are appropriate for evaluating the CED in research.

3. Method

3.1. Process and Design of the Research

The goal of study is to use data to monitor and evaluate the development of community education objectively, so as to better explain the performance and quality of community education to the public. In order to achieve this research goal, we combined the actual situation of community education in China and took the community education activities carried out by official social education organizations as the key monitoring objects, and designed the research process as follows: First, build a theoretical framework for community education monitoring and evaluation from the cornerstone of theory and practice, and then clarify the process of community education carried out by official organizations to provide a theoretical basis for the subsequent refinement of community education monitoring and evaluation index system. On this basis, combined with CIPP, the community education monitoring and evaluation index system is designed. At the same time, based on the entropy weight TOPSIS designed the algorithm of community education development index (CEDI). Finally, taking a province in China as an example, the community education monitoring and evaluation indicators system is used to discuss the current situation and difficulties of community education development.

3.2. Data Collection Method and Process

The research data in this paper are mainly used in the last step of the research process, that is, the community education monitoring indicators system and calculation method constructed by taking a province in China as an example. we took "Jiangsu Learning Online" (a public welfare website built by the government to carry out community education) in Jiangsu Province, China as an example, and conducts research by obtaining data through multiple channels such as web crawling and data platform collection. The reason for choosing the above cases to carry out this research is that Jiangsu Province has a large scale of community education in China and a relatively complete organizational structure of community education, which plays a certain representative role.

3.3. Data Processing Method and Procedure

After the community education monitoring indicators system is determined, the key step is to determine the weight of the indicators for data analysis. According to the definition of information entropy, the entropy value is used as an index to describe the degree of data dispersion. The smaller the entropy value, the greater the degree of data dispersion, and the greater the impact of this index on the comprehensive evaluation. Therefore, the index weight can be calculated by using information entropy, as Provide a basis for multi-index data evaluation. In this study, IEW and TOPSIS method are combined to construct a comprehensive evaluation method, which can make full use of the original data information to reflect the gap between evaluation schemes.

The calculation idea of “standardization-weight assignment-index synthesis-comprehensive measurement” is adopted as a whole. First, on the basis of data standardization processing, the information entropy and weight vector between indicators are calculated based on IEW, and the comprehensive evaluation value is obtained. Development index , to avoid imprecise subjective empowerment law. Afterwards, the TOPSIS method is used to calculate the distance of each scheme relative to the ideal solution and the negative ideal solution, and finally the scheme with the smallest distance is selected as the optimal solution. The community education development monitoring system obtained by the entropy weight TOPSIS method can more scientifically and objectively evaluate the development level of community education, provide decision support and reference for relevant departments, and promote the healthy and sustainable development of community education.

4. Theoretical Framework and Indicators for the Study

4.1. Conceptual Framework: Circular Model for Monitoring the Dynamics of Community Education

In order to better study the mechanism of community education monitoring, we construct a theoretical model of social education monitoring. This model (Figure 1) mainly includes the following subsystems: monitoring subject, monitoring content, monitoring method, result feedback and monitoring guarantee, and answers several key questions in social education monitoring: who monitors, what to monitor, which method to use, what kind of guarantee is needed, and what effect is achieved. So we also call it the 5W model of community education monitoring, which is very similar to the analysis principle of the famous 5W communication model in communication(Wenxiu,2015).

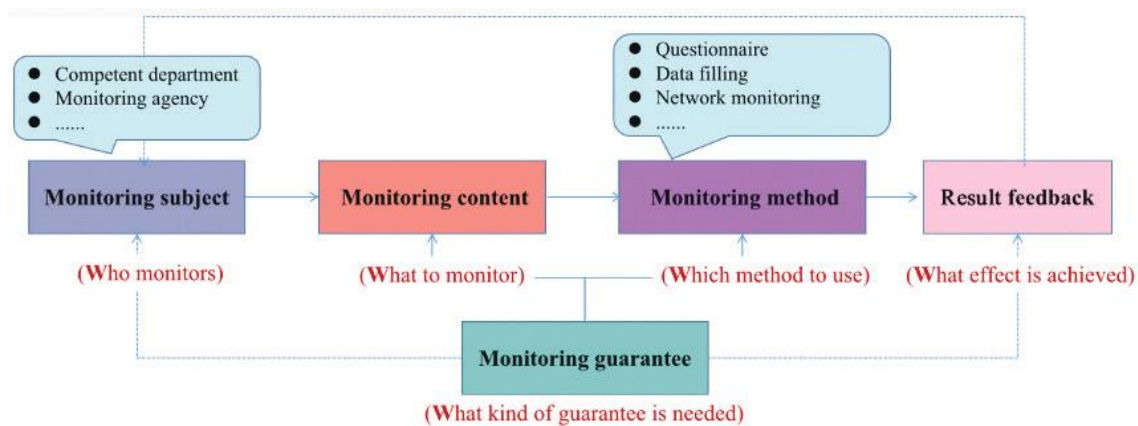


Figure 1. Cyclic Model for Dynamic Monitoring of Community Education

(1)Monitoring subject subsystem: The prosperity and development of social education often involve multiple stakeholders such as the competent department, social organizations, and research institutions. In order to realize the all-round and multi-angle monitoring and evaluation of community education, the monitoring subjects also need to be composed of the competent department, social organizations, research institutions and other parties, among which the competent department is the main monitoring subject, responsible for comprehensive monitoring of community education development in order to formulate corresponding policies and measures. Social organizations are mainly responsible for the implementation and organization of community education, and provide useful references for government decision-making by monitoring and evaluating the actual situation of community education. Research institutions are responsible for research and discussion on the theory and practice of community education, and usually provide strong support for the improvement of community education through monitoring and evaluation. Relevant departments, academic research institutions, industry associations, etc. participate together to realize the sharing and exchange of monitoring data. At the same time, it is necessary to establish a special monitoring agency to be responsible for the collection, collation and analysis of monitoring indicators, and to form monitoring reports and policy recommendations.

(2) Monitoring content system. Establish an indicator system covering all areas of community education, including indicators on the number of students, the strength of teachers, and learning outcomes. Carry out research and collect data according to the indicator system, regularly update indicators, and improve indicator analysis methods and evaluation standards.

(3) Monitoring method system. Applicable to different community education fields and target objects, establish a diversified monitoring system, including questionnaires, field visits, statistical analysis, case analysis, network monitoring, etc., as well as qualitative and quantitative monitoring methods, so as to obtain more real and comprehensive monitoring data.

(4) Monitoring result feedback system. Establish a system for feedback and utilization of monitoring results, and timely feedback the monitoring results to government departments at all levels and community education institutions to form policy recommendations and improvement measures for reference. At the same time, it is necessary to establish a long-term mechanism to make effective use of monitoring results and promote the sustainable development of community education.

(5) Monitoring guarantee system. Establish a scientific and reasonable monitoring policy system, clarify the direction and goals of community education development, and formulate corresponding monitoring policies and measures. The policy system should include community education development planning, community education quality evaluation standards, community education subsidies and incentive policies, etc.

4.2. Indicator dimensions: four-dimensional CIPP-based indicators

The CIPP evaluation model designed to systematically guide both evaluators and stakeholders in posing relevant questions and conducting assessments at the beginning of a project (context and input evaluation), while it is in progress (input and process evaluation), and at its end (output evaluation), which is an objectives-based approach in quasi-evaluation category mainly concerned with the final retroactive evaluation of whether a set of objectives has been met (Zhang & Zeller et al., 2011). A survey by American Society for Training and Development members found that the CIPP model was preferred over other evaluation models (Galvin, 1983). Referring to the concept of CIPP, we also evaluate and monitor the development of community education from four dimensions: context, input, process and output in this study.

(1) Context: the scale of community education development; it mainly measures the development of community education and the overall participation, which can reflect the popularity of community education in the region and the distribution of resources, and generally includes participation indicators at the vertical level, such as the number of applicants for community education courses, participation rate, etc., and coverage indicators at the horizontal level, mainly refer to the population and scope covered by the community education platform, such as the overall scale of the community education platform, the number of schools or institutions of each level and category, and the size of the teaching staff.

(2) Input: the investment in the development of community education; it mainly includes capital investment, personnel investment, etc., and the capital investment can be divided into various forms of education funds such as financial allocation, social donations, and tuition income, which can comprehensively reflect the community education. Input status, while personnel input includes the number of personnel at all levels and types involved in community education.

(3) Process: the quality of community education development; it mainly measures the frequency and depth of community education implementation, which not only reflects the process quality but also takes into account the result quality such as user evaluation and experience, so as to fully reflect the education quality of community education, generally including activity organization indicators such as The number and types of community education activities organized, resource utilization indicators, resources used to carry out offline and offline community education activities, such as venues, equipment, teacher resources, etc. occupied by community education activities, as well as their utilization rate, satisfaction, etc.

(4) Output: the benefits of community education development; it mainly refers to the social benefits and economic benefits obtained by carrying out community education. Among them, social benefits mainly refer to the implementation of community education activities and the social effects generated. Generally, the influence and dissemination power of community education can be used, learning ability and other indicators.

5. Results and Discussion

Based on the community education indicator framework obtained from the above research, we took Jiangsu Province, China as a case study, and selected and determined the indicators. Community education in Jiangsu Province is under the overall planning of Jiangsu Community Education Guidance Center, organized by

community education organizations at all levels, and carried out online and offline through the “Jiangsu Learning Online” public welfare education platform. In this case study, the community education monitoring indicators we finally adopted are shown in Table 1.

Table 1. The Community Education Monitoring Indicators of Jiangsu Province

Dimension	Indicator	Connotation
Scale	Number of registered students on the platform	Registered numbers of “Jiangsu Learning Online” community education platform
	Registered learners source community	The number of communities where the registered personnel of “Jiangsu Learning Online” community education come from
Quality	Number of community education activities	Number of projects holding community education activities
	Number of community educational activity organizations	Number of institutions offering community education activities
	Number of beneficiaries of community education activities	Number of beneficiaries of community education activities
	Number of personnel in community education activities	Number of workers engaged in community education
Performance	Frequency of community education activities	Frequency of community education activities
	Community Education Dissemination Power	Performance data of community education dissemination power in various regions released by “Jiangsu Learning Online”
	Community Education Learning Ability	“Jiangsu Learning Online” released the performance data of community education learning ability in various regions
	community education research	Performance data of community education research capabilities in various regions released by “Jiangsu Learning Online”

In this part, we mainly discuss the results of monitoring community education in case studies, including three aspects, one is the key indicators affecting the development of community education, the other is the important characteristics of community education development, and the third is the development of community education based on data monitoring suggestion.

5.1. Regional Community Education Development is Strongly Influenced by the Size of the Participant Population

Based on the entropy weight method, we calculated the information entropy value, information utility value and weight coefficient of each indicator, as shown in Table 2. It can be seen that the weight coefficient of the source community of the learner is relatively high, accounting for more than 30% of the overall weight, indicating that the numerical value of the communities where social learners are distributed in different regions has a large difference. However, the size of the population in each region is very different, which may also lead to a large difference in the number of communities in each region. Considering that the number of communities where social learners are distributed may be affected by the size of the regional resident population, the total number of distributed communities of learners registered on the “Jiangsu Learning Online” platform in each city and the resident population of each city were tested for Pearson correlation. The results show that the correlation coefficient between the resident population of each city and the source community of community learners is 0.072, which is close to 0, and the p value is $0.814 > 0.05$, thus indicating that there is no relationship between the source community of community learners and the resident population. The correlation relationship also basically excludes the judgment of community education scale indicators that are affected by the differences in the size of the population in each region. The above results also indicate to a certain extent that there may be a large gap in the level of promoting the construction and application of community education platforms in various regions, especially in the promotion of registration applications.

Table 2. Community Education Indicator Related Value of Jiansgu Province

Indicators	Information entropy value e	Information utility value d	Weight coefficient w
Number of registered students on the platform	0.8469	0.1531	8.60%
Registered learners source community	0.3253	0.6747	37.92%
Number of community education activities	0.9875	0.0125	0.70%
Number of community educational activity organizations	0.9912	0.0088	0.49%
Number of beneficiaries of community education activities	0.6548	0.3452	19.40%
Number of personnel in community education activities	0.9702	0.0298	1.68%
Frequency of community education activities	0.9234	0.0766	4.30%
Community Education Dissemination Power	0.7436	0.2564	14.41%
Community Education Learning Ability	0.9831	0.0169	0.95%
community education research	0.9489	0.0511	2.87%

5.2. The Hierarchical and Territorial Character of The Development of Community Education is Evident

According to the ranking results of TOPSIS evaluation and development index calculation (as shown in Table 3), it can be seen that the ranking results of TOPSIS evaluation and development index calculation are basically similar. That is to say, the development index can reflect to a certain extent the extent to which each region is closest to the ideal method.

In order to better explore the development characteristics of community education in various regions, we use the method of cluster analysis to process the relative proximity C_i and development index in Table 3. According to the results of cluster analysis, we divided the cities in the research sample into three gradients: the first gradient includes one city (Wuxi) with a development index greater than 5, indicating that Wuxi's community education development level is excellent; the second gradient includes 2 cities (Huaian & Suzhou) with a development index between 1 and 5, that means those cities' community education development level is midum; the remaining 10 cities' development index are all less than 1, by contrast, the development of community education in these cities is extremely super. From above results, it clearly shows that there are also obvious hierarchical characteristics in the field of community education in different cities.

Table 3. TOPSIS Evaluation Results and Development Index Calculation Ranking in Each Region

City	Positive ideal solution distance d+	Negative ideal solution distance d-	Relative proximity c	Sort results	Development Index	Index sort
Xuzhou	4.227	0.030	0.007	12	0.192	13
Changzhou	4.131	0.304	0.069	5	0.693	5
Wuxi	0.817	4.147	0.835	1	5.962	1
Nanjing	4.164	0.090	0.021	11	0.309	11
Lianyungang	4.206	0.092	0.021	10	0.342	10
Suqian	4.224	0.029	0.007	13	0.196	12
Huaian	3.635	0.663	0.154	3	1.141	3
Yancheng	4.139	0.213	0.049	6	0.598	6
Taizhou	4.053	0.366	0.083	4	0.874	4
Nantong	4.198	0.131	0.030	8	0.417	9
Zhenjiang	4.179	0.108	0.025	9	0.430	8
Yangzhou	4.169	0.147	0.034	7	0.451	7
Suzhou	4.066	0.852	0.173	2	1.395	2

Based on the level of community education development in each city, combined with its geographic location to draw the heat map of community education development in each city (shown in Figure 2), the figure shows that the level of development of community education as a whole shows the trend of increasing from north to south according to the geographic location, which is basically the same as the overall trend of increasing from north to south of the economic level of Jiangsu Province. According to geographic location, which is basically consistent with the overall trend of the economic level of Jiangsu Province improving from north to south. From the perspective of socio economics, the development of regional community education must be driven by various supporting factors such as sufficient capital investment, good personnel, and high-frequency activity organization. In addition, the rapid development of the social economy has stimulated more diverse and personalized lifelong learning needs of social personnel, leading to further upgrading of community education. This phenomenon also reflects the long-standing problem of regional inequality in education. Similarly, there are still regional imbalances and differences in community education. This is also a key research topic that needs to be broken through in the field of community education.

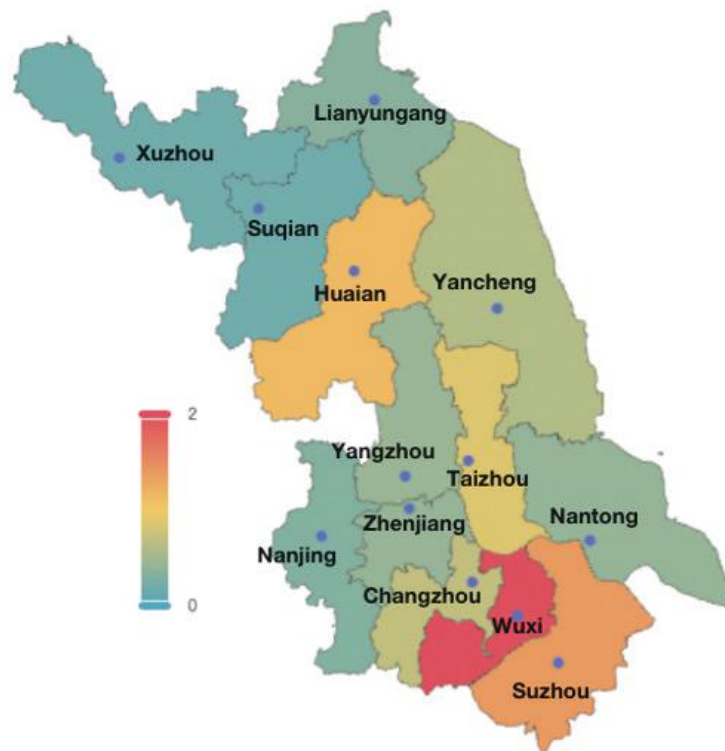


Figure 2. Heat Map of CED by City

5.3. Focusing on the Scale of Development is a Distinctive Feature of the Development of Community Education in China at this stage

In order to further study the development of social education in various regions in various dimensions, we draw a heat map of the development of social education in 13 regions of Jiangsu Province according to the three dimensions of “scale, quality, and performance” (shown in Figure 3). In the Figure, the darker the color, the better the development. Through the heat map, we can intuitively observe that community education is better than other dimensions in the scale dimension, and the performance dimension is relatively poorly developed. The above results also show to a certain extent that the current development of community education in China is still in a rough development mode that emphasizes large-scale development, and lacks the tendency to more refined development such as performance.



Figure 3. Heat Map of CED by City and Dimension

We use correlation analysis to explore the correlation between scale, quality and performance dimensions, and use the Pearson correlation coefficient to indicate the strength of the correlation. Specific analysis shows that the correlation coefficient between scale and quality is 0.779, and it shows a significance level of 0.01, thus indicating that there is a significant positive correlation between scale and quality. The correlation coefficient value between scale and performance is 0.472, which is close to 0, and the p value is $0.104 > 0.05$, thus indicating that there is no correlation between scale and performance. The above data analysis results also gave us some enlightenment for the development of community education, that is, there may be interactions between different dimensions of community education. In the process of seeking innovative development of community education in practice, we must fully consider the balanced development of various elements of community education based on the perspective of system theory.

5.4. Discussion of Proposals for Monitoring the Quality of Community Education Development

As Earl and Katz (2006) aptly state: ‘Accountability without improvement is empty rhetoric, and improvement without accountability is whimsical action without direction. In nowadays data-rich digital era, using data to promote the high-quality development of community education, the competent authorities should firstly establish a sound community education responsibility system and management system, and formulate by-laws including community education supervision, quality assessment, rectification, reward and punishment mechanisms, etc., so as to provide a basis for guaranteeing the sustainable development of community education. Secondly, the authorities should also strengthen the digitization of community education, give full play to the potential and advantages of big data decision-making, and continuously improve the data literacy of community educators. Finally, community education organizations should actively expand their cooperation activities, attract more forces to participate in the supervision and monitoring process of community education, establish monitoring standards and systems with regional characteristics and standardization, and promote the standardization and long-term development of community education.

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133-A Study on the Diversification of Teaching Methods in KNOU Graduate School

Kim Sanghong¹

Abstract

Currently, KNOU graduate school offers a total of about 160 courses per semester, but the majority of classes are uniformly taught in the form of 13-week multimedia video lectures and offline course seminars, excluding midterm and final exam weeks, which does not reflect the diverse academic characteristics of each course. Therefore, it is necessary to diversify the content production method and online education teaching method according to the characteristics of the subjects. The purpose of this study is to diversify graduate content production and class operation methods so that professors in charge of subjects can select and operate learning methods that are suitable for graduate classes at distance universities and meet the characteristics of various subjects. For this purpose, we investigated the cases of other distance graduate classes at home and abroad, and summarized and drew implications on teaching methods, blended teaching strategies, and real-time interactive teaching systems. In addition, to analyze the current situation of graduate class operation at KNOU, a survey was conducted with 173 instructors who are currently graduate classes. The questionnaire consisted of 6 questions on graduate class content production and operation, 7 questions on graduate learner evaluation and interaction, and 4 questions on graduate class methods and teaching strategies, and the survey was conducted to secure the current status of graduate class operation and the feasibility of diversifying graduate class methods. Based on the survey results and examples of graduate classes in KNOU, we derived a model for diversifying graduate teaching methods by dividing them into three categories: content creation methods, class models, and class operation methods that fit the characteristics of the subjects. In other words, we suggest ways to diversify content creation methods suitable for graduate classes outside the existing framework of one-way multimedia video lectures, class models summarize models derived from graduate class cases and surveys, and class operation methods derive ways to diversify teaching strategies and operation methods for interactive classes by moving away from one-way online classes. After analyzing the opinions on diversifying content production methods expressed in the survey, interviews with instructors, and examples of graduate classes in KNOU, it was found that there are four main types of content production methods. The four types of content production methods were categorized as DMC content production, self-instructor content production, multimedia content production, and content convergence production. As for the teaching-learning design of graduate classes, based on instructors' teaching practices and surveys, graduate classes were categorized into knowledge transfer classes, functional practice classes, discussion classes, and collaboration-oriented project classes. In terms of class operation methods, online classes and blended classes are divided into content lectures, real-time interactive classes, and content lectures online interactive classes, and blended classes are divided into flipped learning, blended classes, and convergence classes to diversify teaching methods by subject.

Keywords: Graduate school, KNOU, Teaching Methods, operation methods, content-creation methods

1. Introduction

In the current academic landscape, KNOU's graduate school, encompassing 19 departments, and its business graduate school offer approximately 160 courses each semester. However, a significant majority of these courses are standardized, employing a 13-week multimedia video lecture format, excluding midterm and final exam weeks, and offline subject seminars. This uniform approach fails to capture the diverse academic characteristics inherent to each course. There is an evident need to diversify content creation and online education methodologies to better align with the unique attributes of individual courses.

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Graduate courses should not merely replicate the undergraduate model of content delivery and evaluation. Given the distinct educational objectives of graduate studies, it is imperative to adopt a differentiated teaching approach from that of undergraduate courses. This calls for the development and diversification of effective content creation methods and online teaching strategies tailored for graduate studies. The foundation should be laid such that professors in charge of courses can select and implement teaching methods that best fit the characteristics of their respective subjects.

The primary aim of this research is to explore diverse content creation and teaching methodologies suitable for KNOU's graduate courses. This will empower course professors to choose and operate teaching methods that align with the distinct attributes of their subjects.

2. Research Content

Strategies for KNOU Graduate Online Education: We delineated the teaching strategies for KNOU's graduate online education based on the roles of instructors in an online learning environment. This was further segmented into four main components and key teaching strategies: fostering a sense of community, team activities, evaluations, and roles of instructors and tutors.

Strategies for Remote Graduate Online Courses: We proposed strategies that can be employed in remote graduate online courses, categorized into monitoring learning processes, feedback, cooperative learning, and evaluations.

Comparative Analysis of Remote Graduate Courses: An investigation was conducted into the teaching methodologies of remote graduate courses both domestically and internationally. This encompassed course structures, blended learning strategies, and real-time bidirectional teaching systems. Implications for KNOU's graduate school were derived from this analysis.

Case Study of Innovative Online Courses: We analyzed the teaching methodologies and operational systems of the Innovation Academy and Minerva School. Special attention was given to Minerva School's major fields, yearly educational objectives, the 'Forum' teaching platform, course flow, structure, teaching methods, main platform features, operational procedures, and objectives. This analysis aimed to derive methods to diversify courses at KNOU's graduate school.

Experimental Case Study at KNOU: We examined the operational cases of courses such as "Food and Culinary Science," "Fashion Design Studio," and "Statistical Inference" at KNOU's graduate school. This involved analyzing diverse teaching examples, models, and innovative evaluation methods.

Survey on KNOU Graduate Course Operations: A survey was administered to 173 faculty members currently teaching graduate courses at KNOU. The survey aimed to understand the current state of graduate course operations and validate the need for diversifying teaching methodologies.

Diversified Graduate Course Model: Based on the survey results and KNOU graduate course case studies, we categorized our findings into content creation methods, course models, and course operation strategies. This emphasized the need to move beyond the conventional one-way multimedia video lectures and typify content creation methods suitable for graduate courses.

Content Creation Methods: We proposed various content creation methods such as DMC content creation, single instructor content creation, multi-content utilization, and integrated content creation. This aimed to reduce the burden of content creation on instructors and guide them towards diverse content creation and utilization.

Teaching and Learning Activities: Based on surveys and course examples, we categorized teaching and learning activities into lecture-centric, functional practice-centric, discussion-centric, and collaborative project-based learning. A detailed analysis of the course procedures and strategies is necessary.

Graduate Course Operational Methods: We differentiated between online course methods and blended course methods. Online methods were further divided into content lecture type, online bidirectional type, and content lecture + online bidirectional type. Blended types were categorized into flipped learning, blended courses, and integrated courses, with detailed explanations for each.

Course Strategies and EdTech Utilization: We derived strategies and EdTech utilization methods suitable for each course's characteristics. This involved analyzing the functionalities of the graduate LMS being developed under the U-KNOU campus enhancement project and designing features for online bidirectional courses.

3. Method of Research

Objective: The primary aim of this research is to develop and diversify effective teaching methodologies suitable for graduate courses in remote universities. This will empower course professors to select and implement teaching methods that best fit the characteristics of their respective subjects, thereby facilitating the creation of tailored content and diversified course operation strategies.

Preliminary Literature Review: An extensive review of existing literature was conducted to understand the current landscape of content creation and diverse teaching methodologies.

Expert Consultations: Internal expert consultations and external expert advice were sought to gain insights into best practices and potential areas of innovation in content creation and course operation.

Case Study Analysis: We undertook a detailed analysis of specific case studies to understand the practical applications of various teaching methodologies. This helped in identifying the nuances and intricacies of real-world implementations.

Graduate Course Diversification Model: Based on the survey results and case studies from broadcast university graduate courses, we categorized our findings into three main areas: content creation methods tailored for individual course characteristics, course models, and course operation strategies. The objective was to move beyond the conventional one-way multimedia video lectures and introduce diversified content creation methods suitable for graduate courses. The course models were derived and refined based on the graduate course examples and survey responses. In terms of course operation strategies, we emphasized the need to transition from the traditional unidirectional online courses to bidirectional teaching, thereby diversifying teaching strategies and operational methods.

4. Analyze Lesson Cases

4.1. Analysis of the [Food and Culinary Sciences] Course at KNOU Graduate School

Course Objective: The [Food and Culinary Sciences] course delves into the scientific theories of food and culinary science. It aims to cultivate logical thinking and investigative skills by having students conduct related experiments and draft research reports.

Course Design Considerations: Given the remote nature of the university's courses, a distinct teaching approach from traditional hands-on experimental courses is required. Additionally, there's a wide variance in students' prior knowledge, necessitating a flexible course design.

Course Structure: The course is structured into basic and advanced learning segments, with the former focusing on theory and real-world examples, and the latter utilizing recent research papers. A project-based approach is adopted, where students select research topics, engage in team discussions using LMS and ZOOM, and undergo the entire research process from design to report submission.

Teaching Methods: Until 2019, offline experimental sessions were conducted, which were highly appreciated by students. However, in 2020, due to constraints, online seminars replaced these sessions, focusing on research paper discussions and writing techniques.

Student Evaluation: The grading is broken down as follows: Class Participation (20%), Quizzes (10%), Research Paper (30%), Mid-term Report (10%), and Final Report (30%). Participation includes video lecture engagement and team discussions or peer evaluations.

Future Recommendations: While the course is primarily online, integrating hands-on experimental sessions with various research equipment is deemed effective. Adjusting the media lecture schedule to allow for more real-time online seminars or offline experimental sessions is recommended for enhancing the course's effectiveness.

4.2. Analysis of the [Fashion Design Studio] Course

Objective: The ultimate goal is to cultivate creative fashion design skills. The course design is based on the HPL framework, focusing on learners, knowledge, evaluation, and community-centered environments.

Learner-Centered Environment: While the remote course content is standardized, design practices are tailored to individual learners. At the start of the semester, the instructor assesses each student's design knowledge, skills, work experience, and current job to provide personalized guidance during design projects.

Knowledge-Centered Environment: The design practice is crucial for achieving the course's ultimate goal. Students are encouraged to design and create outside the online classroom. The design process is based on a four-stage model, ensuring students understand each stage's concept. The course also provides a wealth of information to motivate learners, using various media like text, videos, and images.

Evaluation-Centered Environment: Given the limitations of remote learning, formative evaluations are emphasized. Students receive feedback multiple times, allowing for continuous improvement. The course uses a virtual design studio where everyone can view others' work and share feedback.

Community-Centered Environment: Building an active online community is essential for remote learning. The course encourages interaction between instructors and students and among students themselves.

Course Structure: Students can access the course a week before it starts. The course content is provided in 13 modules, sequentially delivered each week. Weeks 8 and 15 are reserved for assignments and project progress. Each module offers VOD-based lectures and text content, with external blog links. Offline sessions are held twice a semester for project orientation and final critique.

Evaluation: The grading consists of four small assignments (10% each), a semester-long art costume project (50%), and class participation (10%). The art costume project is divided into four stages, with each stage having a specific duration and set of deliverables.

Use of Blogging Tool: The course utilizes a blogging tool compatible with mobile apps and PCs. Students share their project progress weekly on the blog, and participation is encouraged through mandatory commenting on peers' posts.

Course Effectiveness: The combination of the blog and mobile app with the traditional LMS enhanced two-way communication. The course's design, which combined various content types with practical exercises, provided students with diverse stimuli and challenges. The use of the flipped learning approach, where online content is provided in advance and class time is focused on discussions or practical work, is suggested for future iterations.

Benefits of Blogging: The blog facilitated two-way communication, compensating for the limitations of asynchronous remote education. It provided opportunities for peer learning and allowed for flexibility in instruction based on student progress and characteristics. The blog also served as a record of feedback and facilitated formative evaluations.

4.3. Analysis of the [Statistical inference] Course

Objective: [Statistical inference] is a theoretical statistics course that delves into the principles of statistics using mathematical proofs and extensions. The course aims to understand probability distributions and the principles of statistical estimation and testing based on mathematical foundations.

Student Background: Many students in the Department of Bioinformatics and Statistics graduate school have gaps in their mathematical and statistical knowledge compared to general graduate statistics students. This necessitated changes in the course content and assignment formats of [Statistical inference].

Course Content & Features: The course typically focuses on understanding statistical principles through mathematical proofs and computations. It covers probability distributions and statistical principles, using mathematics (like calculus) for problem-solving. However, students with limited mathematical knowledge find it challenging, leading to potential dropouts.

Course Design: Considering the background of Department of Bioinformatics and Statistics graduate students, the course incorporated mathematical software tools like wxMaxima and Wolfram Alpha for problem-solving. Additionally, students were introduced to statistical principles through computer coding (mainly R) and simulations.

Content Development: The course is divided into probability theory (lectures 1-7) and inference theory (lectures 9-14). A comprehensive 212-page lecture note, including problem solutions and various codes, was provided. The course content was designed to emphasize conceptual understanding and problem-solving.

Teaching Methodology: The course was designed to provide a comprehensive understanding of theoretical statistics. It emphasized the historical significance of statistical concepts, problem-solving both manually and using mathematical software, and understanding statistical phenomena through R-based simulations.

Resource Availability: Codes related to theoretical statistics problem-solving using wxMaxima and simulations using R were organized and made available on Github for all students.

Evaluation Method: Given the lecture style of [Statistical inference], which combines traditional statistical education with R-based simulations and wxMaxima-based problem-solving, the assignments were designed to include:

- * A video presentation on the history of theoretical statistics.
- * Problem-solving using mathematics.
- * Understanding statistical concepts through simulations.

Assignments were conducted about three times, with the midterm focusing on drawing distribution correlations by hand, and the final exam involving comprehensive problem-solving.

Video Presentation: Students were required to create a 5-10 minute video summarizing a statistical book or a figure in statistics and post it on the Naver cafe “A world of statistics.” This approach allowed for social learning, where students could learn in-depth about various statistical concepts and history by watching each other’s videos. These videos also serve as a lasting memory of their learning even after graduation.

5. Diversification Model for Graduate School Teaching Methods

5.1. Content Creation & Teaching Method Tailored to Course Characteristics:

Surveys of graduate school professors and case studies of several graduate courses indicate a need to move beyond the traditional one-way multimedia video lectures and categorize content creation methods suitable for graduate courses.

Currently, the DMC of the broadcasting university limits graduate courses to a standardized 13-session video format, potentially misrepresenting that one-way content delivery is the entirety of graduate education.

Some professors, as per the survey results, are already moving away from content-centric methods and are concurrently conducting real-time online interactive classes.

In the case of a course from the College of Education and Science’s 00 Department, content is briefly filmed only for essential knowledge transfer, with the course being interaction-centric on the LMS.

Analysis of content creation diversification opinions from surveys, professor interviews, and case studies of broadcasting university graduate courses revealed four main types of content creation.

These four content creation methods can be categorized as DMC content creation, solo professor content creation, multimedia content creation, and integrated content creation.

Design of Teaching and Learning in Graduate Courses:

Based on professor case studies and surveys, graduate courses can be categorized into knowledge transfer classes, functional practice classes, discussion and debate classes, and collaborative project classes.

In terms of course operation, they can be broadly divided into online course types and blended course types.

Online courses can be further divided into content lecture type, real-time interactive type, and content lecture + online interactive type.

Blended courses can be categorized as flipped learning type, standard blended type, and integrated type.

In essence, the teaching method for graduate courses can be diversified by combining content creation methods, teaching-learning activities, and course operation methods tailored to course characteristics. This model can be visualized as [Figure 1].

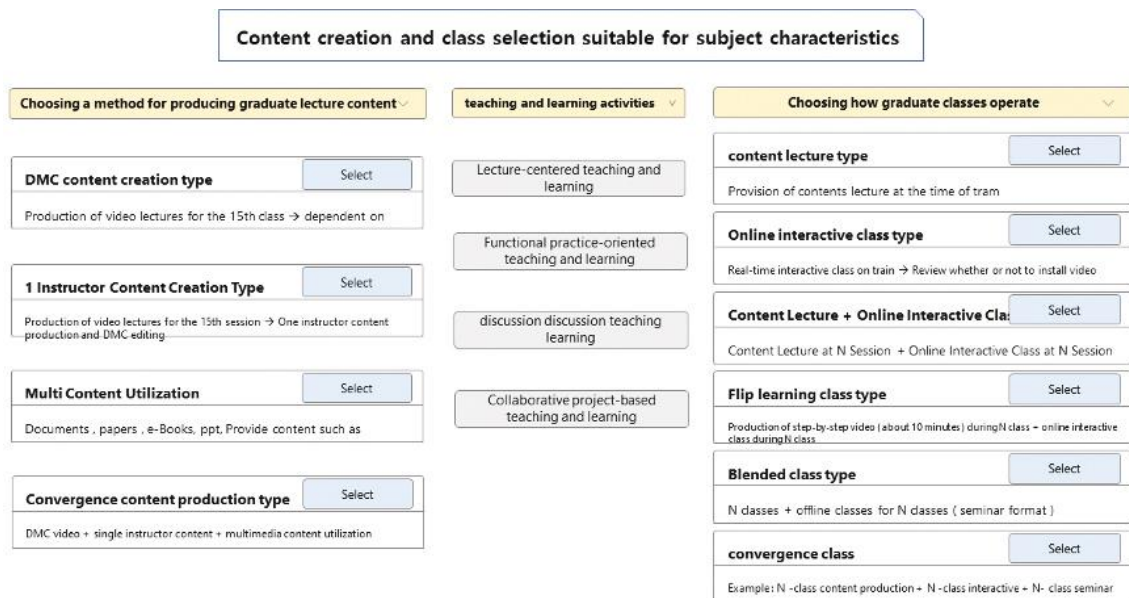


Figure 1. Diversification Model for Graduate School

5.2. Diversification of Graduate Lecture Content Creation Methods

Diversifying Graduate Lecture Content Creation Methods:

There's a need to move beyond the traditional one-way multimedia video lectures and categorize content creation methods suitable for graduate courses. Depending on the content creation method for graduate lectures, they can be categorized into DMC content creation type, solo professor content creation type, multi-content utilization type, and integrated content creation type.

DMC Content Creation Type:

This is the most basic method utilized in graduate schools based on DMC content creation. It offers advantages like high-quality video production and systematic content design and creation. It supports course and content design activities, evaluations, interactions, learning management, and data management.

Solo Professor Content Creation Type:

This method involves a single professor creating content using tools like PowerPoint, OBS Studio, and Explain Everything. The basic recording is done by the professor, while tasks like intros, outros, and subtitles can be supported and edited by DMC.

Multi-Content Utilization Type:

Beyond video content, this method incorporates various resources such as research papers, reports, e-Books, PowerPoint presentations, external MOOC videos, etc.

It provides a rich array of content and resources to students.

Integrated Content Creation Type:

This method combines various types like DMC content creation, solo professor content creation, and multi-content utilization. Professors can integrate and utilize these types in diverse ways to enrich their course offerings.

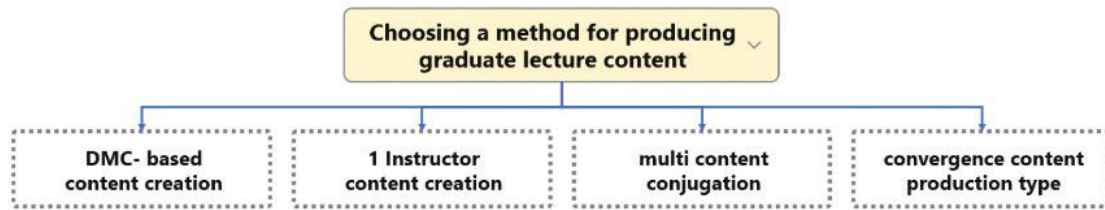


Figure 2. Select a method for contents create

5.3. Diversifying Graduate Course Operation Methods

Graduate course operation methods can be broadly categorized into two main types: Online Course Type and Blended Course Type.

Online Course Type:

This type can be further divided into:

Content Lecture Type: This is a traditional online lecture format where content is delivered primarily through pre-recorded videos.

Real-time Interactive Type: This method involves live online sessions where students and professors interact in real-time.

Content Lecture + Real-time Interactive Type: This combines the traditional online lecture format with live interactive sessions, offering a mix of pre-recorded content and real-time discussions.

Blended Course Type:

This type can be further divided into:

Flipped Learning Type: Traditional in-person lectures are replaced by pre-recorded online videos. Classroom time is then used for interactive exercises, projects, and discussions.

Blended Course Type: This method combines online digital media with traditional classroom methods. It requires the physical presence of both teacher and student, with some element of student control over time, place, path, or pace.

Integrated Course Type: This method integrates various teaching methods and tools, both online and offline, to provide a comprehensive learning experience.

A visual representation of the diversification of graduate course operation methods can be seen in [Figure 3].

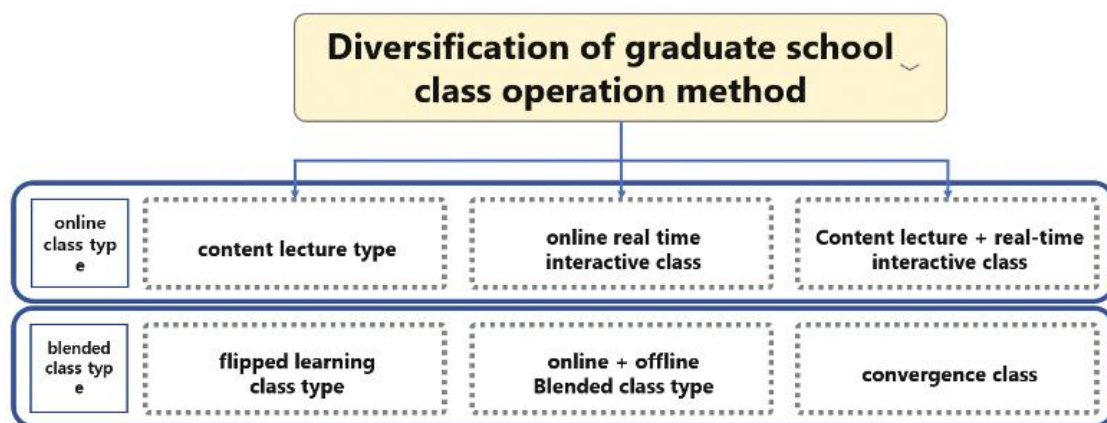


Figure 3.

Diversifying Graduate Course Operation Methods:

Online Course Type:

Content Lecture Type: This method, similar to undergraduate courses, offers 13-15 sessions entirely through pre-recorded content. It's the most common operation method in broadcasting universities.

Real-time Interactive Type: Using tools like Zoom, Webex, and Google Meet, this method schedules real-time interactive sessions. While it offers the advantage of unrestricted time and location for online classes, the fixed schedule might be burdensome for some graduate students.

Content Lecture + Real-time Interactive Type: This hybrid approach combines pre-recorded content with scheduled real-time sessions. It's a practical solution since conducting all sessions in real-time might be unfeasible.

Blended Course Type:

Flipped Learning Type: Essential knowledge is delivered through short videos (5-10 minutes), with the remaining time dedicated to real-time online interactions or interactions within the LMS.

Online + Offline Blended Type: This method combines online content or real-time sessions with offline workshops. The offline sessions complement the online ones, enhancing the students' understanding.

Integrated Course Type: This flexible approach allows professors to tailor the course according to its requirements. For instance, out of 15 sessions, two can be 45-minute content lectures, seven can adopt the flipped learning approach with 10-minute videos followed by LMS interactions, four can be real-time interactive sessions, and the remaining two can be offline workshops.

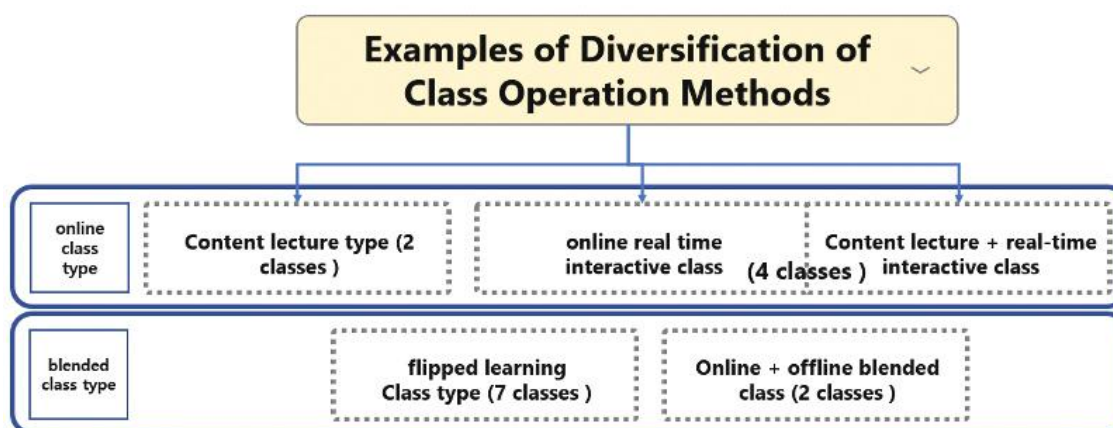


Figure 4. Example of diversification of class operation method

6. Result

Based on the conclusions drawn from this study, in order for graduate school course methods to diversify, there needs to be institutional improvements related to lecture production support, amendments in regulations related to periodic seminars, and a consensus among members.

In other words, even without the development of 45-minute lecture content that was produced in DMC's 13 lectures, there needs to be institutional improvements and support to develop and operate graduate courses. This means that the professor in charge of the course should plan the content development and lecture operation methods suitable for the nature of the course in advance. Once the plan is approved by the graduate school, appropriate support should be provided. Various activities related to course operation (offline seminars, Zoom real-time lectures, etc.) should all be recognized as lecture operation hours.

In the case of our university, which does not have a separate teaching and learning support center, there is a need to regularly organize workshops or special lectures for instructors so that they can utilize various emerging edtech tools. In addition, workshops related to the production of individual lecture video content should be held, so that graduate lecture content can be updated and refined in line with the changing times, necessitating institutional support from the school.

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137-Practicing Constructivism Learning Theory in Online Learning

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Abstract

This study aims to elaborate on the use of principles of constructivism learning theory to conduct effective online learning. The integration of constructivism learning theory and the promising features of online learning is expected to create an effective learning environment that can support students' learning process in open and distance learning. Effective and efficient online learning programs require well-designed course content, motivating interaction between the instructor and learners, and well-prepared, and fully supported instructors. Systematic steps and approaches to the research and development model were used to create effective constructivist online learning for students of open and distance learning. The consecutive steps of research and development include 1) identifying the instructional goals 2) Conducting instructional analysis 3) Analysing learners and contexts 4) writing performance objectives 5) Developing the assessment instrument 6) Developing instructional strategies 7) Developing and selecting instructional materials 8) Design and conducting a formative evaluation of instruction 9) Revise instruction based on poor test items and/or poor or unsuccessful instruction methods. The result of the study indicates that the use of constructivism learning theory enhances students' learning achievement in online learning. In addition, the use of the constructivist approach facilitates the students to build the learned substance of the course.

Keywords: *Constructivism, learning theory, online learning.*

1. Introduction

The existence of the computer and internet technology triggers the use of many new modes of learning. The terms of e-learning which is defined as the instructions delivered through digital devices with the intent of supporting learning include online learning, blended learning, massive open online course (MOOC), and flipped classrooms. Recently, these new modes of learning are used by many educational institutions to convey the substance of the courses or programs. These modes of learning provide both students and faculty with chances to explore the available rich learning content.

The use of online learning provides a wide opportunity for students to study a wide range of learning resources. In addition, the online learning program enables the students to interact with the instructors and peers intensively. This kind of learning interaction will open a chance for the students to develop the required knowledge and skills.

The online learning program must be designed and developed systematically to support the students to gain knowledge and skills. The relevant learning and appropriate strategy have to be applied to facilitate students to achieve predetermined learning outcomes. Besides, the potential features of web-based learning technology have to be used to create students' learning engagement.

One of the indicators of online learning success is active student engagement in the learning process. The involvement of the students in intensive interaction will enhance the learning process. In online learning, the students have to interact with a lecturer, peer students, and learning materials. In this sense, the student's learning engagement can be considered a factor that initiates the process of learning.

Online learning is considered the newest and most popular form of distance education today. In recent years, many open and distant learning institutions have used the online learning mode to deliver course content to their students. The use of online learning is expected to provide significant support to students' learning process.

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Effective and efficient online learning programs require well-designed course content, motivating interaction between the instructor and learners, and well-prepared, and fully supported instructors. Some studies concerning the use of online learning programs indicate that the students who took all or part of their classes online performed better, on average than those taking the same course through traditional face-to-face instruction. This paper will elaborate on the use of constructivism based on an online learning program to support the student's learning process to build the required knowledge and skills.

1.1. Purpose of the Study

This present study is aimed to design and develop an online learning program that implements the principles of constructivist learning theory. The integration of constructivism learning theory and the promising features of online learning is expected to create an effective learning environment that can support students' learning process.

1.2. Research Question

This present study elaborates on the use of the constructivism learning theory in conducting online learning programs. Is the constructivism learning theory applied to online learning programs able to facilitate the students to build knowledge and skills? This research question was explored in this present study study.

2. Literature Review

2.1. Constructivism Learning Theory

Constructivism is a theory that is based on observation and scientific study about how people learn. The basic premise of the constructivist learning theory is that people are said to learn when they have gained experience from what they learn. That is, people create their meaning through experience. Constructivism is 'an approach to learning that holds that people actively construct or make their knowledge and that reality is determined by the experiences of the learner.

Constructivism theory noted that learners construct knowledge rather than just passively take in information from outside. People experience the world and reflect upon those experiences. In addition, people construct their representations and incorporate new information into their pre-existing knowledge or schemas.

The aim of learning in applying the constructivism learning theory is to facilitate the students to construct meaning through experiences. In addition, learning is also influenced by connecting prior and new knowledge. Philip (1995) in this sense noted that the prior knowledge owned by the students influences what new or modified knowledge would be constructed from new learning experiences.

Constructivism is viewed as a learning theory that is closely related to other learning concepts such as discovery and meaningful learning. The purpose of using the constructivism learning theory in learning activities is to maximize the students' comprehension. (Cruickshank, 2006, p. 255).

Woolfolk (2006) defines the constructivist learning theory as: "... View that emphasizes the active role of the learner in building understanding and making sense of information. (P. 323). Constructivism learning theory views learning as a process of building the knowledge and skills of students. To build their knowledge and skills, the students must interact with various types of learning materials that are relevant to the instructional objectives.

The objective of implementing the constructivist approach in learning activities is to provide students with specific abilities in searching, understanding, and applying knowledge and skills. Cruickshank, et.al. (2006) notes several characteristics of the constructivist approach to learning such as:

- Active learning,
- Learner should engage in authentic and contextual activities,
- Learning activities should be interesting and challenging,
- Bridging,
- The learner should think about what is being learned,
- Learning takes place best in communities of learners,
- Teacher facilitates the acquisition process of information,
- Teachers must provide learners with assistance or scaffolding.

In addition, Tam in Bada (2015) lists the following four basic characteristics of constructivist learning environments, which must be considered when implementing constructivist instructional strategies: 1) Knowledge will be shared between teachers and students. 2) Teachers and students will share authority. 3) The teacher's role is one of the facilitator or a guide. 4) Learning groups will consist of small numbers of heterogeneous students.

According to constructivists, learning is viewed as an active process. The students have to search for meaningful knowledge and information to be applied in a contextual situation. The students are not passive learning objects. They must be able to construct knowledge by connecting the instructional content to previously learned concepts.

Constructivism learning theory explains that learners consciously process and process external information regarding their background of experience. The students explore their knowledge of things and build their knowledge process. The students have to search, research, investigation, inspection the process, build their knowledge, the formation of scientific concepts, and comprehend the process of scientific methods when practicing the constructivism learning theory.

Constructivist learning theorists view learning as an active process of finding, understanding, and implementing knowledge to solve contextual problems. The students, in this matter, must be able to construct their knowledge and skills. They must be highly competent in gaining new comprehension of their learning experiences.

Honebein in Koohang, et al (2009) propose the goal of implementing the constructivism learning theory in instructional programs as follow.

- Provide experience with the knowledge of the construction process,
- Provide experience in and appreciation for multiple perspectives,
- Embed learning in realistic and relevant contexts,
- Encourage ownership and voice in the learning process,
- Embed learning in social experience,
- Encourage the use of multiple modes of representation, and
- Encourage self-awareness in the knowledge construction process. (P. 93).

Doolittle (1999) notes that constructivism posits that knowledge acquisition occurs amid four assumptions: 1) Learning involves active cognitive processing 2) Learning is adaptive 3) Learning is subjective, not objective 4) Learning involves both social/cultural and individual processes (p. 24). Learning under the constructivist learning theory differs from face-to-face teaching activities to some extent.

1. Students learn best when engaged in learning experiences rather than passively receiving information,
2. Learning is inherently a social process because it is embedded within a social context as students and teachers work together to build knowledge,
3. Because knowledge cannot be directly imparted to students, the goal of teaching is to provide experiences that facilitate the construction of knowledge.

As to teaching focuses on delivering information to students, yet constructivism argues that you cannot directly impart this information. Only experience can facilitate students to construct their own knowledge. Therefore, the goal of teaching is to design these learning experiences. (https://www.buffalo.edu/catt/develop/theory/constructivism.html#title_1308821097).

Baviskar, Hartle & Whitney (2009) noted the following main components of constructivist principles in designing lessons and classroom learning activities.

- Elicit prior knowledge,
- Create cognitive dissonance,
- Apply knowledge with feedback,
- Reflect on learning.

New knowledge is created in relation to the learner's pre-existing knowledge. Lessons, therefore, require eliciting relevant prior knowledge. Activities include pre-tests, informal interviews, and small group warm-up activities that require recall of prior knowledge.

Assign problems and activities that will challenge students. Knowledge is built as learners encounter novel problems and revise existing schemas as they work through the challenging problem. Provide students with

an opportunity to show you (and themselves) what they have learned. Activities might include presentations, reflexive papers, or creating a step-by-step tutorial for another student.

Encourage students to evaluate new information and modify existing knowledge. Activities should allow students to compare pre-existing schema to the novel situation. Activities might include presentations, small group or class discussions, and quizzes.

2.2. Online learning

Online learning is considered the latest and most popular form of distance education today. In the present years, it has had a significant impact on post-secondary education, and the trend is only increasing. Online learning is defined as education that happens over the Internet. Online learning is often referred to as e-learning among other terms. However, online learning is viewed as one type of distance learning. In this sense, distant learning is the umbrella term for some learning that takes place across a distance and not in a traditional classroom.

Horn and Staker (2010) refer to the term online learning for a wide range of programs that use the Internet to provide instructional materials and facilitate interactions between teachers and students and in some cases among students as well. Online learning can be fully online, with all instruction taking place through the Internet, or online elements can be combined with face-to-face interactions in what is known as blended learning.

Online Learning encompasses a range of technologies such as the world wide web, email, chat, new groups and texts, and audio and video conferencing delivered over computer networks to impart education. It helps the learner to learn at their own pace, according to their own convenience.

Online learning overlaps with the broader category of distance learning, which uses earlier technologies such as correspondence courses, educational television, and video conferencing. Earlier studies of distance learning summarized that these technologies were not significantly different from regular classroom learning in terms of effectiveness.

The effectiveness of implementing online learning was advocated by the United States Department of Education (2009). The results of the meta-analysis study reported that: “Students who took all or part of their class online performed better, on average than those taking the same course through traditional face-to-face instruction.”

Nguyen (2015) noted the following benefits of implementing the online program as its effectiveness in educating students, its use as professional development, its cost-effectiveness to combat the rising cost of postsecondary education, credit equivalency at the postsecondary level, and the possibility of providing a world-class education to anyone with a broadband connection.

Effective online teaching and learning requires a carefully designed classroom that promotes student engagement with faculty, peers, and course content. Cook (2022) noted some factors that determine the success of implementing online learning that include 1) the use of a system approach to course design, 2) providing professional development, 3) setting students’ expectations, 4) creating community, and 5) take advantage of the online community. (<https://www.ppic.org/blog/five-factors-successful-online-learning/>).

Fraihat, Sinclair, and Joy (2017) noted ten factors that influence or determine the success of implementing online learning such as 1) Planning, 2) Readiness, 3) Management, 4) Support, 5) Pedagogical, 6) Technological 7) Faculty, 8) Institution, 9) Evaluation, and 10) Ethics. These essential factors must be considered in implementing a successful online learning program

3. Method

The study implemented the research and development model of Borg, Gall, and Gall (2007) that adopts the systematic design of the instruction model of Dick, Carey, and Carey (2005). The model consists of nine systematic and systemic steps that include 1) identifying instructional goals, 2) analyzing instructional goals, 3) analyzing instructional goals and learning context, 4) writing performance objectives, 5) developing instructional strategy, 6) selecting and developing instructional materials, 7) selecting and developing instructional materials, 8) designing and implementing formative evaluation, 9) revising the instructional program.

This system approach of the research and development model is divided into three consecutive phases 1) design phase, 2) development phase, and 3) evaluation phase. These phases can be seen in Figure 1.

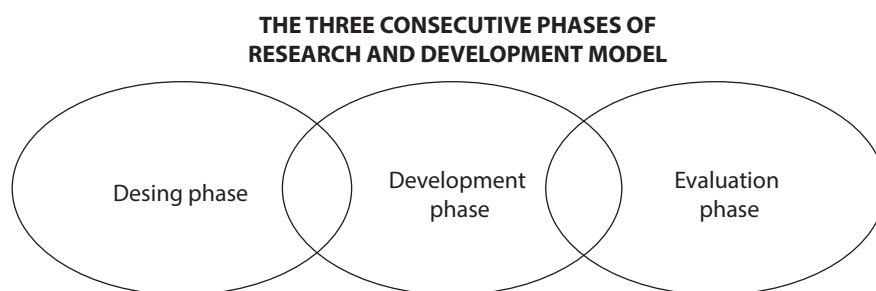


Figure 1. Three systematic and systemic phases of research and development model.

The design phase consists of designing an online learning program that integrates constructivism learning theory. An academic writing course was selected as a subject of the study. The online learning program of academic writing course was designed and implemented the constructivism learning theory. The design phase of the study was followed by developing constructivism-based instructional materials for an online academic course.

In the end, designed and developed instructional materials were evaluated formatively in the evaluation phase of the study. In this sense, formative evaluation can be defined as a kind of evaluation that finds the weaknesses of the instructional materials or program and revise them before they are used in a real learning situation.

One-to-one formative evaluations by an instructional design expert and students were used to find the major weaknesses of the constructivism-based online instructional materials. The draft of the instructional material was revised and refined before it was tried out in the next evaluation step – small group evaluation.

In this formative evaluation step, the draft of constructivism-based online learning was tried out with ten respondents who represent the intended target audiences. Finally, the program was evaluated by implementing the pre and post-test sessions to find the students' gain scores or impact of the designed and developed constructivism-based online learning program on students' skills and knowledge of the substance – academic writing.

4. Findings

In general, the use of constructivism-based online learning provided a positive impact on improving respondents' knowledge and skills in mastering the academic writing course. The design and development phase of the study were systematically done in order to produce an online program that is able to facilitate students' learning achievement of the academic writing course. The evaluation phase of the study indicated that students showed positive reactions regarding the use of constructivism-based online learning theory in the academic writing course.

The instructional design expert suggested some revisions to the draft of the program concerning the structure and learning activities that enable to trigger students' motivation to engage in constructivism-based online learning. Based on the previous suggestions and inputs both from an expert and students, the draft of the constructivism-based online learning was revised and refined for the next evaluation step.

In addition, the revised program was evaluated by trying it on with ten respondents who represented the characteristics of the intended target audiences. The pre and post-test sessions were used to measure the gain score of the respondents before and after learning with the draft of the constructivism-based online learning on an academic writing course.

In this evaluation phase of the research and development study, the cognitive aspects of the academic writing of the students were assessed prior to and after learning activities. The pre and post-test sessions score can be seen in the following table.

Table 1. Students' scores on small group pre and post-test sessions.

	Pre-test	Post-test
Students' scores on small group evaluation	53.07	70.43

5. Discussion and Conclusion

Practicing constructivism learning theory in online learning provides students with the chance to interact both with the tutor and colleagues. This learning interaction enables students to build knowledge and skills concerning writing academic articles. Writing academic articles requires students' intensive interaction with learning resources – tutors, other students, and available considered to create learning resources.

The essential component of constructivism learning theory must be considered to create successful online learning. The components include eliciting prior knowledge, creating cognitive dissonance, applying knowledge with feedback, and reflecting on learning. Implementing the constructivism approach in online learning triggers learning interaction that results in building the knowledge and skills of students.

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141-Developing Ut-Virtual Audit Center (Ut-Vac) as Experiential Learning Through Simulation for Student With Disabilities

Ratna Marta Dhewi¹, Hendrian², Antares Firman³, Eka Wirajuang Daurrohmah⁴, Lasando Lumban Gaol⁵

Abstract

Higher education students often struggle to understand audits because they only learn technical audit knowledge. Accessibility and mobility issues may also hinder students with disabilities practical audit experiences. These phenomena have prompted university auditing educators to give students more real-world audit experience. The main objective of this study is to describe the development process that has been carried out on the Universitas Terbuka Virtual Audit Centre (UT-VAC) mobile application that functions as an audit learning simulation, which is an alternative to helping persons with disabilities. The present study focuses on the development of applications utilising the GAMED method and incorporating key features of learning simulations, including Role and Task, Model of Interaction, and Environment. In UT-VAC, students will be assigned to an external auditing team to undertake audits at a private or public organisation. The lecturer sets the game's start time to ensure participant equality in team formation. Thus, each group will audit the same case with different roles. Players can be team members, leaders, or public accountants. The simulation is expected to improve auditing soft skills, ethical decision-making, and cognitive abilities. As part of the Merdeka Belajar Kampus Merdeka (MBKM) policy and as the first step in developing a bigger Open and Distance Learning (ODL) system, students from all academic fields can participate in this UT-VAC. This research makes a valuable contribution to the existing body of knowledge on distance education and audit learning through various means. Initially, it addresses the need to further investigate educational interventions that are tailored towards the field of auditing. This study employs Experiential Learning Theory to elucidate the utilisation of UT-VAC as a substitute learning environment in the realm of auditing education. Third, describing the use of GAMED (Digital Educational Game Development Methodology) has modernised the research and development approach diagram in the development of UT-VAC. Additionally, a review of the constraints of the study and recommendations for prospective researchers are provided.

Keywords: *Audit learning, disabilities, distance education, experiential learning*

1. Introduction

1.1. Research Background

The major goal of this study is to outline the development of the Universitas Terbuka Virtual Audit Centre (UT-VAC) mobile application, which serves as an alternative for providing convenience to people with disabilities. Educators often encounter challenges in offering their students practical experiences in the classroom setting. This assertion holds significant validity, especially when instructing a discipline that is primarily focused on practical implementation, such as auditing (Buckless, Krawczyk, & Showalter, 2014). Crawford et al. (2011) suggest that a lack of practical audit experience may contribute to the challenges that auditing students encounter in comprehending audits, as they tend to assimilate technical audit knowledge without practical exposure. Over a prolonged duration, the primary challenges encountered in undergraduate auditing education pertain to the formulation of the curriculum, the creation of pertinent instructional resources, and the distribution of technology (Armitage, 2008; Frakes, 1987; Reinstein, Churyk, & Tate, 2018).

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Students with disabilities, whether because of illness or not, encounter comparable obstacles, undoubtedly. Students who have physical and communication disabilities may face challenges related to accessibility and mobility when attempting to engage in practical audit experiences. According to Stendal (2012), technology presents novel prospects and holds the potential to provide individuals with disabilities with the same opportunities and empowerment as their non-disabled counterparts. In the present paper, technology is defined as a three-dimensional virtual world environment that introduces an additional dimension wherein users are visually represented as avatars and are capable of navigating the environment (Minocha, Tran, & Reeves, 2010).

The aforementioned discoveries have prompted appeals for academic institutions to encourage the creativity of their academics to provide academic services with the aim of equipping students with practical exposure related to the field of auditing, which makes it easier. For instance, academics are placing particular emphasis on Metaverse-based simulations as a tool for providing students with immersive virtual experiences. Merchant et al. (2014) conducted a meta-analysis to investigate the effects of specific instructional design principles on virtual reality technology-based instruction, such as games, simulations, and virtual worlds, in both K–12 and higher education settings. The study's authors deduce that games exhibit greater learning benefits compared to simulations and virtual worlds and that individual gameplay has a positive impact on students' academic performance. According to Stendal (2012), individuals with disabilities have demonstrated proficiency in acquiring independent living skills by means of specialised virtual world training programmes.

Despite the growing recognition of the value of simulations in education and training, the field of audit education has been largely overlooked. The domains of accounting and auditing exhibit a dearth of virtual simulations in comparison to other fields of specialisation. The Accounting and Auditing specialisation has not received significant attention from either private organisations or universities in terms of providing virtual training to students (Bhavani, 2020). One instance of a business simulation with a greater emphasis on financial aspects is Mr. Bigshot, a straightforward simulation of the stock market. An interactive accounting simulation environment (IASE) has been developed for use in accounting curricula. Milner and colleagues (2008) devised The IASE as a platform for imparting accounting education within a simulated “game” setting. The International Association for Statistical Education (IASE) employs a 3-dimensional (3D) accountant avatar to represent the user, which may be customised according to their preference or selected from a set of standard templates. The user has complete control over the avatar, which is permitted to navigate a three-dimensional urban environment. Nevertheless, it should be noted that neither of the aforementioned games incorporates audit learning services.



Figure 1. UT-VAC interface as Metaverse-Based in Learning Auditing

The primary goal of this research is to describe the development process for the UT-VAC mobile application, which was created by a group of accounting lecturers Faculty of Economics and Business Universitas Tebuka who were awarded funding through the PKK (Independence Campus Competition Programme) in 2022. It has functions as an audit learning simulation, which is expected to have many advantages to help people with disabilities and implement policies of the Ministry of Education and Culture of Indonesia related to Merdeka

Belajar Kampus Merdeka (MBKM). Because UT-VAC can be played by students across disciplines and can be played anywhere as an online interactive game, MBKM allows students to conduct independent studies outside of the classroom in order to develop themselves and master the specific competencies required for work in the real world. UT-VAC is the first step in creating a larger Open and Distance Learning (ODL) system at Universitas Terbuka.

This research makes a valuable contribution to the existing body of knowledge on distance education and audit learning through various means. It begins by addressing the necessity of looking into educational initiatives that are specifically geared towards the auditing area. Then, explaining the use of UT-VAC as a substitute learning environment in the realm of auditing education using experiential learning theory. Finally, describing the use of GAMED (Digital Educational Game Development Methodology) in the development of UT-VAC.

1.2. The Future of Audit

It is imperative that auditors possess adequate preparation and training to effectively manage the novel challenges that arise from the collection, processing, and integration of new forms and substantial quantities of data (Lombardi, Bloch, and Vasarhelyi, 2014). This is particularly crucial given that a significant proportion of these data sets may necessitate the utilisation and comprehension of advanced technologies. The Metaverse has the potential to serve as an audit tool, allowing auditors to conduct virtual tours of a company's remote physical locations. This eliminates the need for costly and time-consuming travel and accommodation expenses, as auditors can simply access the virtual location that accurately simulates the physical location and its attributes, providing a comprehensive 360-degree view of the Metaverse. As a result, cost and time savings can be realised, which can be redirected towards additional value-adding activities for the company. According to certain sources, virtual reality technology enables individuals to interact with simulated environments in a manner that is comparable to their interactions in the physical world. Virtual reality technologies facilitate the ability of auditors and management to convene and conduct paper examinations, as well as engage in discussions pertaining to management concerns (Faccia and Mosteanu, 2019). Some scholars have suggested that individuals have the ability to engage with virtual reality through virtual reality devices, perceiving the experience as tangible and authentic. The integration of harmonic technology may result in the Metaverse possessing a greater quantity of data in comparison to the physical world. The Metaverse is characterised by the seamless integration of various technologies, which enables the provision of augmented data and supplementary information beyond what is available in the physical world.

1.3. Traditional Approach versus Virtual Based in Learning Auditing

In order to transmit the knowledge and abilities required for the practices of auditing, auditing lecturers frequently use the "practice set" method. Auditing practice sets are commonly characterised by a high degree of organisation, wherein all the requisite information for conducting the audit is encompassed within the purchased practise set, as per usual. The utilisation of a pre-packaged learning approach fails to replicate an authentic audit environment. In reality, the data is not easily accessible to the auditor in a single package. In addition, the auditor is required to make a determination regarding the selection of documents to be examined. The act of furnishing a practise set to a student can be interpreted as a decision made on behalf of the student. The student intends to utilise solely the documents included in the package, without any exceptions. Minimal or negligible discretion is required in the process of document selection for review. This paper presents an unstructured audit simulation that facilitates the development of analytical and critical thinking skills among students. Moreover, it engenders a significant amount of uncertainty that students are likely to encounter in real-world audit settings.

In contrast to the traditional approach, experiential learning on the metaverse platform is characterised by its ability to effectively tackle the intricate aspects of the audit process. The audit simulation entails the selection of a local retail company that is publicly traded. A company that is listed on a stock exchange offers access to its financial information. A regional enterprise provides students with the opportunity to gain familiarity with its operational procedures and track its activities through local news outlets. The retail corporation provides an opportunity for students to conduct a tour of their sales facilities and document the sales control system implemented by the company. The audit simulation is an experiential learning initiative that aims to replicate the ambiguous nature of the audit environment while simultaneously imparting some of the fundamental concepts of auditing. The simulation is conducted collaboratively in a team-based environment to replicate real-world scenarios.

1.4. UT-VAC as Experiential Learning through Simulation

The UT Virtual Audit Centre (UT-VAC) is a platform that offers experiential learning through simulation. The advantages of experiential learning in the field of accounting have been extensively documented. Kolb (1984) formulated a theoretical framework comprising four fundamental components to delineate experiential learning, namely: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The aforementioned model is depicted in Figure 2.

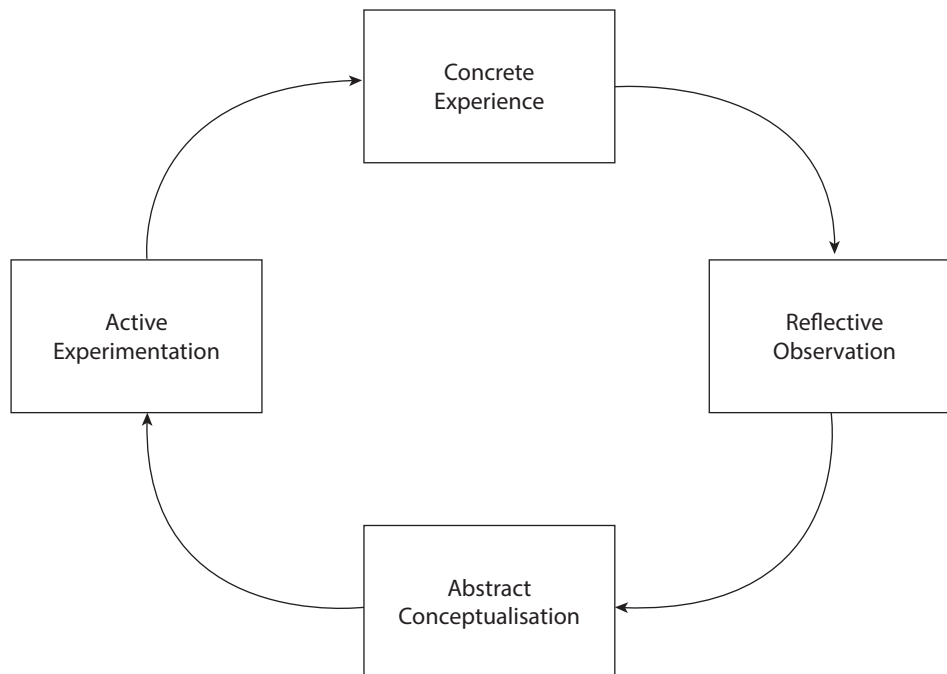


Figure 2. Kolb's experiential learning model

Within the framework of the UT-VAC model, the initial phase, known as concrete experience, involves the learner's direct participation in an audit activity. During the second stage of the learning process, known as reflective observation, the individual deliberately engages in introspection to contemplate their audit experience. During the third stage of abstract conceptualization, the individual endeavours to conceptualise a theory or model based on reflective observation. Stated differently, the learner is endeavouring to establish a connection between their comprehension of the audit encounter and their pre-existing conceptual knowledge. During the fourth stage of active experimentation, the individual engages in testing or applying their acquired knowledge to the model or theory at hand. This iterative process is iterated as knowledge acquisition advances in greater intricacy and sophistication.

According to Faria et al. (2009), simulation games have been frequently used in accounting and business education during the past 40 years. Simulation games are interactive games that are designed to facilitate experiential learning through simplified and dynamic representations of reality (Ranchhod et al. 2014). Simulations have the ability to integrate game components in order to generate authentic systems that present complex scenarios as well as well-defined regulations and objectives. The UT-VAC platform incorporates several simulation characteristics that are pertinent to the learning process. Simulations offer a significant benefit in that they enable learners to address ill-defined problems (Ceschi, Dorofeeva, & Sartori, 2014).

The following are important simulation characteristics: (1) **Role and Task**, each participant has an assigned role and task with responsibilities and limits. (2) **Model of interaction**, the existence of a model that facilitates students' interaction with intricate real-life scenarios (referred to as fidelity or validity), (3) **The environment**, a data-rich environment that allows students to execute a variety of strategies, from targeted to "shotgun" decision making (Gredler, 2013). The fundamental characteristics of simulations encompass the dynamic interactions among variables, which mirror authentic causal or relational mechanisms.

2. Method

A group of accounting lecturers at Universitas Terbuka worked on the UT-VAC application from June to December 2022. The authors comprise a collective of developers and innovators responsible for conceiving this application concept. The UT-VAC has been awarded a grant for the 2022 PKKM (Independence Campus Competition Programme).

The digital educational game development methodology, GAMED, is utilised in the creation of a simulation known as the UT-Virtual Audit Centre (UT-VAC). Aslan and Balci (2015) have posited that GAMED is an integral component of the life cycle of Digital Educational Games (DEGs), which comprises four distinct phases and approximately twelve processes. The game development process comprises four distinct phases, namely the game design phase, the game software design phase, the game implementation and publishing phase, and the game-based learning and feedback phase, as illustrated in Figure 3.

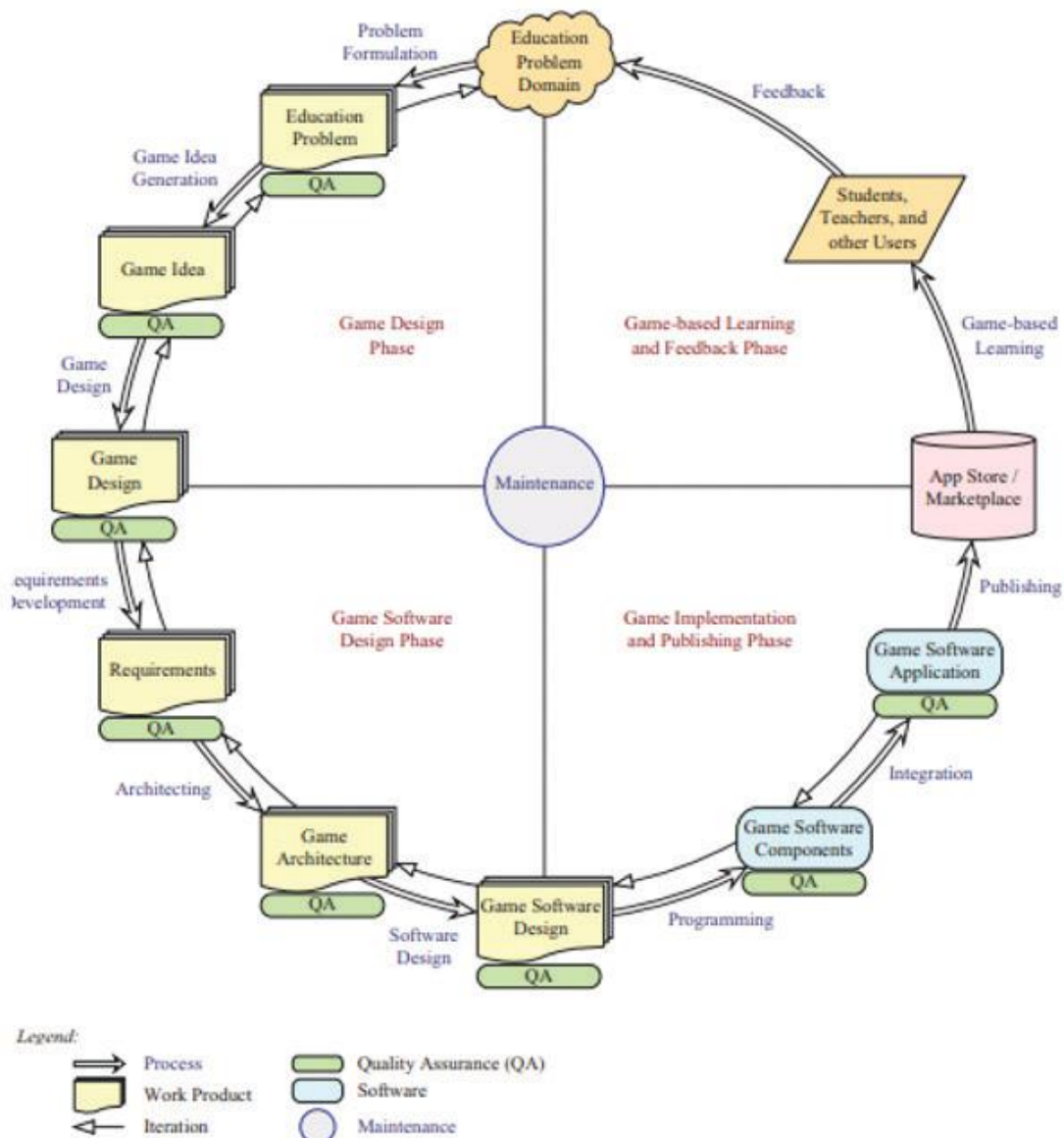


Figure 3. GAMED phase (Aslan & Balci, 2015)

Table 1 has a description of each phase and sub-phase.

Table 1. GAMED phase description

Phase	Sub-phase and description
Game Design Phase	<p><u>Problem Formulation</u> The current problem of audit education is being addressed by identifying state-of-the-art pedagogies. Elaborate on the inadequacies of current pedagogical approaches.</p> <p><u>Game Idea Generation</u> Create ideas from real-life audit activities. A game's concept can be inspired by real-life experiences.</p> <p><u>Game Design</u> The process of game design involves utilising the Game Idea Specification document as an initial input, which is then transformed into the Game Design Specification document as a final work product.</p>
Game Software Design Phase	<p><u>Requirements Development</u> The process of identifying and specifying functional and non-functional requirements for the UT-VAC is known as requirements development.</p> <p><u>Architecting</u> Architecting refers to the procedure of designing and defining a network-centric architecture for the UT-VAC.</p> <p><u>Software Design</u> The software design process pertains to the creation of a UT-VAC software design based on the game architecture specification.</p>
Game Implementation and Publishing	<p><u>Programming</u> The programming process involves utilizing the game software design specification document as an input to generate executable UT-VAC game software components as the output work product.</p> <p><u>Integration</u> The term "integration" describes the combination of independently validated executable UT-VAC game software components created by different teams to create a cohesive whole.</p> <p><u>Publishing</u> Publish UT-VAC as Software as a Product (SaaP)</p>
Game-based Learning and Feedback Phase	<p><u>Game-based Learning</u> The process of game-based learning pertains to the utilisation of the UT-VAC game software application by students as a means of acquiring knowledge on a particular subject matter.</p> <p><u>Feedback</u> This procedure focuses on documenting the game-based learning assessment outcomes and conveying them as feedback to the game developers.</p>

3. Findings and Discussion

This section outlines the discussion of each GAMED phase in the development of the UT-VAC. The limitations of this application are also explained at the end.

3.1. Phase 1: The Game Design

The current phase has been bifurcated into two distinct steps: education problems and game ideas. Commence by delineating the domain of educational issues that will be tackled via a simulation game. The challenge faced by auditing students pertains to comprehending the nature of an audit, as they tend to assimilate technical audit-related information in the absence of practical audit exposure.

Table 2. Game Idea Translation

Simulation Characteristics (Gredler, 2013)	UT-VAC Game Idea
Role and Task	Students take on the role of external auditors who are assigned to audit an entity. As an example, in the case of an inventory audit, students will meet employees in a variety of positions, ranging from customer service to finance director to warehouse manager. The role of an internal auditor is no less important than the role of an external auditor. Therefore, it is possible that in the future, competency training will also be developed for internal auditors.
Model of Interaction	Interaction of auditing activities such as Financial Statement audits, Compliance audits, and Performance audits. In the future, it is possible that the UT-VAC will be developed for an interaction audit model with a specific purpose or an investigative audit that has a high level of difficulty.
The Environment	Simulation environment, i.e., private companies, public institutions, as well as public accounting firms.

The domain of educational issues is subsequently transformed into a concept for a simulation game known as the UT-Virtual Audit Centre (UT-VAC). The utilisation of three simulation characteristics, namely Role and Task, Model of Interaction, and environment, is a common practise in the UT-VAC field. Table 2 provides a summary of the characteristics and their corresponding implementation in the VAC game idea.

3.2. Phase 2: The Game Software Design

In order to facilitate the process, software is used to generate a virtual simulation game. The employed software in this instance comprises Blender 3D and Unity 3D. The integration of both software applications is believed to enhance the efficacy of the simulation. Blender is a software application used for the purpose of generating 3D assets, animations, and visual effects that are employed in the creation of avatars and specific objects within an office environment. Blender is also designed for rendering, compositing, motion tracking, video editing, and game creation. This software is available at no cost, potentially reducing the expenses associated with the development process. The integration of Unity 3D game development software is utilised. The game VAC is designed to be compatible with devices that satisfy the specifications outlined in Table 3. This application is designed to be used on Android-based computers, laptops, and cellphones. Considering that there are still more Android users (90.24%) than iOS users (9.64%) in Indonesia (Statcounter, 2023), Making it easier for students to access anywhere and learn anywhere in a fun way with one hand on their cell phone.

Table 3. Minimum Requirements Specification

Mobile Phone Specification	Minimum Requirements
Android System Operation	Android 5.1
RAM	3 GB
Storage	32 GB
FPS value	50 – 60

3.2.1. Role and Task

Three simulation qualities serve as the foundation for the VAC game architecture approach. One aspect to consider is the role and task. Students and lecturers will be assigned to a team of external auditors to conduct audits of a business organisation. Every player must create an account (Figure 4(a)). The game begins at the time set by the lecturer so that the team formation process is consistent with the level of player equality. In other words, each group will perform the same case audit, but with different roles assigned to the players. Team members, team leaders, and public accountants are all options for players (Figure 4(b)). Mainly, this is used as the basis for determining the level of player understanding of level audit knowledge so that after completing a certain level of play, the competence of players who were originally at the team member level can increase to the team leader level and then to the public accountant level. Hence, the game can run smoothly because each player can follow the instructions that have been provided. The hope is that at this early stage, players are honest in determining their level of function. However, if in one team there is a lack of competency, for example, if no one registers as a public accountant, UT-VAC will automatically act as a cameo to replace a position not chosen by a player who performs a non-existent role.

In the next development stage, the UT-VAC will also be developed for competency as an internal auditor. Because being an internal auditor is just as important as being an external auditor. In addition, the share of the workforce that can become an internal auditor is still wide open because each agency must have an internal control unit as a guarantor of the quality of the running of an entity's business processes.

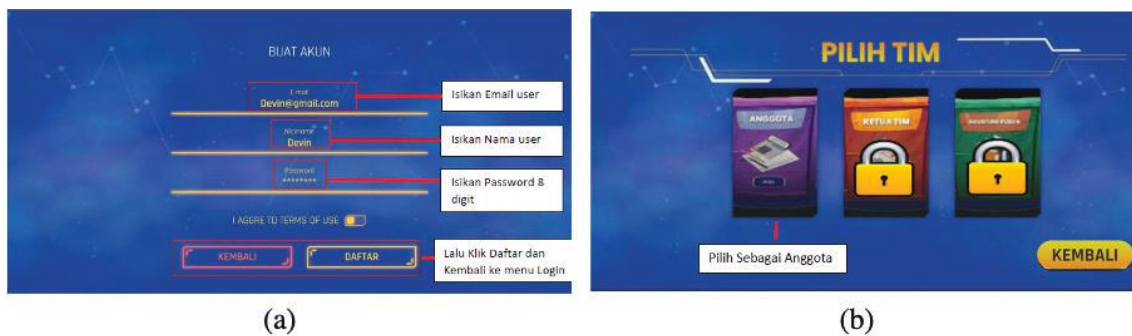


Figure 4. Snapshot of the account registration and role option in audit team

The illustration presented in Figure 5(a) portrays an individual entering an office edifice and receiving a cordial welcome from a representative of the customer service department. Subsequently, the customer service agent solicits the player's identity and audit assignment letter, as depicted in Figure 5(b). Upon the issuance of the validity declaration, players are instructed to convene with the financial director (Figure 5(c)) and the warehouse manager (Figure 5(d)) in order to initiate an inventory audit.



Figure 5. Snapshot of the player's role as an external auditor who meets various key positions in the company.

Upon accomplishing a given task, an asterisk and a score will be granted as a form of recognition. The score obtained by a student is a crucial factor in determining their progression to the next level. It is anticipated that the challenges and dynamics of the simulation will enhance the development of soft skills, ethical decision-making, and cognitive abilities within the realm of auditing. The Role and Task component holds significant importance in simulation games as it facilitates experiential learning. The students will acquire practical knowledge by serving as external auditors. The individual will ascertain the pivotal positions within an organisation and comprehend their respective responsibilities and levels of jurisdiction. Despite potential variations in real-world scenarios, such as an auditor's interaction with employees of varying hierarchical positions within a sizable organisation, the UT-VAC effectively portrays the typical duties and responsibilities of an auditor.

3.2.2. Model of Interaction

The Interaction Model is the second constituent of the UT-VAC game simulation. The interaction mechanism in this simulation game is based on the categorization of audit types according to their respective audit fields. A financial statement audit is concerned with the process of collecting and assessing evidence relating to an organisation's financial statements with the aim of issuing an opinion or conclusion about whether the report complies with established accounting principles and generally accepted criteria. Examining payments owed to companies and auditing inventory is an evaluation of financial records in the current UT-VAC simulation.



Figure 6. A snapshot of the Interaction model with various audit types available for selection

The upcoming interaction pertains to a compliance audit, a performance audit, and a specific purpose, or an investigative audit. Compliance audit that aims to ascertain the extent to which the organisation has adhered to relevant regulations and policies. These policies may have been established by either internal or external entities or firms. The performance audit evaluates the degree of economy, efficiency, and effectiveness in the utilisation of resources towards the attainment of objectives. Lastly, an investigative audit is an audit aimed at ensuring the appropriateness of the implementation of activities, programmes, or other things that are not included in the categories of financial audits and operational or performance audits. The present audit is characterised by a qualitative and analytical approach that involves the use of indicators, standards, and performance goals. Prior to engaging in the interplay between compliance and performance audits, players in the UT-VAC are required to successfully undertake an inventory and accounts receivable audit at a certain level.

3.2.3. The Environment

The game environment is the final component of the UT-VAC architecture. Players can select a simulation of audit activities in private or public companies (Figure 7(a)). If the player chooses to audit in the private sector, the playing atmosphere will reflect the audit atmosphere in a public accounting firm. Conversely, if the player chooses to play in the public sector, then the game will lead to public sector organisations such as non-governmental organisations or local and central government. Thus, after players have completed all the existing game steps, their experience and competence are expected to increase so that they can carry out audits as both external auditors and internal auditors in the real world. Furthermore, the game's difficulty is gradually increased from basic to intermediate to advance to international stages (Figure 7(b)).

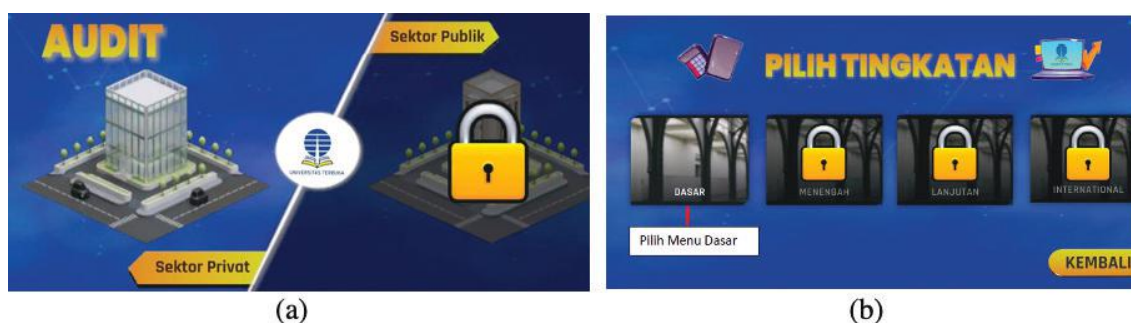


Figure 7. A snapshot of the UT-VAC game environment

3.3. Phase 3: Implementation and publishing

The UT-VAC application has been released as software as a service (SaaS). According to the SaaP model, the game software is distributed through three channels: (a) it is provided for download from the Google Play Store; (b) it is delivered to the user as a product; and (c) it is installed on a mobile phone for utilisation. Table 4 outlines the process of publishing games on the Google Play Store.

Table 4. UT-VAC Publishing Info

Game Info	Description
App Name	Virtual Audit Center
Category	Educational
Version	0.1
Last Updated	November 11, 2022
Required OS	Android 5.1 and up
Rated for	3+ Age
Developer	UPBJ Universitas Terbuka

3.4. Game-Based Learning and Feedback Phase

The use of simulation games for experiential learning in UT-VAC development remains constrained. The fourth stage, which deals with game feedback, hasn't been finished by UT-VAC yet. The present methodology centres on the documentation of the results obtained from assessments of game-based learning, encompassing motivational learning and knowledge auditing. The feedback resulting from this assessment will be furnished to the developers of the game. The game development process recommences and undergoes an additional life cycle iteration in response to this feedback, resulting in the creation of an enhanced and revised iteration of the UT-VAC. The repetition of this iteration is aimed at achieving a continuous enhancement of the quality of the VAC over its entire life cycle.

Furthermore, tasks that necessitate substantial engagement with the UT-VAC may be more effectively executed at a physical office location or in a real office atmosphere. The UT-VAC has not yet displayed a conflict of interest or ethical dilemma between the players. Some of the interviewees view matters related to leadership related to interactions with clients and team members, such as dispute resolution, with a critical view as important. The principle mentioned above also applies to the phenomenon of self-organisation in the auditor collective, especially around problem solving. A report has been jointly published by the International Auditing and Assurance Standards Board (IAASB), the International Ethical Standards Council for Accountants (IESBA), and the International Accounting Education Standards Board (IAESB) (see IAASB, 2017b), in which they highlight the importance of this ability in conducting audits. Practical implementation of applying the knowledge or skills acquired in the online environment to real-world scenarios is considered an implementable prospect.

4. Conclusion

This paper presents the development of the UT-VAC mobile application as a learning simulation for auditing and is intended for students with disabilities. We have generally described the UT-VAC development process

from the four phases of the GAMED method (Game Design, Software Design, Game Implementation and publishing, and Game-Based Learning and Feedback Phases) and three aspects of learning simulation (Roles and Tasks, Interaction Models, and Environment).

The UT-VAC mobile app has the potential to be useful in terms of scientific advancements as well as commercial rewards, given that it is extensively used by a large number of various organisations, according to the study of several responses. The UT-VAC provides an experiential learning initiative that aims to replicate the ambiguous nature of the auditing environment while conveying some of the basic concepts of auditing. Simulations are performed collaboratively in a team-based environment to replicate real-world scenarios. Furthermore, UT-VAC can be used as the forerunner of metaverse-based learning; however, consideration and collaboration between universities and the world of business and industries are needed to finance the development of this application so that the process of using UT-VAC does not also impose high costs on students.

However, UT-VAC has yet to finish the fourth phase, Game Feedback, which documents game-based learning assessments, including motivational learning and knowledge auditing. Besides that, for further development, developers can collaborate with associations in the field of auditing, such as the Institute of Indonesia Chartered Accountants (IAI) and universities, for recognition of credit semesters or certification in the field of auditing if players can complete the game up to a certain level. Of course, this will attract many students and lecturers to join in these games and further provide unlimited auditing and learning facilities. In response to this feedback, the game development process restarts and undergoes an additional life cycle iteration, resulting in an improved UT-VAC. This serves as an indication for the subsequent researcher to carry out the fourth phase. It would be fascinating to explore how the various types of disabilities assist students in understanding the goals of UT-VAC and the audit learning objectives. Furthermore, understanding why and how educators employ UT-VAC, as well as knowing what elements promote or hinder instructors' acceptance of this game, are questions that merit additional exploration.

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154-Emotion Recognition in Online Learning: A Deep Learning-Based Approach For Advancing Digitalized Open Education

Meng Guo¹

Abstract

In the age of digital transformation of education led by the new generation of artificial intelligence, open universities, as an essential part of the education system, bear the responsibility to actively respond and lead this change. Especially in the post-pandemic era, online learning has grown from a supplementary teaching form to a significant learning method. However, under the online learning mode, it is difficult for teachers to grasp the emotional changes of learners, which has become one of the pressing issues in online education research. Research on learner emotions can reflect learners' cognition and motivation at the individual level, deeply explore learners' cognitive styles and learning preferences, and facilitate precise teaching and personalized learning. From the teaching level, it can understand the overall participation and reflect the teaching effect, serving as an important indicator of effective teaching. At present, research on emotion computation in online learning mainly adopts two technological paths: one is based on physiological feedback technologies such as EEG and eye-tracking; the other is based on the measurement of data such as facial expressions, voice, and body posture. However, both of these methods require specific equipment support and have a certain degree of invasiveness. Learners in open universities are usually in an unsupervised, relaxed learning environment, and the collection of physiological or audio-visual data faces great challenges. Therefore, current research on emotional analysis in the scenarios of open education is still very limited. In light of this, this study proposes a new text emotion recognition method based on deep learning, which is particularly suitable for the online learning environment of open education. We have integrated the BERT model and the bidirectional LSTM model to extract deep temporal emotional features from text information, such as learners' real-time comments, teacher-student interaction, and forum discussions. This method does not rely on specific equipment or invasive data collection but directly uses the existing text data in the open education environment for emotion analysis. This method is more flexible and applicable, meeting the emotional computation needs of online learning, providing a new perspective and ideas for emotional computation research in open education, and also providing powerful tools and theoretical support for the future of open universities in the age of digitalized higher education.

Keywords: *Emotion Recognition, Online Learning, Deep Learning.*

1. Introduction

Online learning offers many advantages, including flexible teaching times and locations, maximized resource utilization, diverse interactive forms, and self-directed learning behaviors. It has become a key educational practice for advancing the digital transformation of education. In particular, the widespread outbreak of COVID-19 has made online learning a necessity, promoting it as one of the primary ways for learners to engage in learning activities, establish interactive connections, and collaboratively build knowledge. However, due to the time and space separation characteristics of online learning, and the lack of face-to-face communication and interaction between teachers and students, there is an emotional deficit in online learning that severely impacts its efficiency and effectiveness. Therefore, emotional analysis remains one of the pressing issues that need to be resolved in online learning.

As the emotional state during the learning process gradually gains attention from many researchers, the measurement and analysis of emotions have become a research focus in academia. In the process of online learning, collecting and recognizing learners' emotional data can effectively alleviate feelings of frustration

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during the learning process, thereby improving learners' learning efficiency. The existing research methods for collecting learning emotional data mainly include physiological equipment sensing, video monitoring, and text analysis. However, all of these approaches have varying degrees of limitations. For example, physiological equipment is highly intrusive to learners and it is difficult to guarantee the authenticity and accuracy of the data. Furthermore, these methods are especially unsuitable in the unsupervised, relaxed learning scenarios of open education. Therefore, this research mainly focuses on text data in the online learning process, including real-time comments, teacher-student interactions, and forum discussions. We aim to mine the hidden emotional information in these texts, explore the emotional changes in the learner group during the online learning process, enable teachers to understand the emotional state of learners, alleviate the emotional deficit problem in online education, and enhance the implementation effect of online education.

2. Related Works

Emotion is a core variable in educational research that is worth attention. It is a general term for learners' subjective cognitive experiences, reflecting learners' attitude, experience and mental activities towards interactive content. It is also one of the important indicators of a learner's learning state. Existing research offers different method systems for emotional description. In emotion computation research, based on the emotional model, emotion recognition can be divided into "discrete category methods" and "continuous dimension methods"; Depending on the data modality, it can be divided into unimodal and multimodal emotion recognition; and according to the number of target objects, it can be divided into individual and group emotion recognition.

The emotional model is a basic problem in emotional computation. The commonly used description for emotions is the "Categorical Approach". American psychologist Ekman divided human expressions into six basic types: anger, disgust, fear, happiness, sadness, and surprise, and released the Facial Action Coding System (FACS)[3-4]. For emotion computation, FACS serves both as a theoretical foundation and a rare prior knowledge. To include all the emotions produced by humans, researchers have gradually freely combined and expanded basic emotions into 6-18 types. Due to the intuitiveness, simplicity, and universality of the discrete emotional model, it is widely used in the field of emotion recognition.

In existing educational psychology research, "academic emotions" were first proposed by Pekrun[10], who found that emotions such as fatigue, despair, boredom, worry, and pleasure appear in the learning process. Hollenstein[8] used emotion analysis technology to help detect the online interaction of learners during the discussion process. The results showed that there are six common emotions under the online learning environment, including positive, negative, neutral, profound, puzzled, and joking. Sidney[11] proposed an emotional dynamic model to explain the dynamic emotions that appear in deep learning activities, suggesting that in a deep learning scenario, according to the cognitive state of learners, emotions such as participation, confusion, frustration, boredom, enjoyment, and surprise will appear.

The existing research methods for text-based emotion analysis can be roughly divided into three categories: methods based on emotional dictionaries, methods based on machine learning, and methods based on deep learning. Methods based on emotional dictionaries have disadvantages such as low flexibility and over-reliance on dictionary quality, but they also have unsupervised characteristics. Asghar et al. used an emotional dictionary to judge the emotional polarity of learners' comment texts, then formulated emotional computation rules to calculate learners' emotional scores, and reflected learning satisfaction with this [1]. With the maturity of machine learning technology, some scholars have completed online education text emotion analysis based on machine learning methods. Lin et al. compared the actual effects of machine learning algorithms such as Naive Bayes and Logistic Regression to achieve automated analysis of students' teaching evaluation emotions, and applied the best method to the student evaluation section of the school teaching management system [9].

In recent years, the development and application of deep learning technology have achieved good results, and this technology has subsequently been applied to the field of education. Feng et al. constructed an academic emotional dimension classification system for student comments in an online learning environment. They developed an automatic recognition method for a specific aspect of academic emotions, integrating convolutional neural networks, long short-term memory networks, and attention mechanisms [5]. Han et al. built a long short-term memory neural network (LSTM) to detect cognitive emotions in MOOC comments [6].

Based on the aforementioned literature review, it is clear that learning emotions play a vital role in learners' cognitive processing and learning outcomes. How to use process data from online learning for emotion

recognition is a problem that urgently needs to be solved. Unlike these works, we focus on the unique characteristics of open education scenarios, including small data samples, limited useful information, and unsupervised learning processes. We integrate deep learning technology to design an automatic emotion recognition model based on text data. We aim to provide support for the innovation and development of emotion-related theories in online learning.

3. Method

The overview of our proposed model is shown in Figure.1. The main steps include obtaining text data, data preprocessing, deep learning model representation, and emotion recognition.

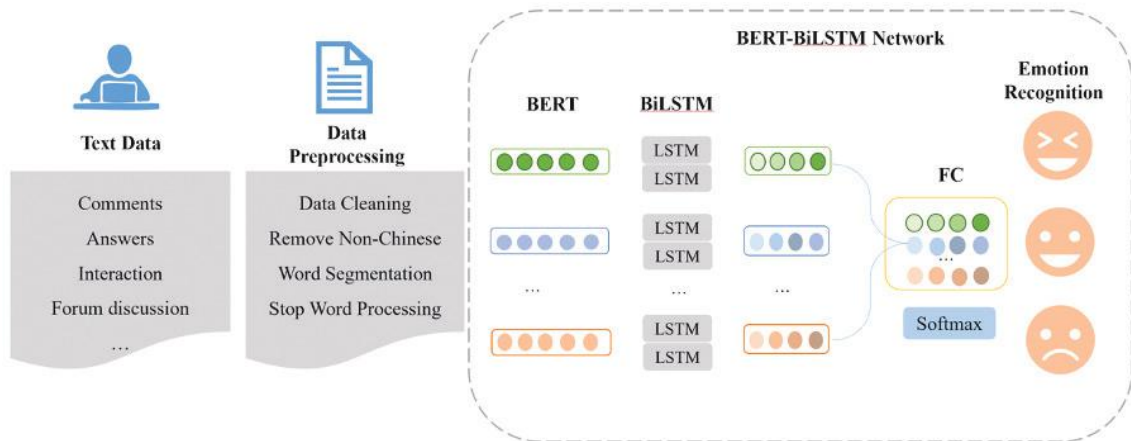


Figure 1. Flow chart of the proposed model.

The key to our method is the BERT-BiLSTM network, and the overall architecture is shown in Figure.2. Specifically, we first use the pre-trained language model BERT to dynamically represent text data, and then use the BiLSTM neural network to integrate text information and sentence order features to generate bidirectional deep semantic features and obtain precise semantic representations, thereby further improving the effect of the model's emotion recognition.

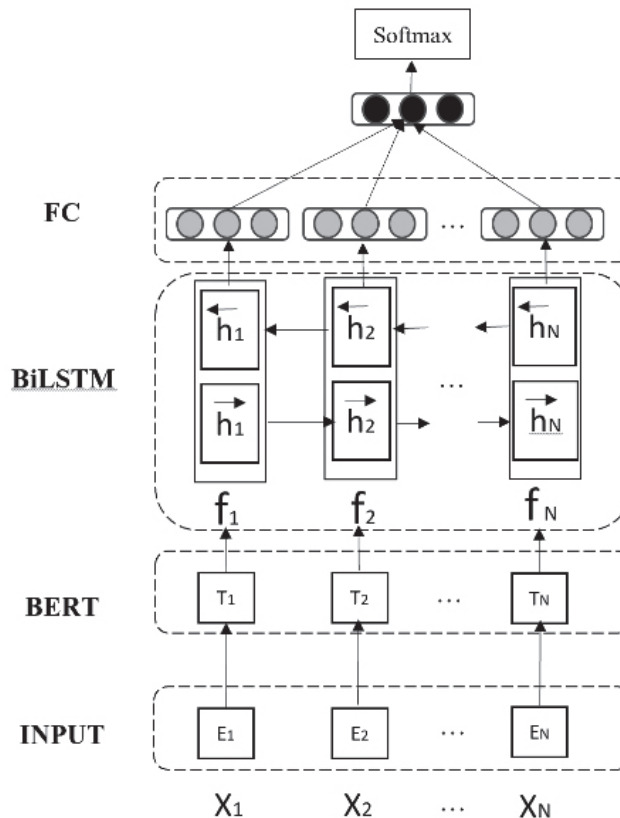


Figure 2. Overall architecture of the BERT-BiLSTM network.

3.1. Input Layer

The input layer completes the text encoding work according to the input specifications of the BERT pre-training model. First, the input text is divided into individual characters; then, the divided text is positionally embedded, character embedded, and input embedded; finally, the three parts of the embedded vectors are integrated to obtain the text sequence .

3.2. BERT Layer

The is input into the BERT model[2], outputting the implicit semantic tensor . The BERT model is a text pre-training model released by Google AI, aimed at pre-training deep bidirectional representations by jointly adjusting all layers of context. It can be fine-tuned through an additional output layer, thereby applying to most natural language processing tasks without requiring major modifications for specific tasks, effectively solving the limitation of small samples.

3.3. BiLSTM Layer

LSTM is a variant of the recurrent neural network[7]. The BiLSTM model replaces the hidden layer of the traditional RNN with LSTM units and arranges them bidirectionally, allowing it to obtain both unit status and hidden layer status information from the previous moment in both directions. Specifically, the contextual temporal feature is incorporated from both directions: forward hidden sequence and the backward hidden sequence , i.e., .

In this layer, BiLSTM will carry out bidirectional semantic learning on the implicit semantic tensor obtained from the training of the BERT model, learn sentence order features, and mine the deep semantic feature tensor .

The pre-training model BERT itself is a mature neural network model that can be directly applied to sentiment analysis tasks. However, this paper uses the output of the pre-trained model BERT as the input to Bi-LSTM. The purpose is to extract high-dimensional features of the text through a deeper network model, and further learn the text features by connecting the context of the text.

3.4. Fully Connected Layer and Output Layer

In the output layer, is input into the fully connected layer FC to obtain a probability vector consistent with the dimension of the category, and then input into the Softmax layer for classification, to achieve the normalization processing of probability, and thus complete the prediction of emotional categories.

$$\hat{y} = \text{Softmax}(FC(X_{\text{BiLSTM}}))$$

This study uses cross-entropy as the loss function,

$$L = - \sum_{i=1}^N y^{(i)} * \log \log \hat{y}^{(i)}$$

where N is the number of categories, i is the number of labels, y is the probability distribution vector of the actual value, is the probability distribution vector of the predicted value, and L is the loss value of the training data.

4. Findings

4.1. Dataset

Emotion classification algorithms require a large amount of data to train the algorithm model, but there is no large-scale public text data in the field of online education. Therefore, to verify the robustness of the model on Chinese datasets, the data used in this paper comes from the 2019 CCF Big Data & Computing Intelligence Contest (CCF BDCI). The data is crawled from major internet sites, including major news websites, WeChat, blogs, forums, etc. The data format is shown in Table 1.

Table 1. Data Type of the Dataset

Field	Type	Description
news_id	String	News ID
title	String	Title content
content	String	Content of news text
label	String	Emotional label in news

Figure 3 provides some data examples. News sentiment labels are divided into three categories: positive (or upbeat) emotions are represented by 0, neutral emotions by 1, and negative (or pessimistic) emotions by 2.

id	title	content	label
7a3dd79f9	问责领导上黄镇党委书记张涛。宣国才真能	这几天看了有人举报施某某的帖子，经与举报人联系证实，是宣	2
8c5bda93c	绝味鸭脖广告开黄腔引众怒 双11这么拼值吗	“双11”1600亿的销售额让中国乃至全世界感到震惊，为此，不仅	2
1aa777fed	央视曝光如东一医药企业将槽罐车改成垃圾	2016年以来，如东高新区一家叫做拜瑞生物医药的企业竟然将装	2
6c67ac553	恶劣至极，央视都曝光了南通如东一医药企	新闻资讯·民生热点·城市生活·南通人都在看浏览更多资讯请关注	2
4760de6f9	央视曝光南通一医药企业夜间偷排高浓度废	昨晚央视一套晚间新闻栏目曝光了一则新闻报道的对象竟是如东	2
8c35b37b2	粉丝爆料五洲国际无锡项目涉嫌诈骗，非法	随着金融街1号（）对有非法集资、诈骗嫌疑的案例的曝光，粉丝	2
3b27c107b	年内约10起锂电重组失败 资本对高估值收购	摘要来自中国电池联盟的数据显示，今年以来，国内动力电池产	1
167c5e0e3	男子梦想一夜暴富持水泥块砸机	一分钱都没取到 近日，江苏扬州，谢某为盗取钱款手持水泥块	2
51d757b89	北京多家法院供暖纠纷案件主体为供暖费追	北京的这个冬天来得比往年更早一些，大风寒潮一次次刷新着温	2
97ad0a0cc	手机号、开头的注意看完吓得冷汗都出来	原标题手机号、开头的注意看完吓得冷汗都出来了今年月，深	2

Figure 3. Data Examples.

4.2. Experimental Environment and Evaluation Criteria

The experimental environment settings are shown in Table 2.

Table 2. Experimental Environment Parameters.

Environment Parameters	Configuration
GPU	NVIDIA RTX3090
Server Memory	32G 3200HZ
OS	Ubuntu22.04
Third-party Libraries	PyTorch
Programming Language	Python3.6

To verify the effectiveness of the model, the algorithm evaluation standards used in this paper is Macro-F1 score.

$$P = \frac{TP}{TP + FP}$$

$$R = \frac{TP}{TP + FN}$$

$$F1 = \frac{2PR}{P + R}$$

Among them, TP is the true example, FP is the false positive case, FN is the false negative case. The value of F1 is obtained by the above formula. Macro-F1 value can be calculated out by averaging F1 value.

4.3. Results and Analysis

This paper designs two sets of comparative experiments aimed at identifying a relatively superior model for text emotion recognition.

The first set of experiments is based on various BERT pre-training models. A dataset from the initial competition training set, comprising 7340 entries, is used. This dataset is randomly split into a training set and a validation set at a ratio of 8:2. Training is performed on the training set, while evaluation is carried out on the validation set. A Macro-F1 score is computed using a test set that consists of 7363 entries. Three models are selected for evaluation: “BERT-base, Chinese”, “RoBERTa-wwm-ext, Chinese”, and “RoBERTa-wwm-ext-large, Chinese”. The experimental results are presented in Table 3.

Table 3. Performance comparison between different BERT Models.

Models	Descriptions	F1
BERT-base, Chinese	Layers of Transformer:12 Hidden layer: 768-dimension Attention heads:12 Masking:Word pieces	0.79936072
RoBERTa-wwm-ext, Chinese	Layers of Transformer:12 Hidden layer: 768-dimension Attention heads:12 Masking: Whole Word Masking	0.80337161
RoBERTa-wwm-ext-large, Chinese	Layers of Transformer:24 Hidden layer: 1024-dimension Attention heads:16 Masking: Whole Word Masking	0.80616034

“BERT-base, Chinese” has been pre-trained for Chinese, training and random input masking has been applied independently to word pieces. The “RoBERTa-wwm-ext, Chinese” model features two main optimizations compared to the “BERT-base, Chinese” model. The first is the use of the RoBERTa pre-training model, and the second is the adoption of a Whole Word Masking training method for Chinese. Specifically, the RoBERTa pre-training model utilizes several optimization strategies such as dynamic masking, cancellation of the NSP (Next Sentence Prediction) task, larger batch size for training, extended training period with more data, adjustment of Adam optimizer parameters, and the use of Byte level for vocabulary construction. These strategies have led to significant improvements in many tasks. The “RoBERTa-wwm-ext-large, Chinese” model further enhances performance by employing more layers of Transformers and attention heads. It can be observed that the “RoBERTa-wwm-ext-large, Chinese” model yields the highest score on the test set.

The second set of experiments is based on the three models from the first set and compares the results after the application of LSTM and BiLSTM respectively. These comparisons demonstrate the effectiveness of the proposed BERT-BiLSTM fusion model. The experimental results are presented in Table 4.

Table 4. Performance comparison between different approaches.

BERT-Models	LSTM-Models	F1
BERT-base, Chinese	-LSTM	0.80200591
	-BiLSTM	0.80426334
RoBERTa-wwm-ext, Chinese	-LSTM	0.80561690
	-BiLSTM	0.80661683
RoBERTa-wwm-ext-large, Chinese	-LSTM	0.80832447
	-BiLSTM	0.81003272

As can be seen, the BERT-BiLSTM model achieves superior results compared to both BERT and BERT-LSTM across all three models. The greatest improvement is seen in the model based on “BERT-base, Chinese”, with an F1 score increase of 0.004902. Overall, the BERT-BiLSTM Network based on “RoBERTa-wwm-ext-large, Chinese” yields the best results on the test set.

5. Discussion and Conclusion

To alleviate the problem of emotional absence in online education, this paper proposes an emotion recognition method based on online text data. This method leverages deep learning technologies (LSTM, Bi-LSTM, BERT), which are suitable for temporal feature data, based on a clear understanding of the concept and connotation of learning emotions. This approach takes into account the shortcomings of previous learner emotion recognition research and the limitations of method applicability.

Although the experimental results on public datasets demonstrate the effectiveness of the method we propose, there are still some limitations. First, in terms of emotional categories, the current research only classifies the text into three categories: positive, negative, and neutral, which are relatively basic. Therefore, future research can further refine the emotional categories to better align with the emotional traits of online learners, such as happiness, confusion, frustration, etc. Secondly, data is the key factor determining the performance of deep models. Future work will focus on building an online learning text database under actual scenarios to verify the application value of the model.

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Best Paper Award
Gold Medal

**155-Exploring the Impact of Motivational Factors on Learner Participation
in E-Learning**

JungHyun Park¹, Jin Gon Shon²

Abstract

E-learning is largely characterized by learner autonomy, making motivation an essential factor for student success. It serves as the driving force that initiates and sustains engagement in learning. In this light, identifying the motivational factors that significantly affect learner participation can aid in the optimization of e-learning environments. This study sets out to delineate the components of learning motivation that have the most profound impact on learner participation. Drawing on the Expectancy-Value Theory and Self-Regulated Learning Theory, the research argues that heightened learning motivation corresponds to increased e-learning participation. The experiment conducted as part of this study aimed to ascertain the influence of specific components of learning motivation - value, cost, cognitive regulation, and scheduling - on learner participation. These components were identified through an extensive review of previous studies and motivational theories. The experimental design involved surveys and an English vocabulary learning program administered via MoodleCloud, an open-source learning management system. Learner participation was gauged through these means. A group of 56 participants took part in the experiment, and the results were statistically analyzed using SPSS. The analysis process involved multiple steps. It started with the verification of the survey's validity and reliability, followed by the assessment of group differences. Correlations among variables were then examined before the impact of motivational factors on learner participation was explored. This study's key findings highlight the significant influence of value and scheduling on learner participation in e-learning. The higher the value learners place on their education and the better their scheduling skills, the more active their participation in e-learning. These findings have substantial implications for improving learner support systems in e-learning environments. By focusing on motivational factors of value and scheduling, e-learning platforms can be fine-tuned to enhance learner engagement. Moreover, these results could be instrumental in developing an index for quantitatively measuring learners' motivation levels, presenting a clear, intuitive gauge of their engagement.

Keywords: *e-learning, learning motivation, motivational factors, learner participation, learner supporting.*

1. Introduction

E-learning offers numerous advantages in comparison to traditional offline classes, primarily in terms of its cost-effectiveness, flexibility to accommodate individual learners, and the removal of temporal and physical constraints. However, a significant downside to e-learning is its non-compulsory nature, allowing learners to progress at their own pace without stringent guidelines. As a result, many e-learners find it challenging to actively engage or maintain consistent participation in the learning process. This leads to a high dropout rate, which remains a persistent issue in the field of e-learning. Therefore, in order for learners to effectively participate in e-learning, a driving force is required to initiate and maintain their studies. This driving force is referred to as learning motivation (Jiang, Rosenzweig, & Gaspard, 2018).

To ensure successful e-learning experiences, it becomes crucial to provide support for learners who lack motivation to initiate and smoothly pursue their studies. Learners who already possess motivation may also require support to sustain effective learning. Consequently, identifying the factors of learning motivation

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that significantly influence learner participation can greatly contribute to optimizing e-learning. This study aims to determine the fundamental components of learning motivation that have the utmost impact on learner participation. By shedding light on these components, we can establish strategies to enhance learner motivation and ultimately improve the overall effectiveness of e-learning.

2. Literature Review

2.1. Learning Motivation

There have been numerous studies on the concept of ‘motivation’ in various fields. In psychology, motivation has been described as the force that activates and sustains human behavior, providing direction towards a goal. Motivation indicates the direction of behavior, sustains that behavior in a consistent direction, and aims towards an individual’s goals (Koenka, 2020). In this paper, motivation is defined as the “driving force that initiates and sustains a certain behavior.” Applying this definition to learning, learning motivation can be considered as the “driving force that initiates and sustains learning behavior.” Learning motivation refers to a psychological state or force that motivates learners to choose and persist in learning according to their learning goals (Adam, Hamid, Khatibi, & Azam, 2023).

Among the various characteristics of learners, learning motivation serves as a determining factor in the sustainability and intensity of learning, which remains consistent regardless of the learning environment. Therefore, just as in offline learning, learning motivation is a crucial characteristic that significantly influences the sustainability and intensity of online learning. In remote online classes where learner autonomy is essential, learners need to actively participate. The degree of learner participation is an essential concept in online learning environments where learners are expected to engage in self-regulated learning. Consequently, in online learning, individual volition to participate in learning is even more important than in offline learning (Adam et al., 2023; Barnard, Lan, To, Paton, & Lai, 2009).

Since learning motivation is defined as the “driving force that encourages participation in learning” in this paper, this research was conducted based on the proposition that “having a motivation to learn equates to participating in learning.”

2.2. Motivation Theories explaining Learner Participation

2.2.1. Expectancy-Value Theory

The Expectancy-Value Theory is one of the most influential theories in explaining learning motivation (Moeller, Viljaranta, Tolvanen, Kracke & Dietrich, 2022). This theory explains how the learners think about the importance and value of the learning task, the expectation that they can perform well in the learning task, and the cost required for learning affect achievement and sustained participation in e-learning (Gorges & Kandler, 2012).

Expectancy explains that learners may expect a successful e-learning experience when they have a specific goal, a challenging task, self-efficacy, and past success experiences. In this study, it is assumed that there is no differentiation in difficulty due to the nature of the experimental e-learning program, so the expectancy factor of this theory was excluded.

Value, referring to the learner’s thoughts on the e-learning program, is composed of intrinsic value, achievement value, and utility value (An, Lai, & Gan, 2023; Jiang et al., 2018; Loh, 2019). Intrinsic value refers to the curiosity and interest the learner feels towards the learning content; achievement value is the perception that learning is important, and utility value is the extent to which the learner feels that learning is helpful for their personal goals. According to this theory, learners invest more time and effort to pursue e-learning goals and they participate with priority and persistence when they value the e-learning program highly (Moeller et al., 2022; Loh, 2019; Wigfield & Eccles, 2000). When the success of a learning task is important to an individual, there is a higher tendency to choose and continue that learning. As the learner perceives utility value for e-learning, the willingness to participate in the class increases, and perceiving intrinsic value increases the duration of learning and promotes deeper cognitive engagement (Jiang et al., 2018).

In the context of learning, the cost was initially included as a subfactor of value, but research suggests that it should be separated from the value due to the different nature of its influence on learning (Jiang et al., 2018; Jiang & Zhang, 2023). The cost of learning encompasses anxiety and fear felt during the learning process,

the amount of effort required to successfully achieve the task, and opportunity costs incurred from sacrificing one thing in order to choose another, and can be defined as effort cost, opportunity cost, and emotional cost. The higher the perceived cost required for learning, the more passive the participation in learning becomes. Therefore, the perceived cost by the learner influences learning participation and may, furthermore, affect academic achievement (Jianga et al., 2018).

2.2.2. Self-Regulated Learning Theory

Unlike traditional learning environments in offline, there is a physical distance between instructors and learners in online environments. Learners must be able to manage and plan their own learning activities, assess and manage the progress of their learning process and learning goals (Barnard et al., 2009; Pintrich, 1999). Learners must take responsibility for their learning time, workload, and resource utilization, and therefore, self-regulated learning is considered an essential ability for e-learning learners. Self-regulation in learning is a value-based decision, in which learners make decisions based on their judgment of the value of learning by comparing various situations (Pintrich, 1999). In this sense, Self-Regulated Learning Theory can be connected to the content of Expectancy-Value Theory. Scholars who have studied Self-Regulated Learning Theory have presented various components of self-regulated learning, with commonly presented factors including cognitive regulation, motivational regulation, and behavioral regulation, although the composition of each factor and sub-factor may varies. Cognitive regulation includes cognitive strategies such as memorization, demonstration, and organization of content for learning, as well as metacognition, which includes planning, regulating, and monitoring in learning. Time and resource management strategies are connected to cognitive regulation and behavioral regulation and are particularly important elements of self-regulation for e-learning learners who must plan and proceed with their own learning. In previous studies, the element expressed by various terms is summarized and used as ‘scheduling’ in this paper. These components have been found to have a significant impact on learner engagement in e-learning. Learners who have self-regulatory abilities plan and proceed with their learning accordingly. Therefore, self-regulated learning abilities increase learner motivation, leading to more active and prolonged participation in learning.

Based on the characteristics of e-learning that learners must plan and proceed with their own learning, and from previous studies based on motivation theories explaining the relationship between motivation factors and learner participation, value, cost, cognitive regulation, and scheduling were selected as four components of e-learning motivation aligning with the keywords ‘learner participation,’ ‘e-learning,’ and ‘learning motivation.’

3. Method

3.1. Research Model

This paper relies upon two theories to elucidate the relationship between motivational factors and learner participation. Expectancy-Value Theory posits that participation is more likely when the e-learning program is highly valued by learners and its associated costs are perceived as minimal. Conversely, Self-Regulated Learning Theory postulates that more participation is shown by learners when the ability to plan and schedule their learning independently is possessed and cognitive regulation capabilities in e-learning contexts are exhibited.

“*value(v)*,” which signifies the importance and utility attributed to the e-learning program by learners, and “*cost(c)*,” representing the perceived risks, burdens, efforts, and opportunity costs associated with e-learning participation, were adopted from the Expectancy-Value Theory. “*cognitive regulation(r)*,” denoting the ability to employ meta-recognition, memorization, and comprehension during learning, and “*scheduling(s)*,” referring to the skill of autonomously planning and organizing learning, were derived from the Self-Regulated Learning Theory. These four components are collectively constituted as the Motivational Factor Value (MFV), and are used as the key motivational elements influencing the *participation score (ps)*, as illustrated in Figure 1.

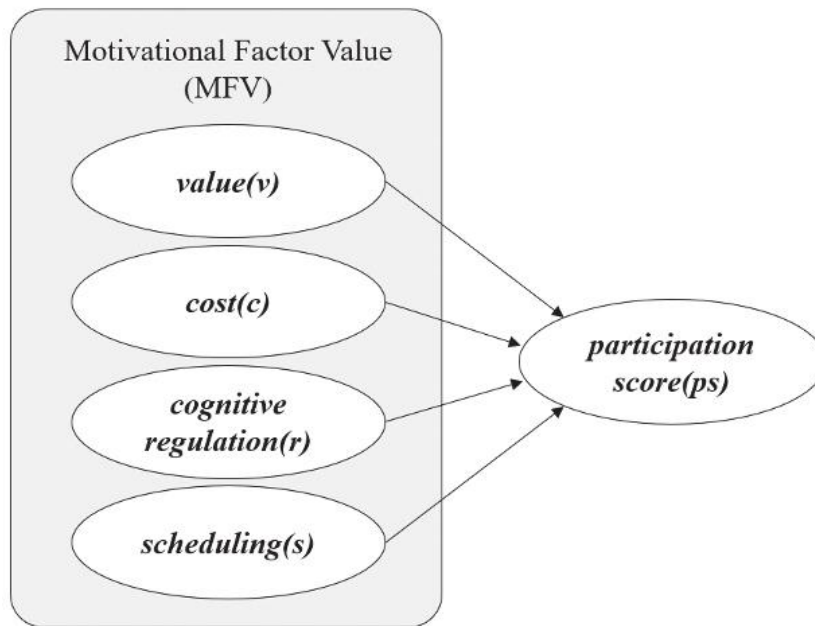


Figure 1. Research Model

3.2. Measures

3.2.1. Collecting Motivational Factor Value (MFV) from a Survey

Motivational Factor Value (MFV) comes from the data that each learner answers the survey. MFV consists of *value(v)*, *cost(c)*, *cognitive regulation(r)*, and *scheduling(s)*. Questionnaires for the survey were drew from previous studies and confirmed after modification for this study. This survey is provided at the beginning of the experiment.

3.2.2. Measuring Participation Score (PS) from an Experiment

Measuring learner participation has been suggested mostly in two ways, by the system or by the survey. Participation in the survey has limitations. Survey answers by learners themselves can be biased or subjective to what they recognize themselves. Therefore, in this study, participation was measured by the system using log data of learners. An e-learning program about the Etymological Study of English Vocabulary was implemented on MoodleCloud to easily collect log data of learners along the learning process. This experiment begins with a survey and provides a series of e-learning activities, and finally end with another survey. The number of learning activities completed by learners was multiplied by the weight based on the standard elapsed time, and the total sum of these yields *participation score(ps)*. The maximum score can theoretically be 30 when a learner completes all activities including surveys, videos, and quizzes. The minimum score can be 3 when a learner only answered a survey at the beginning without doing any further activities.

3.3. Analysis Process

The analysis was conducted in two stages: the first stage involved data collection and cleansing, while the second stage encompassed data analysis, as depicted in Figure 2. Data were prepared in the first stage by collecting log data from the e-learning program prepared on MoodleCloud. This e-learning program runs an experiment designed to measure learner participation along with a survey. After data cleansing, data from the survey were input to dependent variables, and data from learner participation were input to a dependent variable. A five-step statistical analysis was conducted to obtain meaningful results. This paper fundamentally presents an experiment aimed at quantifying the realistic participation of learners.

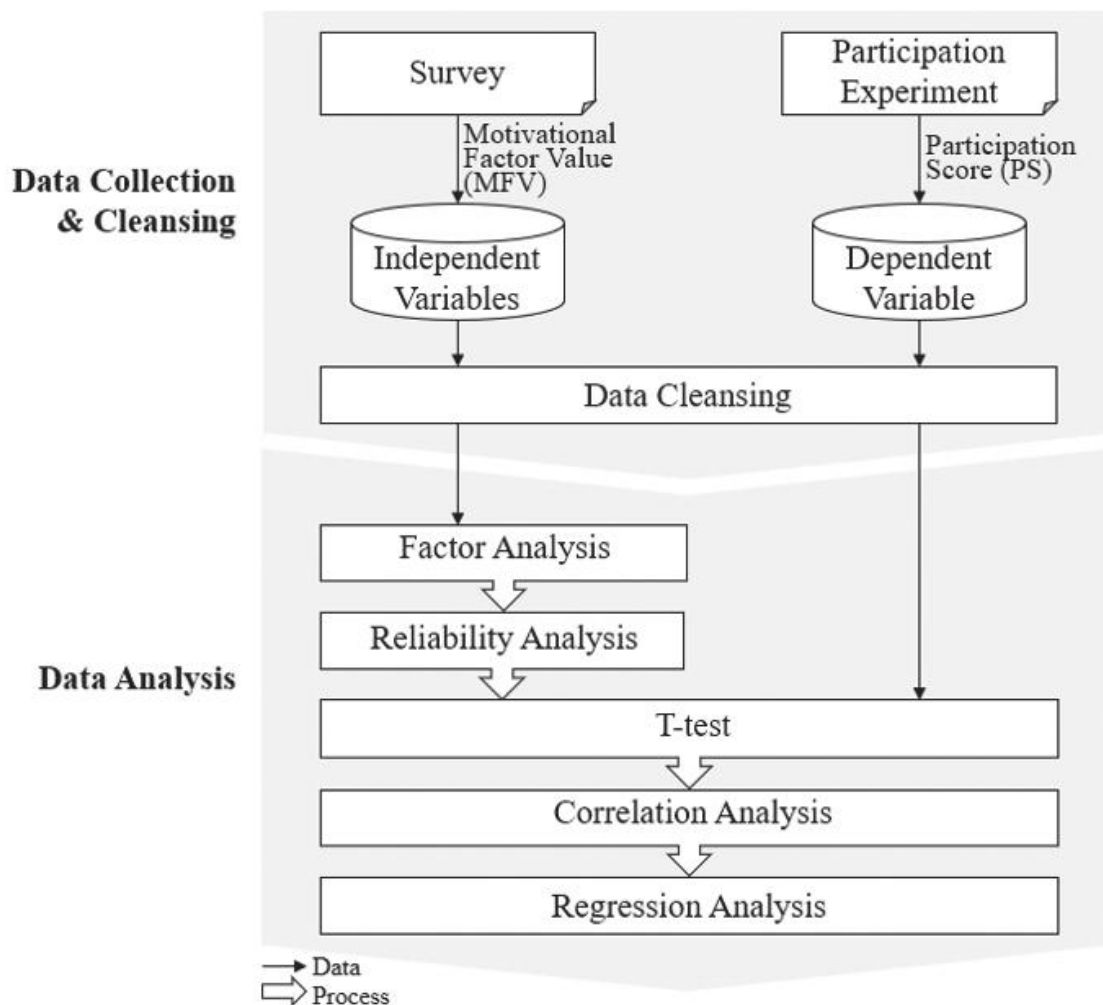


Figure 2. Analysis Process

4. Findings

4.1. Data Collection and Cleansing

This experiment took place over sixty-five days collecting data from sixty-eight participants. Fifty-eight of them completed the survey. Two of the fifty-eight participants showed outliers and therefore were removed. As a result of data cleansing, the survey results of fifty-six participants were utilized as the baseline data of this study. Males took 34%, females took 66% of the total participants, 37% of males completed the survey, and 54% of females did.

4.2. Data Analysis

Statistical analysis was conducted on fifty-six data. Factor analysis, reliability analysis, t-test, relativity analysis, and regression analysis have been applied using SPSS. Two types of data were collected from the learning activities of participants. The first one is Motivational Factor Value (MFV), collected from the survey, which was about the motivational factors of e-learning, later input to independent variables. The other was the *participation score(ps)*, collected from the experiment and later input to a dependent variable. Factor analysis and reliability analysis were conducted for survey validation using independent variables. Analysis of both independent and dependent variables was conducted as a t-test, correlation, and regression analysis.

4.2.1. Examination of Survey Validity and Reliability

Factor analysis was performed to examine the validity of the collected survey. Using the principal component analysis method with Varimax rotation, it was found that the questions effectively explained the four components of motivation. The Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy was 0.812, indicating sufficient sample adequacy. Bartlett's test of sphericity yielded a p-value of <0.001, justifying the usage of factor analysis.

Reliability analysis was performed to examine the reliability of the obtained factor analysis results. All four components of learning motivation exhibited Cronbach's alpha coefficients above 0.8, indicating high reliability for the items comprising each factor. Therefore, it can be concluded that the survey items effectively and consistently measure the intended factors in this study.

4.2.2. Difference Analysis

Differences between completers and non-completers of the e-learning program were analyzed. Among the 56 participants, there were 27 completers (48%) and 29 non-completers (52%). Independent sample t-tests were conducted to determine if there were significant differences between completers and non-completers for each learning motivational factor. Statistically significant differences were found for the *value(v)*, *cognitive regulation(r)*, and *scheduling(s)* factors, while no significant difference was found for *cost(c)*. Learners who perceive the importance and usefulness of e-learning program and develop an interest in it, as well as those who understood cognitive learning processes, were more likely to persist until completion. Additionally, learners who were able to manage their study schedule and methods effectively during the experiment were more likely to complete their learning. The lack of a significant difference in *cost(c)* may be because learners considered the opportunity costs and psychological burdens before participating in e-learning, or once they had started, these costs and burdens had less of an impact.

4.2.3. Correlation Analysis of Motivational Factors and Participation

Correlation analysis was performed providing Pearson correlation coefficients among the four motivational factors, *value(v)*, *cost(c)*, *cognitive regulation(r)*, and *scheduling(s)*, and the *participation score(ps)*. It was found that all factors had significant correlations with learner participation at a significance level of 0.05 or 0.01. Furthermore, all correlation coefficients were below 0.7, indicating that there is no issue of multicollinearity between the variables.

4.2.4. Impact Analysis of Motivational Factors on Participation

Multiple regression analysis was performed with four independent variables: *value(v)*, *cost(c)*, *cognitive regulation(r)*, and *scheduling(s)*. In order to determine the impact of these four independent variables on the dependent variable, the backward elimination was employed, which involves initially analyzing all independent variables and gradually removing them one by one, starting from the least statistically significant variable, until significant factors remain.

According to Table 1, the R-square and adjusted R-square values increase in model 2 compared to model 1 but decrease in model 3. All three models have a significance probability of $p < 0.05$, therefore, the regression equations of all three models are statistically significant.

Table 1. Regression Analysis: Summary

Model	R-square	Adjusted R-square
1	0.285	0.229
2	0.285	0.243
3	0.269	0.241

Although the R-square and adjusted R-square in model 2 are higher than those in model 3, this paper adopts model 3. The reason for this decision can be found in Table 2. By applying backward elimination, all four factors were included in the analysis in model 1. However, as there were no factors showing a significance probability of $p < 0.05$, the least influential factor, *cost(c)* was eliminated. In the analysis of model 2, conducted with the remaining three factors, both the R-square and adjusted R-square increased compared to model 1. However, since there were still no factors showing a significance probability of $p < 0.05$, the factor with the least influence, *cognitive regulation(r)* was further removed. After the elimination of the two factors in earlier stages of models 1 and 2, model 3 was analyzed with the remaining *value(v)* and *scheduling(s)* factors, both of which had a significance probability of $p < 0.05$, indicating statistical significance. Therefore, even though the R-square and adjusted R-square decreased in model 3 compared to model 2, model 3 was adopted due to the absence of significant factors in model 2, representing that *value(v)* and *scheduling(s)* are two motivational factors that impact learner participation.

Table 2. Regression Analysis: Coefficient

Model	Motivational Factors	Unstd. B	Std.B	t	p	VIF
1	(Constant)	-10.636		-1.534	0.131	
	value(v)	2.738	0.221	1.399	0.168	1.772
	cost(c)	0.064	0.007	0.050	0.960	1.364
	cognitive regulation(r)	2.468	0.176	1.040	0.303	2.044
	scheduling(s)	2.366	0.238	1.620	0.111	1.540
2	(Constant)	-10.648		-1.552	0.127	
	value(v)	2.753	0.222	1.438	0.157	1.730
	cognitive regulation(r)	0.492	0.178	1.083	0.284	1.960
	scheduling(s)	2.379	0.239	1.672	0.101	1.490
3	(Constant)	-7.510		-1.206	0.233	
	value(v)	3.817	0.307	2.317	0.024	1.275
	scheduling(s)	2.965	0.298	2.249	0.029	1.275

5. Conclusion and Discussion

The result of this study revealed that the significant factors of learning motivation that impact learner participation in e-learning are value and scheduling. The influence of value on learner participation was shown to be greater than that of scheduling. As learners perceive a greater necessity, interest, and usefulness of the learning program, they are more inclined to participate in the learning process. Moreover, learners endowed with proficient self-management skills, especially in devising learning plans and managing their schedules, tend to immerse more deeply in the learning experience.

Both learners and e-learning providers can establish strategies by acknowledging the pivotal roles of value and scheduling skills to enhance learner participation. In order to successfully participate in e-learning, learners need to confirm their scheduling skills and cognitive recognition of the learning context before starting. Learners require self-regulation skills to create and consistently follow a study plan, thus self-reflection and commitment are necessary. It's also advisable for learners to evaluate the pertinence and potential application of the learning program prior to its onset. This can be achieved by fostering curiosity and building prior knowledge via a preliminary review of the course content.

Future research might consider the creation of an index representing each learner's motivation level concisely and intuitively within the e-learning context. Leveraging such an index could empower both learners and providers to craft targeted strategies enhancing learner participation.

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156-Online Teaching Journey: Case of Indonesia

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Abstract

Online teaching has been emphasized in Indonesia, especially after the Pandemic. While lecturers in higher education institutions had little preparation when they started online teaching during the Pandemic, they eventually reflected that they enjoyed online teaching, which offers both lecturers and students flexibility. Based on that trend, lecturers from 10 higher education institutions in Indonesia collaboratively developed the Micro-Credential Program for Game Developers as part of the game talent development effort to support the game industry in Indonesia. The Micro-Credential Program for Game Developers has been introduced to higher education students across Indonesia as an online program aiming at developing skills of creativity, innovativeness, and teamwork to develop games. It is micro-credential consisting of 20 credit hours of study load to be completed within 14 weeks. Started in 2022, the program is offered fully online, with a videoconferencing component to provide virtual face-to-face meetings, and a virtual lab for game development teamwork. As the program enters its 2nd intake, the course developers and lecturers reflected on their online teaching journey in this Micro-Credential Program for Game Developers. Starting on how they designed their course, conducted the teaching process, and supported students in learning have been considered new and unique. Further, their reflection is correlated to the student's achievement in the final grade. This paper will discuss the reflection of 28 lecturers tapped using a set of questionnaires and in-depth virtual interviews focusing on 1) course design which includes design and alignment for course organization, learning outcomes, sequence of activities, use of varied learning resources, and assessment, 2) teaching process which includes learning presence, cognitive presence, and social presence of the lecturers, and 3) students support that consists of guidance for students to use institutional supports, technical assistance, feedback and motivation, and monitoring students learning progress. Then the reflection is correlated quantitatively to the student's achievement in the Micro-Credential Program for Game Developers.

Keywords: *Online teaching, Indonesia, game developer, micro-credential program.*

1. Introduction

Online education has been emphasized in Indonesia, especially after the Pandemic. While lecturers in higher education institutions had little preparation when they started online teaching during the Pandemic, they eventually reflected that they enjoyed online teaching, which offers both lecturers and students flexibility. As they enter the new normal, a study done by Universitas Indonesia indicates that 76% of students and 91% of lecturers preferred to start their semester using the online or blended delivery mode (Harris, 2021).

Furthermore, online education has also been supported by the Government of Indonesia through the issuance of the MBKM Policy in 2020. The MBKM (Merdeka Belajar, Kampus Merdeka = emancipated learning) is a program that allows universities and industries to collaboratively provide better quality education to meet industries' demand through a series of activities that will be recognized as 20 credit hours per semester earned by a student during the last three semester of the study period. Through MBKM, students can engage in taking courses from other study programs or universities, students are also allowed to take a micro-credential program that will be suitable for the 20 credit hours load per semester. This policy has been a milestone for online education development in Indonesia, as well as a driving force for the establishment of ICE Institute as an online courses marketplace.

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1.2. Background of Study

Based on the MBKM policy and in an effort to support the Government of Indonesia's need to develop Game Talents in Indonesia, 10 universities and four game industries⁶, collaboratively designed a Micro-credential Program for Game Developers in 2021. The program aims at creating students who will become creative and skillful game talent in the national game industry. Specifically, at the end of the program, students are expected to have competency in creating digital games. The curriculum was designed based on the double diamond design thinking framework from Nessler (2016) which provides a means for designers, creative thinkers, or even project managers to set up, frame, organize, structure, run, or manage creative design works and projects. Based on its creative scope of work in game development, the double diamond design thinking framework fits the purpose of designing the curriculum of the program.

The Micro-credential Program for Game Developers was designed to consist of five streams of 28 courses and a Capstone Project as depicted in Table 1 (Pannen, Ramdhani & Nugraha, 2022).

Table 1. Curriculum Content

Stream	Course
Game Programming This program is aimed at developing the talent of game developers in building fundamental game mechanics based on the application of algorithms and programming logic.	1. Introduction to Unity Game Engine
	2. Building Micro-gamer: Pong 2D
	3. Building Microgamer: Side Scrolling Platformer 2D
	4. Building Microgamer: Top Down Shooter 2D
	5. Building Microgamer: 1st Person Shooter 3D
	6. Building Microgamer: 3rd Person Shooter 3D
	7. Building Game Monetization
Game Artist This program is aimed at developing the talents of audio-visual virtual object resource developers in building games	1. Game UI
	2. Game Audio Engineering
	3. 3D Game Modelling
	4. 3D Game Animation
	5. 2D Game Animation
	6. 2D Game Object
Game Designer This program is aimed at developing the talent of game developers in designing the plot of a game which includes story concepts, level arrangements, and interface design	1. Game Layout
	2. Game Mechanic Design
	3. Game Flow Design
	4. Game Story Design
Game Project Management This program aims to prepare trainees to be able to analyze the game market project management and determine the direction of game development for Entertainment Games, or Serious Games and manage company business game projects	1. Production Management
	2. Monetization
	3. Serious Game
	4. Entertainment Game
	5. Market & Business Analysis
Educational Game This program is aimed at developing game developer talents in education to accelerate innovation in learning activities in various fields and levels	1. Pedagogy for educational Game
	2. Instructional Game Design
	3. Introduction to Renpy Game Programming
	4. Implementing Creative Game System for Renpy
	5. Advanced Renpy for Educational Game
Capstone Project This program is intended as a collaborative project that integrates five streams in the curriculum with intensive mentoring to produce prototype outputs.	Capstone Project Steps:
	1. Team Building – tools & case development, design thinking, sharing mentor
	2. Game Development #1
	3. Game Development #2
	4. Game Development #3
	5. Final Product
6. Competition	

⁶ i.e., University of Indonesia (UI), Gadjah Mada University (UGM), Ten November Institute of Technology (ITS), Pelita Harapan University (UPH), Bina Nusantara University (Binus), Telkom University (Tel-U), Pradita University, Amikom University, Bandung Institute of Technology (ITB), the Open University (UT), Lentera Nusantara, Bumi Langit, Cakra, and Asosiasi Game Industri

The study load of this program is 20 credits which are to be completed by students in 14 weeks with intensive assistance from mentors. It consists of 5 main streams of 15 credits each and 1 Capstone Project of 5 credits.

At the micro level, each lecturer of the 10 universities designed one or two courses. The course design consists of a course plan, an online course developed in Open EdX LMS using various learning, and a set of assessments. The offering of each course is varied. Some courses are delivered fully online and few are lecturer-led courses. In the lecturer-led course, a face-to-face meeting is facilitated through Zoom or MS Teams meeting. In delivering the courses, the lecturers were assisted by one or two mentors who monitored students' learning progress.

When the student completes the requirements of a course, the student may obtain the individual course certificate. When the student completes all courses in a single stream, then the student will obtain the stream certificate. Further, the students will be grouped into a group of 10 members – 2 members from each stream – to develop a game through the virtual game lab in the Capstone Project. At the end of the Capstone Project, there is a competition for games being developed. Each group has to present its game to three evaluators from the game industry. The best three games are selected for the incubation process. The process is depicted in Figure 1.

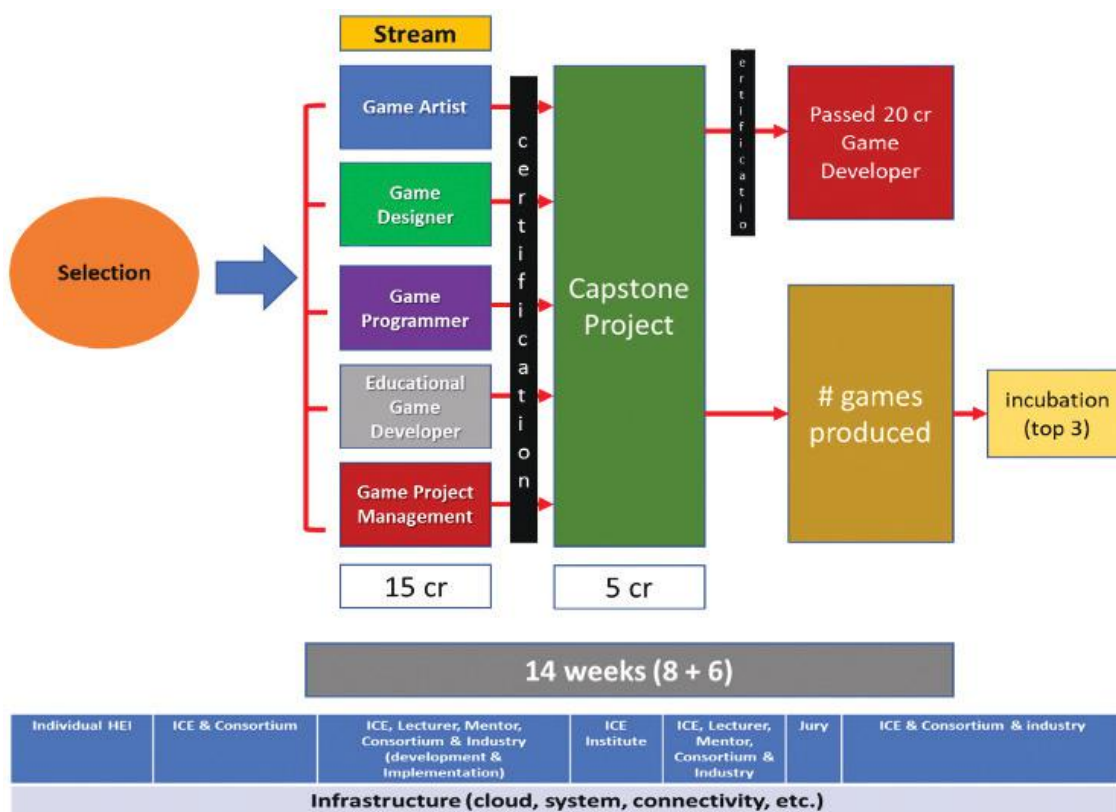


Figure 1. The Micro-Credential Program for Game Developers

This paper will discuss the reflection of 28 lecturers in their teaching journey in the Micro-credential Program for Game Developers for the 2nd cohort, focusing on designing online courses for the Micro-credential Program for Game Developers, teaching online courses, and supporting students to learn as correlated to the student's achievement (final grade) in the program.

1.3. Significance of the Study

Effective online instruction depends on learning experiences that are appropriately designed and facilitated by knowledgeable lecturers (Zheng, Lin & Kwon, 2020). In this study, effective online instruction is indicated primarily by student achievement. In the first batch of the Micro-credential Program for Game Developers, the completion rate was 90.2%, and in the 2nd batch was 92.9%. This completion rate is relatively higher than the completion rate of other online courses offered through ICE Institute which is around 25% completion rate (ICE Institute, 2023).

As such, which factors significantly correlate to the student's achievement in the Micro-credential Program for Game Developers? Assuming other factors are equal, does the course design by the lecturers play a significant role in the student's achievement? Or the teaching process? Or the provision of students' support? Understanding the significant factors correlated to student achievement will indicate which part of the ICE Institute's online programs needs to be improved for better student achievement in an online learning environment.

The future of online education will depend on the quality of how online education is provided. Therefore, the purpose of this research is to shed light on how to improve the quality of online education by considering the online lecturers' reflections on their online teaching journey. The research question of this study is "What are the opinions of online lecturers on their online teaching journey?"

2. Literature Review

Online education is not simply an electronic copy of traditional face-to-face education. The ultimate test of online education will be the quality of online education as the most important factor. The dimension of quality of online education programs has been raised by many researchers (e.g., Du, Li & Wang, 2018; Littlefield, Rubinstein & Brown Laveist, 2019; Marciniak, 2018; Nazneen, Alsulimani, & Sharma, 2020; Shraim, 2020). The effectiveness of online learning depends on many factors, nevertheless, Pannen (2021) asserts that quality online education highly depends on the quality of course design, the teaching process, students' assessment, and the provision of support. Up-front course design takes on more prominence in online education than in classroom teaching. It is believed that good quality course design by lecturers will lead to good implementation of online learning and good learning results.

2.1. Course Design

Course design plays a pivotal role in the efficacy of online courses. Appropriately structured by proficient educators, online courses can offer students effective and tailored learning experiences (The Illinois Online Network, 2005), (Zheng, Lin & Kwon, 2020). Learning effectiveness in online instruction depends on instructors' ability to translate the unique benefits of face-to-face interactions into the online realm (Hayashi, et.al, 2020). Online educators engage actively in crafting course content, delivering lectures, and curating diverse online activities to foster student engagement, facilitating interactions among students, and fostering a sense of academic community among both students and faculty members.

Course design encompasses the strategic alignment of course components, learning objectives, sequential activities for fostering student engagement and retention, utilization of diverse learning resources, and assessment methodologies. Notably, Al-Naabi, et.al, (2021) affirm that course design significantly influences students' attainment of critical thinking skills. Furthermore, Marciniak (2018) emphasizes that course design constitutes the primary facet of high-quality online courses, encapsulating program justification, objectives, student profiles, thematic content, pedagogical activities, instructor profiles, didactic materials, learning strategies, assessment techniques, tutorials, and the virtual classroom environment.

In concordance, a comprehensive review of online learning literature conducted by Tallent-Runnels et al. (2006) delineates four principal areas of focus within online instruction: the course environment, learners' outcomes, learners' attributes, and institutional and administrative factors. Meanwhile, Martin, Bolliger, and Flowers (2021) categorically posit that there exist five quintessential domains of design standards that significantly influence students' learning experiences: (a) an overview, (b) the presentation of content, (c) interactions and communication, (d) assessment and evaluation, and (e) provision of learner support.

2.2. Teaching Process

Within the framework of the Community of Inquiry model, Garrison, Anderson, and Archer (2000) underscore the multifaceted nature of the teaching process, encompassing learning presence, cognitive presence, and social presence exhibited by instructors. Specifically, teaching presence is characterized as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Center for Advancing Teaching and Learning through Research, Northeastern University, 2020).

In the realm of online education, the nomenclature for teaching presence has seen diverse interpretations among researchers. Learning strategies (Marciniak, 2018), teaching and learning dynamics (Bates, 2000), and even

program delivery strategies (Frydenberg, 2002) have been invoked. Converging perspectives emphasize the imperative of integrating learning and teaching theories into online education (Bates, 2000; Chaney et al., 2009; Khan, 2001). This paradigm shift necessitates fresh pedagogical approaches, distinct from traditional instruction (Altun & Johnson, 2022), coupled with adeptness in online pedagogy and effective utilization of online teaching skills (Khan, 2001). Altun & Johnson (2022) accentuate the pivotal role of educators in motivating and guiding students throughout the online learning process. This encompasses organizing online discussions, curating engaging activities, infusing personal engagement, and fostering creativity in the virtual classroom. Furthermore, Albelbisi, Al-Adwan, and Habibi (2023) mention that interactivity between students and lecturers in online courses has been one of the positive features mentioned by the students taking MOOCs in Malaysia.

According to Garrison, Anderson, and Archer (2000), the role of instructors in fostering students' learning within the online teaching environment involves vigilant oversight and commentary on students' contributions and coursework. This practice is orchestrated to sustain their engagement, motivation, and interest in the course. Within this framework, educators play a pivotal role as intellectual and scholarly leaders (Anderson et al., 2001), in exemplifying the way students contribute and engage, and cultivating students' self-directed learning proficiencies and digital literacy skills.

Central to online teaching is the interactive engagement between lecturers and students, deemed essential for student success. Engagement refers to learner participation with peers, instructors, and materials in the learning management system. Interaction, an active learning environment, as well as clear instructions and guidance, are effective for increasing student online engagement (Chang et al., 2015). Abubakari, Nurkhamid, and Priyanto (2021) assert the significance of factors such as personal innovativeness, institutional support, and student motivation in driving online engagement. Their study underscores the substantial impact of instructor interactivity on student-material interaction, cascading positively to student-student interactions. This engagement-centric approach strives to mitigate challenges like low academic achievement, augmented learning disinterest, and escalated attrition rates arising from student disengagement in online course activities.

Amidst varied delivery modes of online courses, including fully online or self-paced and instructor-led formats, the underpinning of a quality teaching process remains imperative. A well-designed course without a robust teaching process will lower the efficacy of students' learning journeys, and consequently, their achievements in the online course.

2.3. Students support

According to Marciniak (2018), students' support encompasses various facets, including providing guidance on utilizing institutional resources, offering technical assistance, delivering feedback and motivation, and monitoring students' learning progress. In a broader context, student support encompasses additional assistance aimed at facilitating both academic attainment and personal development. Elaborating on the purpose of support for student learning, Earwaker (1992) emphasizes its role in "ensuring the maximal benefit derived from the educational experience." Given its consequential impact on the online learning landscape, student support emerges as a pivotal factor influencing student achievement within online course (Rovai & Downey, 2010).

Research by La Rotta, Usuga, and Clavijo (2020) aimed to ascertain student expectations in the realm of online education. Their study identified five distinct factors: (1) Teacher dynamics, (2) Support from academic resources, (3) Administrative assistance, (4) User interface quality, and (5) Course enrollment procedures. Similarly, Brindley et al. (2004) define student support as "*all educational activities and components tailored to address the needs of specific learners or learner groups, intended to facilitate cognitive, affective, and systemic aspects of the learning process.*" The domain of student support predominantly encompasses instructional endeavors, tutoring, advising, counseling, and information management systems. Additionally, Scretto & Pamulaklakin (2015) affirm that efficacious and responsive student support services play a pivotal role in aiding students to achieve their learning objectives, thus promoting success in open and distance e-learning environments. These support services bear equal significance alongside the provision of high-quality academic content to ensure successful educational outcomes.

Given its critical role in sustaining learning momentum and accomplishment, Nguyen (2023) underscores the escalating significance of supporting students in their online self-regulated learning (SRL) endeavors. Further, according to Nguyen, student support exerts considerable and equitable influence on metacognitive skills and perseverance within online learning contexts, alongside students' efforts in organizing their physical learning environments, significantly contributing to overall success.

Expanding upon the concept, Sang et al. (2011) outline student support as encompassing instructional guidance for learning (academic support) and fostering dialogues and course structures to stimulate motivation and facilitate mastery of course materials, thereby attaining learning objectives. Course-level support is paramount in ensuring seamless and uniform navigation, thus averting student frustration and discontentment. Moreover, heightened student support combined with rigorous instructional demands is posited to cultivate advanced study strategies conducive to elevated performance.

In the same vein, Martin, Bolliger, and Flowers (2021) underscore the indispensability of student support for online students' success. Their strategies encompass intuitive and consistent course navigation, easily accessible and viewable media, detailed technological prerequisites, and resources for technology access and institutional support services. Recognizing the diversity of online students' backgrounds and resources, the specification of technology requirements and media compatibility with mobile devices becomes imperative. This approach aligns with the findings of Han & Shin (2016) and Ssekakubo et al. (2013) that asserts institutions are to offer a diverse spectrum of support services to online students, spanning both academic and technical dimensions.

Evidently, the absence of robust student support has been identified as a notable impediment to adopting Massive Open Online Courses (MOOCs) in Malaysia (Albelbisi, Al-Adwan, Habibi, 2023). Nsamba & Makoe (2017) posit that student support services are pivotal in addressing learners' cognitive, emotional, and social needs, effectively bridging the gap between learners and educational institutions in the absence of live teacher interaction.

2.4. Students Achievement

Student achievement encompasses the successful fulfillment of course requirements and satisfactory progression toward degree attainment. This term is used interchangeably with related expressions such as learning outcomes (Pilli & Admiraal, 2017), academic success (Radovan, 2011), and academic achievement (Dinh, 2023). The concept of student achievement is intricate and multifaceted, thus rendering its influencing factors to be diverse. Pilli & Admiraal (2017) ascertain that student achievement within online education is underpinned by four interrelated components: students' characters, learning environment, learning processes, and learning outcomes. The student's character pertains to both academic and personal traits. The learning environment assumes the form of online courses, carefully designed considering pedagogical principles, tool integration, task sequences, duration, feedback mechanisms, and evaluation methods. Meanwhile, the learning process encompasses students' active engagement in online courses, inclusive of supportive measures for fostering learning. Learning outcomes encompass aspects of engagement, accomplishment, and attrition.

The present review underscores pivotal determinants of student success in online education, including assignment-centric approaches, well-structured courses, sequential curriculum designs, thoughtfully crafted assessments, task-oriented online platforms, compact learning modules, and various instructional resources (Forsey, Low, & Glance, 2013). Notably, these salient features embedded within online courses demonstrate a positive influence on student achievement. Instances encompass group projects, e-learning activities, tutorial sessions, online quizzes, and engaging discussion forums, where students share daily affirmative experiences, thereby contributing to student achievement (Al-Atabi & DeBoer, 2014). It is imperative to recognize that the metrics and evaluation methodologies employed to measure student achievement within online courses may be different from those within traditional face-to-face classrooms.

Another pivotal facet within the learning outcomes paradigm is attrition, which significantly impacts student achievement in online courses. Notably, retention rates in online courses tend to be considerably low (Pilli & Admiraal, 2017). Nonetheless, extensive research elucidates that certain course design characteristics serve as robust predictors of student retention within online courses. These encompass course structures emphasizing flexibility, instructor-guided support coupled with vigilant monitoring, elevated cognitive engagement, and the provision of high-quality course materials, which collectively augment student retention (Campbell et al., 2014). Scholarly observations reveal that elevated attrition rates stem from multifaceted causes such as "lack of time," "ineffective time management," and "limited engagement with course tasks" (Pilli & Admiraal, 2017).

In a comprehensive view, the dynamics of student achievement, encompassing course design, instructional methodologies, and robust student support systems, collectively shape the educational success in online learning contexts.

3. Research Framework

This study specifically focuses on lecturers' perceptions regarding course design, teaching process, and provision of students' support that they have carried out through the planning, implementation, and evaluation stages of the Micro-credential Program for Game Developers.

In this study, the course design model employed is the adaptation of ADDIE Model (Dick & Carey, Carey (2009), as follows:

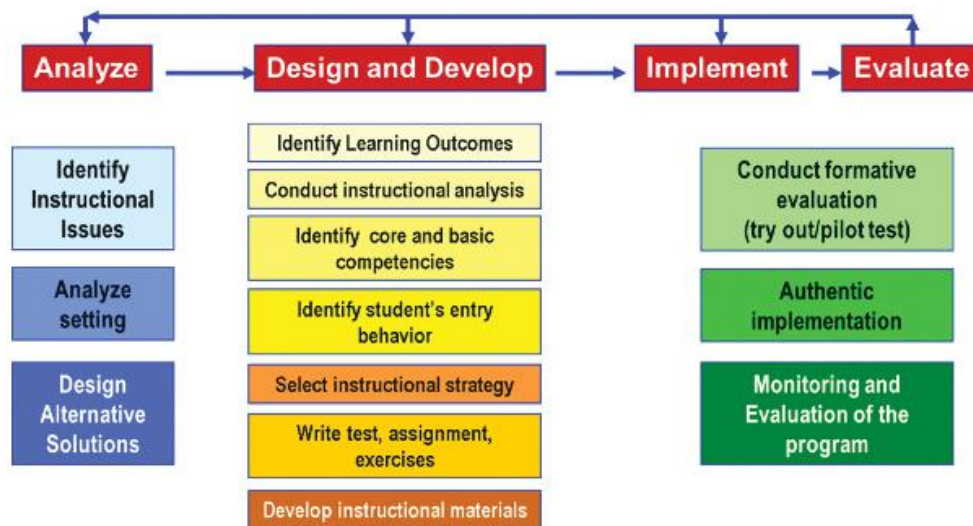


Figure 2. The ADDIE Model (adapted)

In this case, the analysis stage was not conducted by individual lecturers, since the ICE Institute as the program manager has conducted the analysis stage. Nevertheless, lecturers are involved intensively in designing and developing the online course, implementing the online course, and also evaluating the students' achievement. Therefore, in this study, the online course design specifically refers to the design and development stages, and the evaluation of students' achievement. Meanwhile, the implementation stage has been translated into the teaching process and provision of student support.

The research framework is as follows:

Course design is defined as the efforts of individual lecturers to design and develop online course using various learning materials and taking advantage of the availability of technology. It consists of 13 points under 5 components of course design (Martin, Bolliger, and Flowers (2021). The teaching process is defined as activities carried out by lecturers to ensure students' understanding and ability to perform in a certain area as a result of the process. In this study, the teaching process is translated into several components of facilitation and guiding, the use of a flexilearning strategy for reflection and engagement, monitoring the progress, and providing feedback Garrison, Anderson, and Archer (2000). The provision of student support is highly related to the teaching process. It has several factors (La Rotta, Usuga, and Clavijo, 2020), including teacher dynamics, support from academic resources, administrative assistance, user interface quality, and course enrollment procedures. Meanwhile, the student's achievement is defined as the final grade students obtain from the Micro-credential Program for Game Developers.

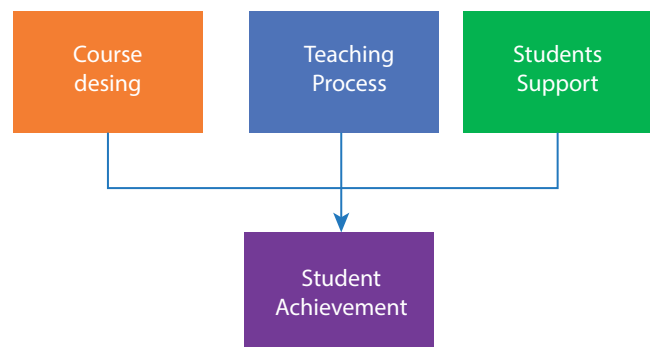


Figure 3. Research Framework

4. Method

This study employed a descriptive research method, which sought to investigate the perceptions held by lecturers regarding their online teaching journey. The lecturer's reflection covers designing an online course, implementing teaching, and providing students' support. Data were solicited from individuals using a questionnaire survey instrument. Online surveys, administered through the Google form, were used to gather data during the months of June - July 2023.

The student's achievement in this study comes in the form of the final grade of the Micro-credential Program for Game Developers from 141 students participating in the program.

5. Population

The population included 28 lecturers (n=23 male, n=5 female) from 10 universities involved in the Micro-credential Program for Game Developers run by ICE Institute in January – June 2023. For the students, the population is 141 students (n=103 male, n=38 female) of the Micro-credential Program for Game Developers, coming from 24 higher education institutions in Indonesia.

The sampling strategy applied for this study was taking the population as respondents since the population size is relatively small.

6. Instruments

The instrument was constructed based on several studies on a similar subject as mentioned in the review of literature. It consists of 46 items to tap lecturers' reflections on him/herself (8), course design (13), teaching process (10), students' support (10), and personal reflection on the course (5). It was designed to be a Likert scale questionnaire with five scales of Strongly Agree, Agree, Neutral, Disagree, and Strongly Disagree. Each scale was then assigned a nominal for ease of data analysis and interpretation, thus Strongly Agree is valued to be 5, while strongly disagree is valued 1, and neutral is 3. The Strongly Agree and Agree (≥ 4.0) are considered positive indicators, while the Disagree and Strongly Disagree (≤ 3) are negative indicators.

The instrument was validated by an educational technology expert for readability, redundancy, and content validity. From 61 items, the final questionnaire consists of 46 items (Figure 3).

The questionnaire was distributed in the Google form to n=28 lecturers during June-July 2023.

7. Data Analysis & Discussion

The study examines the relationship between Course Design, Teaching Process, and Student Support toward Students Achievement in the Micro-credential Program on Game Developers by ICE Institute. Functioning as the independent variables, Course Design, Teaching Process, and Students Support are correlated against the dependent variable of Students Achievement. The dataset, drawn from a cohort of n=28 lecturers, undergoes analysis to measure the extent of correlations between each variable and students' achievement. To this end, the Pearson-product Moment Correlation method is applied, and subsequently, the three variables are collectively assessed vis-à-vis students' achievement utilizing regression analysis.

Course Design

- 1) an overview (1)
- 2) the presentation of content (5)
- 3) interactions and communication (2)
- 4) assessment and evaluation (3),
- 5) provision of learner support (2)

Teaching Process:

- 1) motivating and guiding students participation in the online course (3)
- 2) curating interactive engagement (3)
- 3) developing self-learning and digital learning skills (2)
- 4) providing feedback (2)

Students Support

- 1) Teacher dynamics (3)
- 2) Support from academic resources (4)
- 3) Administrative assistance (2)
- 4) User interface quality (1)

Figure 4. Questionnaire Structure

The results of the data analysis indicate as follows (Table 2):

1. Course Design is correlated significantly to Teaching Process (.772) and Students Support (.669) at the 0.01 level (2-tailed), along with a significant yet milder correlation with Students Achievement (.473) at the 0.05 significance level (2-tailed).
2. Teaching Process is correlated significantly to Students Support (.829) and Students Achievement (.530) at the 0.01 level (2-tailed).
3. Students' Support is correlated significantly to Students' Achievement (.762) at the 0.01 level (2-tailed).

This outcome substantiates the meaningful correlations between Teaching Process and Students Support, individually, with Student Achievement at the 0.01 significance level (2-tailed). Conversely, the Course Design is found to significantly correlate with Students Achievement, albeit at the 0.05 significance level (2-tailed).

Table 2. Correlations of Course Design, Teaching Process, Students Support to Students Achievement

		CD2 Course Design	TP2 Teaching Process	SS2 Student Support	HB2 Students Achievement
CD2 Course Design	Pearson Correlation	1	.772**	.669**	.473*
	Sig. (2-tailed)		.000	.000	.013
	N	28	28	28	28
TP2 Teaching Process	Pearson Correlation	.772**	1	.829**	.530**
	Sig. (2-tailed)	.000		.000	.004
	N	28	28	28	28
SS2 Student Support	Pearson Correlation	.669**	.829**	1	.762**
	Sig. (2-tailed)	.000	.000		.000
	N	28	28	28	28
HB2 Students Achievement	Pearson Correlation	.473*	.530**	.762**	1
	Sig. (2-tailed)	.013	.004	.000	
	N	28	28	28	28
** . Correlation is significant at the 0.01 level (2-tailed)					
* . Correlation is significant at the 0.05 level (2-tailed)					

In this case, the results indicate that lecturers' perceptions of Course Design, Teaching Process, and Students Support significantly correlated to Students Achievement. The mean of lecturers' perception of Course Design, Teaching Process, Students Support, and also Students Achievement are as follows (Table 3).

Table 3. Mean of Course Design, Teaching Process, Students Support, Students Achievement

Course Design (scale of 5)	Teaching Process (scale of 5)	Students Support (scale of 5)	Students Achievement (scale of 100)
4.3201	4.3222	4.3259	71.21

The average values of lecturers' perceptions of Course Design, Teaching Process, and Students Support are on the positive side (≥ 4.0). This indicates that lecturers have a positive perception toward the online teaching journey they experienced, starting with planning the online teaching in the form of designing their individual online courses, and implementing the online course or online teaching process, while also supporting students. This positive perception of lecturers in their online teaching journey is significantly correlated to Students Achievement. As such, this positive perception of lecturers needs to be encouraged as well as maintained by the ICE Institute as the managing institution for the Micro-credential Program for Game Developers.

Further analysis revealed that while the three independent variables of Course Design, Teaching Process, and Students Support are correlated significantly to Students Achievement, the strongest correlation is found in Students Support toward Students Achievement (R-Square = .580, Backward Regression Analysis).

Table 4. Backward Regression Analysis of Course Design, Teaching Process, and Student Support toward Students Achievement

Predictors:	R	R-Square	Adjusted R Square	Standard of Error of the Estimate
Course Design, Teaching Process, and Student Support	.785	.617	.569	.32978
Teaching Process, and Student Support	.783	.614	.583	.32445
Student Support	.762	.580	.564	.33157

Table 4 indicates that positive lecturers' perception of Students Support has the strongest correlation with Student Achievement (58.0%). Altogether, Course Design, Teaching Process, and Student Support contribute 61.7% toward Student Achievement. Meanwhile, Teaching Process and Teaching Process contribute 61.4% toward Student Achievement. Thus, Course Design contributes positively only 0.03% toward Student Achievement. Looking closer to Student Support, it has a 58.0% contribution toward Student Achievement. Thus, the Teaching Process contributes only 0.34% toward Student Achievement.

Drawing from the framework posited by La Rotta, Usuga, and Clavijo (2020), this study's data encapsulates diverse dimensions of support, encompassing teacher dynamics, academic resource provisioning, administrative assistance, user interface quality, and course enrollment practices. The data on lecturers' perception of Course Enrollment Procedures was not collected since lecturers do not provide support in this area. Students are directed to the hotline center of ICE Institute that provides support services to any students' query regarding the LMS, registration, enrollment, and also other technical aspects of the Micro-credential Program for Game Developers.

As such, the first coverage of teacher dynamics has been lecturers' assistance to students in connecting them to the ICE Institute support services (average of 4.29 on a scale of 5). Lecturers reported they provided a welcome message to students (average of 3.92 on a scale of 5), explained to students how to study online (average of 4.41 on a scale of 5), and motivated students to always study (average of 4.59 on a scale of 5). Under academic resource provisioning, lecturers reported introducing various other services and technical supports to technology that can be used by students (average of 4.33 on a scale of 5), guiding participants to access various learning resources (average of 4.37 on a scale of 5), communicating with students through various channels (average of 4.44 on a scale of 5) and guiding students to be academically responsible for their work (average of 4.44 on a scale of 5).

Under Administrative Assistance, lecturers reported providing timely feedback to any students' queries (average of 4.22 on a scale of 5) and monitoring the student's learning process systematically (average of 4.22 on a scale of 5). Under the User Interface Quality, lecturers were assisting students to make progress in their online learning journey through various navigation in the LMS (average of 4.22 on a scale of 5). These factors have been positively perceived by lecturers as part of their online teaching journey, which apparently significantly correlated to the student's achievement in the program.

It is apparent that Students Support constitutes the most salient factor in Students Achievement as perceived by the lecturers. As such, this finding needs to be taken into consideration by the ICE Institute to provide rigorous student support to assist students in their online learning journey for higher achievement. Partner universities also need to take this finding into consideration in selecting lecturers for conducting online teaching. In addition to the commitment to provide rigorous student support, the lecturers must also have a positive perception of their online teaching journey.

8. Remarks

Initiated by the inquiry, "What are the perspectives of online lecturers concerning their online teaching journey?", this study adopts a descriptive research methodology to tap into the perceptions of lecturers pertaining to online teaching and its correlation with student achievement. The discerned outcomes illustrate

positive perspectives among lecturers engaged in the Micro-Credential Program for Game Developers toward their online teaching journey. This positive perception extends across course design, teaching process, and student support, displaying a significant positive correlation with Student Achievement in the program.

Altun & Johnson (2021) underscore an important principle in enhancing online education quality, emphasizing an indispensable focus on the students' needs, particularly rigorous support to their online learning journey. This principle resonates findings from multiple scholars, including Cheawjindakarn, Suwannatthachote & Theeraroungchaisri (2013), Todos, Virlan & Ghencea (2017), and Marciniak (2018). In congruence with this scholarly discourse, the current study verifies the assertion that robust student support tailored to the unique students' online journey emerges as the most important factor contributing toward student achievement. The findings of this study further accentuate the need for educational institutions to particularly account for the student support aspect while designing their online course offerings.

Notwithstanding its contributions, this study warrants refinement through several aspects. Primarily, an expansion of the respondent is imperative, since this study is constrained by a relatively modest sample size ($n=27$). Furthermore, the analysis should investigate more details into each independent variable and ascertain their distinct correlations with student achievement across individual online courses. Additional determinant variables that exert significant influence within the online learning environment is another aspect for enhancement. Moreover, encompassing students' perspectives, alongside instructors, emerges as a promising trajectory for future inquiry. With these enriched perspectives, a more comprehensive understanding of online learning dynamics can be discovered, potentially informing policy and practice more effectively.

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160-Online Collaborative Writing for Improving Learners' Academic and Personal Writing Skills

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Abstract

During the last two decades, online collaborative writing (OCW) has been offered to help distance learners practice their writing skills as well as enhance their critical thinking skills through an interactive process. *OCW has been a challenging technique in giving English learners meaningful learning experiences in writing skills through an online learning environment.* The concept of collaborative learning is more on developing self-reliance, the autonomy of learners for self-learning, and critical learning of learners *This study aims to analyze how OCW helps learners improve their academic writing skills as well as personal writing skills and analyze their perceptions of practicing OCW in tutorial sessions of a distance learning institution in Indonesia.* This paper is part of a qualitative approach, using a research and development (R&D) method for developing a learning model of online-based collaborative writing for English argumentative essays. The method of R&D was based on the model of Gall, Gall, Borg, and Mendel, by adopting a system approach model of Dick, Carey, and Carey. *Twenty-nine learners who are student teachers participated in the study by taking part in collaborative argumentative essay writing. The activities include producing their writing, reviewing and editing other learners' writing, and finally revising their writing based on other learners' feedback and suggestions.* A literature review and an observation were conducted to answer the first research question, while an online survey was conducted to collect some information about the learners' perceptions toward the implementation of the OCW. *The results show a high level of participants' enthusiasm for the OCW activities. Furthermore, the learners were satisfied with the OCW experiences and showed a significant increase in their academic and personal skills in English writing.* Additionally, the learners' experiences in online-based collaborative writing on English argumentative essays help them enhance their academic writing skills in that genre. Meanwhile, the theoretical review of some personal aspects, such as motivation, interpersonal communication/social skills, and self-regulated learning, has described the improvement of their skills.

Keywords: *Academic skill; online collaborative writing; personal writing skill*

1. Introduction

Online distance learning (ODL) is the silver lining in this current situation of learning process, including writing skills. The teaching of writing in a foreign language through online delivery needs to consider pedagogical factors, including appropriate resources, appropriate techniques in various contexts, as well as qualified teachers (both content and use of technology). Today, technology has created a great opportunity for online collaborative learning, such as e-portfolios that can ultimately be incorporated into foreign language teaching curricula (Zhu & Bu, 2009). It is in a position to make the situation of English learning both creative and interactive and to give students exposure to practice in four main aspects of language skills, including writing skills (Yundayani, Kardijan, & Herawan, 2019). Nevertheless, the dynamic writing process has created difficulties for learners to improve all aspects of the stage at the same time, including learners of English as a foreign language. Commonly, they see writing as a challenge (Nunan, 1989). They struggle with writing skills, compounding their lack of faith in their writing abilities. It is hard for them to learn writing skills on their own. Gonye, Mareva, Dudu, and Sib (2012) have indicated that writing skills in English not only contribute to their learning in college, but that it is also necessary to pass writing skills to learners to become good authors.

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In addition, they argued that university students are known to have the ability to write professional academic texts, and that after graduation, they should show acceptable writing skills in their career. As a result, only those things that are automatic or have already been processed (O'malley, O'Malley, & Chamot, 1990) are selectively used and the learning skills needed for writing are not optimally achieved.

1.1. Online Collaborative Writing Through Wiki Moodle

Constructivist-based learning offered to higher-level learners or adults can be used through collaborative learning techniques. Over the last two decades, online collaborative writing (OCW) has been developed to help distance learners build their writing skills and improve their critical thinking skills through an interactive process (Aydın & Yıldız, 2014; Qiu & Lee, 2020). The concept of collaborative learning focuses primarily on the development of self-reliance, the autonomy of self-directed learners and the critical orientation of learners (Barkley, Cross & Major, 2014). Collaborative writing has become one of the best choices to help learners overcome their writing difficulties as well as gain meaningful writing activity (Dysthe, 2001; Storch, 2005; Fernandez Dobao, 2012). It gets involved learners in discussions in which meaning and form are negotiated, comprehensible input is acquired and modified output is generated.

The method of teaching writing skills has shifted from product-based to process-based learning (Shih, 1986). In addition, some language teachers have also embraced and introduced a gender-based approach to ensuring that their students focus on the intent and goals of their learning (Tuan, 2011). Writing skills can be learned by participating in group activities that would be too difficult for individuals to do on their own. Neo, Neo and Tai (2007) support the opinion by demonstrating that collaboration is a necessary and essential part of the learning process. Learners need to look for more experienced people to help them complete their assignments and acquire information and expertise that they do not have if they operate on their own. Browning (2012) suggests that collaborative writing in small groups can help learners learn and develop in a meaningful way. Through a collaborative process, they can be more successful than they are themselves. They can also develop their self-confidence and their sense of achievement. For some students, particularly those who have been identified as under-reachers, small-group collaboration may become their first experience of success and learn from their peers to accomplish their goals together and to feel productive.

Parks, Huot, Hamers, and H-Lemmonier (2003) address four forms of collaboration in writing learning. First, collaborative writing happens when two or more authors collaborate on the same text, sharing the same responsibility for output. Second, parallel collaboration happens when two or more authors do not have the same responsibility for production. Third, incidental collaboration occurs when a request for assistance specifically related to a written assignment is requested at a certain time. Fourth, hidden collaboration includes the practice of collecting information from certain linguistic or non-linguistic sources or records during the development process. Based on the four classifications, Posey and Lyons (2011) offer a range of techniques for the learning design of online collaborative writing based on a number of aspects, namely appropriate technology selection, group forming or collaborative training, and the provision of appropriate online collaboration facilities.

Online collaborative essay writing is suitable for English in-service teachers to develop their writing skills as well as strengthen their teaching strategies for their school students. It is necessary to select correct technology in online collaborative writing. There are five important aspects that need to be considered: (1) the availability of communication technology at the same time (synchronous) or not at the same time (asynchronous); (2) the use of technology in accordance with the expected learning; (3) continuous supervision to ensure that learners know how to use technology and understand its uniqueness; (4) encouraging learners to select the most suitable technology in line with their assignments; (5) maximizing the use of Web 2.0 technology that continues to promote communication, such as forums, wikis, instant messaging, social networking, the virtual world, and others (Posey & Lyons, 2011).

Wiki has made it possible for authors to embody the principles of OCW, in which learners will have their own pages and will be able to write collaboratively and make suggestions to each other. Purdy (2009) claimed that the wiki is an asynchronous communication tool that works on the principle of group composition, including collaboration, continual revision, and community knowledge creation. In addition, Godwin-Jones (2003) suggests that wiki provides space for group discussion and co-authoring texts is sufficient to support student-student collaboration. Some learners do indeed communicate with each other collaboratively during wiki-mediated community writing activities (Arnold, Ducate, & Kost, 2012; Aydın & Yildiz, 2014). Wiki may also be an alternative to assisting learners of OCW strategies (Aydın, 2014).

1.2. How is the online collaborative writing crucial in ODL?

On the basis of the previous study, there are still few collaborative online writing studies in higher education in the Indonesian context. This paper reports on the implementation of an online collaborative learning model of writing skills for students of the English Education Program at the Universitas Terbuka (UT), in particular those in advanced writing. Research has been conducted to promote distance learning in writing through successful online collaborative writing activities. Student teachers were asked to improve their academic and personal writing skills as part of their teaching experience. The goal of this analysis is to address the following research questions:

1. How does online collaborative writing (OCW) help learners improve academic and personal writing skills?
2. How do learners perceive the use of OCW at a distance learning institution?

The results of this study are useful in mapping the use of online collaborative writing at higher education level to improve the quality of the online learning process. Furthermore, they provide a complete overview of how much the application of collaborative online writing can lead to learners' lack of writing skills. It will eventually encourage online learning activities that suit the 21st-century education system and contribute to a supplementary recommendation to enhance the teaching and learning standard of the ELT in the current period.

2. Method

This paper is part of a qualitative approach, using the Educational Research and Development (ERD) framework to establish an online collaborative writing learning model for an English argumentative essay. The ERD process was based on the model of Gall, Gall, Borg and Mendel (year) by following the framework approach model of Dick, Carey and Carey (year). The reason for selecting this model is that it has been commonly used by various communities. This is consistent with the observation by Gall et al. (2007) that Dick et al. (year) have developed a commonly used educational research and development model. In addition, the design and development, as well as the evaluations carried out on the Dick, Carey, and Carey models, are quite detailed. Although the time required was very long with a sufficient number of accompanying resources, the standard of product creation is quite clear and successful.

A literature review and an observation were conducted to address the first research question, while an online survey was conducted to collect information on the learners' views of the application of the OCW. A literature review of the OCW was conducted to explore the implementation of the concepts of process-based writing (Shih, 1986) and some theories of argumentative essay writing (Chala & Chapetón, 2012; McCrimmon, 1984; Renkema, 1993). In addition, researchers have also introduced several tools in relation to the personal dimensions of distance learning, such as motivation, interpersonal communication or social skills and self-regulation (Altanopoulou & Tselios, 2017; Bargate & Maistry, 2015; Brown, 2008; Sánchez-Gómez, Pinto-Llorente, & García-Peñalvo, 2017).

An online survey was conducted using the online application www.surveymonkey.com to gather information from the learners about their impressions of the OCW process. The findings of the survey were analyzed in order to provide more details on the limitations and advantages of the application of the OCW.

2.1. Participants

The research used a method of purposive sampling through an online survey to choose the participants. Twenty-nine prospective student teachers participated in the online tutorial Writing III UT. Two basic courses are required, namely Writing I and Writing II. UT's Writing III English Education Study Program addresses genre-based essay writing, including narrative essays, descriptive essays, and argumentative essays. The OCW was performed asynchronously during a week to discuss genre-based essay writing, i.e. argumentative essays. Many of the participants were in-service English teachers living in different parts of Indonesia, such as Batam, Pekanbaru, Jambi and Lampung (Sumatera Island), Bogor, Semarang, Surakarta, Jember and Malang (Java Island), Denpasar (Bali Island), Samarinda (Kalimantan Island), and Makassar and Majene (Sulawesi Island).

2.2. Data Collection and Online Collaborative Writing Procedures

Two instruments, i.e. observation and survey, were used in this study. An observation was made to explain the OCW method. The focus of the OCW process was on two things, namely the contact between the learners in their own community and the learning experiences in the OCW. An anonymous questionnaire was sent to twenty-nine participants using the www.surveymonkey.com application.

The researcher used wiki built into Moodle to carry out OCW activities. UT applies Moodle, which include Wiki, since it is consistent with the principles of a social constructivist learning style that emphasizes the interconnection of learners in the learning process (Wang, 2014). The theory of this learning style is that learners can achieve the best learning process by engaging with teaching materials. In addition, they may develop new learning outcomes and engage with tutors and other participants in their learning process (Rice, 2006).

OCW is an activity designed to direct learners towards successful collaborative learning with the goal of achieving optimal results in their writing process. The researchers have divided the learners into five groups of five to six learners. This classification helps them to focus on reviewing and editing the writing of other learners in their own groups. The OCW mechanism is supposed to be successful through a grouping framework. With regard to the use of Wiki for OCW activities, the researchers have agreed to organize the pages for every learner. Wiki pages were open to learners to build their own content, and others could review and edit content. The following is the online collaborative writing model for English argumentative essay writing (Ardiasih, Emzir, & Rasyid, 2019).

Researchers have provided some instructions for OCW activities to learners through a wiki integrated in Moodle. Students must develop a piece of argumentative essay writing based on the tutor's theme, i.e. homeschooling is more efficient than public schooling. The learners copied the writing to their own page. Each learner should visit the pages of other members of the group to modify their writing by clicking on the "Edit" menu. The editing process may vary, including the use of bold, italic, highlighted, crossed, blocked or highlighted, colored, and other effects that make it easier for text owners to know the edited parts. Learners must ensure that they click the save button to finish the editing process.

In accordance with the OCW model design, the researchers provided the learners with the opportunity to provide input or even corrections directly to the writings of other learners. The history menu is available to record the editing process performed by other learners as well as the tutor. The history of the changes or editing process could be easily traced in this menu. Details of the changes made to the results of those posts are also provided. The following is an example of the changes recorded from the feedback provided by the tutor.

The learners are expected to feel more comfortable editing the writings of other learners. Researchers have encouraged learners that the most important aspect of the OCW process is how to share ideas and input into the writings of other learners. During the implementation process, the learners were very excited about the review and revision process.

2.3. Data Analysis

The researchers used a descriptive-qualitative method to analyze the data. A literature review of argumentative essay writing, together with the results of the observation, was presented to describe the improvement of the academic writing skills of the learners. In the meantime, the researcher developed a number of motivational theories, interpersonal communication or social skills, and self-regulatory learning based on observation reports. The researchers described the improvement of the learner's personal aspects as distance learning based on the results of the survey. The following concerns the design of the descriptive analysis.

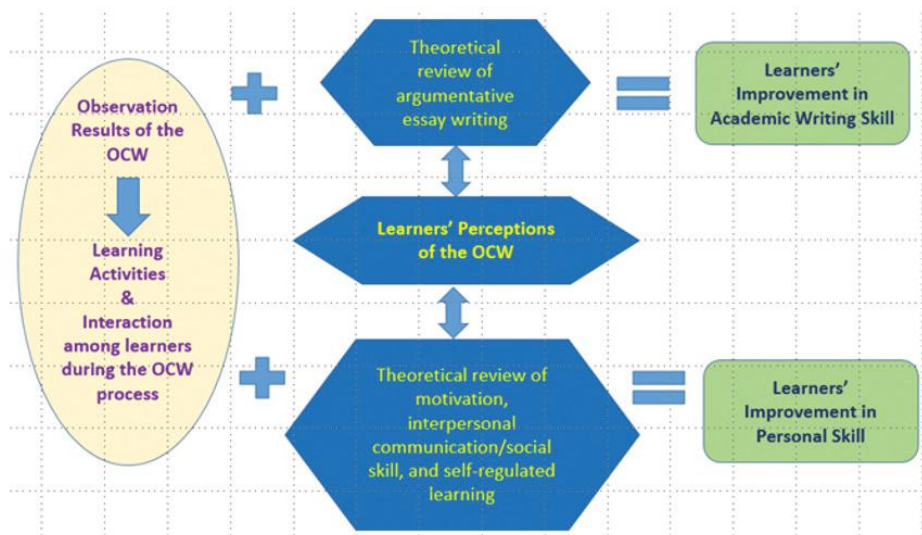


Figure 1. Descriptive analysis of students' academic and personal writing skills

3. Findings

The findings of the study show that the writing of the learners has improved in many respects. An online questionnaire was sent to twenty-nine learners enrolled in the PBIS4313/Writing III online course. The online survey was conducted at www.surveymonkey.com on 4-10 March 2018. The study data showed that learning experiences in collaborative online writing on argumentative English essays enable them to improve their academic writing skills in this genre. In the meantime, the theoretical study of some personal aspects, such as motivation, interpersonal communication or social skills and self-regulation, has characterized the growth of their personal skills. The following are the basic results of the report. The learners' perceptions survey was conducted to help learners gain knowledge of both academic and personal skills.

3.1. The Learners' Progress of Argumentative Essay in Academic Writing

The observation report on the application of the OCW indicates that the writing of the learners has shown progress in several aspects. For example, R9, a student living in Makassar (Eastern part of Indonesia), has seen a significant improvement in the results of the argumentative English essay assessment, from a pre-test score of 66 out of 100 to a post-test score of 93.5. In further, R9 was very interested in the follow-up of the learning cycle from the learning analytics of the learning experience of the learners. In addition, in the OCW process, it was the duty of the person concerned to be the leader of the community and to periodically track and edit the results of the writing of the members of its faction. From the online survey, R9 claimed that the methodology implemented, in particular the introduction of a collaborative process, is quite suitable for the UT online tutorial for any course because learners can communicate with tutors and other learners. Perhaps not all learners were involved, but for those who had extensive access to online tutorial activities, they could learn a lot from tutors and other learners. Table 1 shows the learners' impressions of developing their academic writing skills.

Table 1. Learners' Impressions of Their Progress in Academic Writing Skills

Respondents	Learners' impressions of their progress in academic writing skills
R17	I can get some useful input from my friends as well as suggestions from the tutor on how to better my writing.
R24	I have not faced any difficulties in pursuing the Writing III course, but I have not been able to pursue the learning process in an optimal way.
R10	During the OCW application in the PBIS4313 / Writing III online tutorial, I was able to follow it well helped by a very good response from tutors and other learners.
R12	Guideline is easy to understand.
R28	The learning process has taught me a lot of things to do, such as growing comprehension of argumentative essays and gaining experience in socializing with friends.
R13	I like learning to write essays, so I understand the rules of writing essays, particularly argumentative essays.

In addition, the findings of the analyses show that some learners have demonstrated their critical thinking skills by making feedback or suggestions to the writing of other participants as follows.

I prefer to provide feedback on the editing of the paragraphs you make. After reading, I think you have a really good grammar, but in my opinion it would be easier if the words she and he were replaced by the word "they". I hope it's going to be easier now, and it can be grasped more easily. Overall, it's very cool. I like the grammar of yours (R1).

Great job, Ibu Eka. It's true that writing an argumentative essay doesn't mean that we have to be an expert or have knowledge in the subject. We may also find an explanation from the internet or from another source. If writing an argumentative article, make sure that it contains certain criteria, such as introduction, body text, and conclusion (R9).

In turn, input from certain learners is related to the evaluation that occurs during the OCW learning process. The following are the views of the learners on the advantages of self-assessment as guidance in order to provide input and encourage academic writing by the learners.

Self-assessment principles for argumentative essay writing are useful as a means of reflection (R2).

The self-assessment criteria for argumentative essay writing are very clear, so I can complete my writing and evaluate the results of my writing (R3).

Moreover, some learners address their academic abilities that are impaired by the OCW learning process. Applying wiki to online writing collaboration has affected the academic skills of learners as described in their perceptions below.

... While I was less interested, I followed the OCW practice, and I was very impressed with it. There have been several benefits that I have received from the OCW activity (R10).

Within this segment, it is really beneficial as fellow participants can correct each other's writing and help correct both grammar and spelling errors (R11).

3.2. Strengthening the Personal Skills of the Learners during the OCW Process

Observations show that OCW can be a mediated form of interaction, both between learners and learners with teachers. Therefore, learners prefer to consciously negotiate their personal experience with the outside world in order to be a key sense creator and to take control of the learning process. In addition, the findings of the analyzes show that some learners have strengthened their personal skills as follows during the OCW process.

The OCW process gives me more insight into the essence of writing essays in the context of academic writing (R5).

I get a lot of input through the OCW with different perspectives on essay writing. My insights are broader and the quality of my writing is improved (R7).

The OCW process teaches me how to work together in a mutual position and how to view different thinking in a positive way (R8).

3.3. Motivation of Learners in OCW Activities

Observation report that the learners have demonstrated their motivation to work together on the OCW. This can clearly be seen from their enthusiasm and active participation in the OCW, reading the writings of other learners and making some corrections or simply making comments, and revising their own writing to make it much better to write. In addition, the survey found that most learners were motivated to learn and practice the OCW for a number of different reasons as follows.

The OCW gave me the opportunity not only to learn from tutors but also to learn a lot from other participants. This is very useful to my field of study (R2).

It is very important and has a positive impact on my profession as a teacher, because it can enhance my understanding of writing (R4).

Of course, I possess new information and knowledge that I can use in my profession as a teacher (R8).

The positive impact is that there are more writing skills than before. Another important thing is that we have more friends who can be invited to share their opinions. It's been so exciting!! (R11).

3.4. Interpersonal Communication Skills of the Learners

Observation during the OCW activities showed that interaction between the learners as well as between the learners and the tutor could increase the interpersonal communication or social skills of the learners. Some of the learners who did not take part in the discussion forum appeared in the OCW activity.

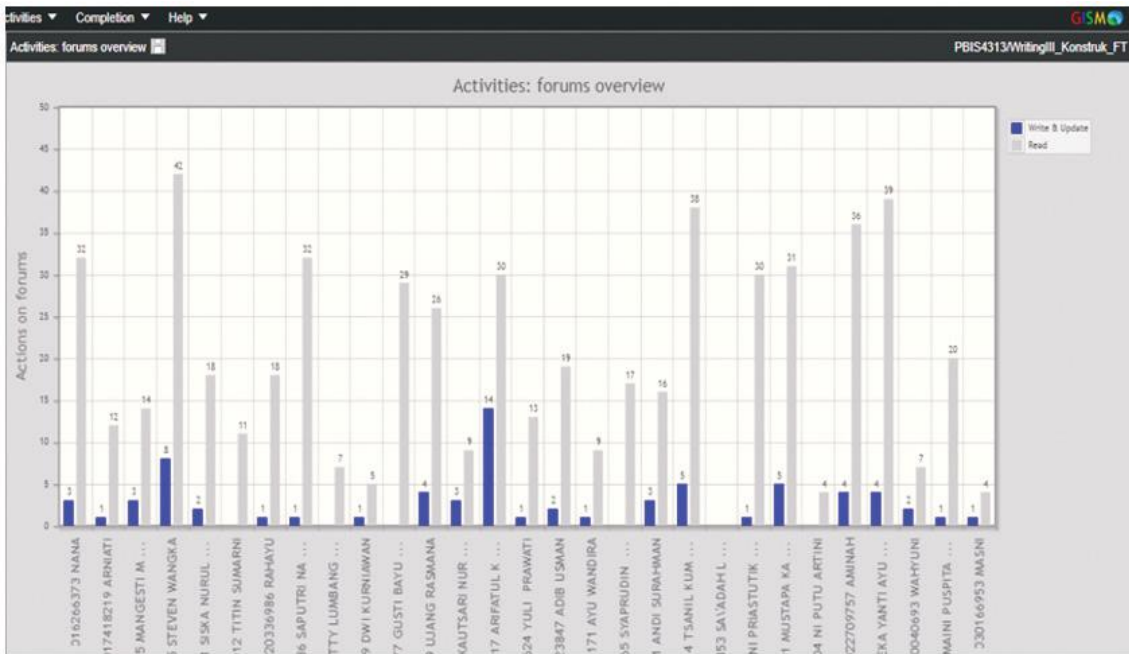


Figure 2. Learning analytics for learners participation in the discussion forum (Phase III)

Figure 4 shows the difference between the activities performed by the learners. Gray graphs show the learning activity of reading in the discussion forum, while blue graphs mean posting activities or writing comments in the discussion forums. The majority of the learners were at the reading level. As many as twenty-eight people, or 97%, seemed to have reached this stage and had done reading activities. However, only twenty-three people, or 79% of participants, actively involved in the discussion activities.

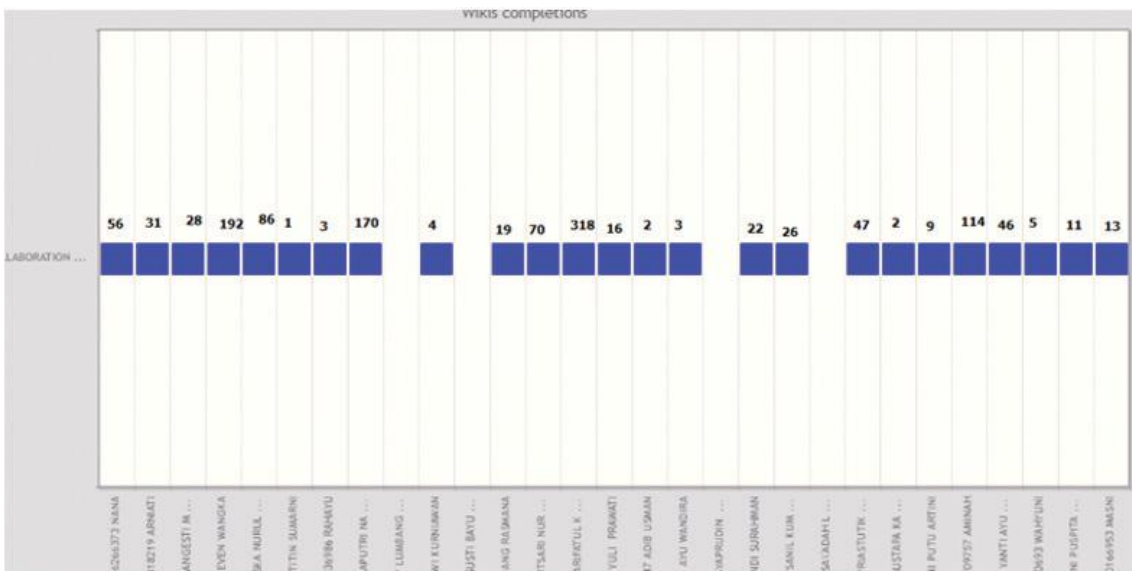


Figure 3. Learning analytics for learner participation in the OCW (Phase IV)

The researchers used the GISMO application to analyze student access and OCW activities. It shows that as many as four of the twenty-nine learners have not been active in this activity at all. The four learners provided information to researchers and tutors that, during the OCW process, they experienced difficulties in accessing the Internet, while 86 per cent accessed and did a variety of activities. The number of accesses and activities is approximately four to five days. The highest number reached 318 times, with 72% of learners performing activities more than 10 times, while 8 or 28% had access to OCW not more than 10 times. Although the implementation of the OCW was not optimal, in the light of the efforts of the learners who tried to participate actively in this activity, the researchers greatly appreciated the enthusiasm of the learners.

Comparing the results of an analysis of learners' participation in the discussion forum and the OCW, the interest of learners in interacting with the collaborative writing process has increased significantly. This is very supportive of their personal development in terms of communication skills with others or interpersonal communication skills (social skills). This is in line with the perceptions of the learners that they have received the added advantages from the OCW in terms of their social and communication skills.

It was so delightful. Because we can get together to correct our fault by making some kind of writing with true friends. I've had a nice experience with it (R8).

This aspect is very helpful for students to socialize with other friends and to share knowledge and improve each other (R9).

I think this phase is a very good one, because we can work together, give each other feedback to keep trying to develop (R16).

3.5. Self-regulated Learning Skills of Learners

In online learning, students are expected to perform their learning process independently or to act as independent or self-directed learners. Students shall determine their own learning time and activities, and the instructor shall act as facilitator. Based on the observation, the researcher identified differences between the attitudes of the learners before and after being involved in the OCW.

On the basis of the explanations given by the two learning specialists involved as tutors, some attention is focused on improving learners. First, the arrangement of questions in phase I (quiz), the variations in the form of questions and the content of the texts refer to the level of the learner. However, they were not used to giving their argument in writing. They therefore need extra time to complete their assignments. However, according to the OCW Learning Specialists (LS), the learners felt happy learning in this way and tried to complete the assignments (LS1). Second, the sequences of questions in Phase I, Part 2, are good, including the "application of the concept" of reasoning (LS2). Based on information from the field trial process and input from both LS, Phase I Part 2 may be maintained or continued to be used to provide initial experience to learners in the construction of knowledge or concepts that will be discussed in the next phase, Phase II: internalization.

4. Discussion and Conclusion

Based on the findings, we can see that learning essay writing cannot be distinguished from its classification known as "genre". The word has long been used and debated from different viewpoints, including "literary studies, popular culture, linguistics, pedagogy and more recently, English / literacy education" (Knapp & Watkins, 2005). Moreover, Hyland (2004) claimed that "Genre-based teaching is concerned with what learners do when they write." This viewpoint focuses on textual and linguistic aspects that are expressed in the results of the learners' writing to understand the meaning. The text is created according to the author's expectations and considers the writing as a way of connecting with the readers. The findings have shown that argumentative writing has a good impact in improving learners' academic as well as personal writing skills. The following is the discussion to strengthen the importance of OCW to improve those skills.

4.1. OCW for Improving Learners' Academic Skills

Oshima and Hogue (2006) describe the essay as "a collection of paragraphs on a particular topic." Writing an essay is not more complicated than composing sentences in paragraphs, but the difference is that writing an essay is longer and more complex because it needs to harmonize the relationship between paragraphs. Argumentative essay is a type of writing that has the linguistic function of persuading readers to consider the writing of a writer that includes arguments, facts, evidence, reasons, descriptions or explanations that support certain opinions. Renkema (1993) states that "argumentation explores topics that are characteristic of argumentative and convincing language science." This opinion indicates that there is a very close relationship between argument and persuasion. Persuasion is described by McCrimmon as "verbal communication that seeks to bring about a voluntary change of opinion so that readers or listeners support the belief they have not kept" (McCrimmon, 1984). Persuasiveness is also directly connected to the reasons in the course of drawing conclusions. In other words, argumentation is a way of persuasion.

McCrimmon (1984) also highlighted that the statement is a way of thought. One discovers something, then draws a conclusion. The relationship between observation and inference is what is referred to as an argument.

When an individual is persuaded that the assumption is valid, he may use his argument to persuade and encourage others to consider it. The form of the argument consists of a number of statements containing two essential components. First, a clarification of the justification (premise) that helps to make the argument both persuasive. Second, the end of the argument. All claims are mixed, and they form an argument together. Therefore, the statement may be assumed to be assumptions (inferences) based on the justification (premise). Chala and Chapetón (2012) define argumentative writing as a complex creative process. In the sense of studying English as a foreign language for college students, argumentative essay writing has produced a variety of different problems. Academic argumentative writing appears to be part of the cognitive or socio-cultural model, and the ability to persuade others has been the primary skill of Coffin, Hewings, and North (2012).

In Indonesia, the argumentative writing of English as a foreign language has developed a situation in which learners and teachers are faced with greater challenges. In the first place, teachers need to pay attention to the lack of knowledge of argumentative structures, the potential for higher grammatical weaknesses of learners, and the limitations of their vocabulary. Second, writing argumentative texts “involves systems of reasoning that are theoretically culturally connected” (Arsyad, 1999). In addition, tertiary learners of English as a foreign language in Indonesia often avoid giving counter-arguments because they think that “it is rude to criticize others, particularly those of higher social status” (Arsyad, 1999). On the basis of these issues, learners must be familiar with the submission of appropriate arguments in English in order to generate good academic argumentative essays in English.

4.2. OCW for Strengthening Learners' Personal Writing Skills

Apart from academic writing skills, the implementation of OCW strategies may also teach students to think critically. Kalelioğlu and Gülbahar (2014) added that one of the skills required by students is how they practice their critical thinking as it is in line with the concepts of 21st-century education, where critical thinking is one of the skills that students must possess. Furthermore, additional insights will be gained by examining student interaction while performing collaborative pre-writing practice tasks once transcription and interaction analyzes have been completed (McDonough & De Vleeschauwer, 2019). Such analyzes may explore the relationship between student talk and text features to examine student engagement.

Feedback is one of the most important elements in collective learning. Bitchener (2008) points out that feedback in the sense of collaborative learning refers to the provision of knowledge to learners about their results, as well as to the clarification of what is known and unknown to learners in order to concentrate on learning. In the learning process, the learners really need enough input to see their development. In addition, they need an opportunity to make and accept recommendations for change and direct input. For example, feedback on correct or incorrect writing, sentence structure, and usage of words must be provided immediately. Nonetheless, students need sufficient input on their results in order to benefit from their program. For example, provide detailed assessments of the written work of students and provide corrections that do not shame learners but inspire them to achieve learning goals (Almuhimedi & Alshumaimeri, 2015). This is confirmed by Lee, Cheung, Wong, and Lee (2013) that self-monitoring will help learners reflect and develop the writing process.

Wright, Burnham, and Hooper (2012) published a review of the use of wiki for OCW. Based on the analysis, wiki is very useful in managing their book. They were able to communicate through the wiki as well as share resources in a single, easy-to-access location. In addition, multiple files (e.g. images, charts, graphs, text) could be uploaded due to the storage space allocated to us in the wiki (Wright et al., 2012).

Teachers offer learning opportunities by taking into account the real needs of learners through integrated learning processes. Bargate and Maistry (2015) added that collaborative learning methods involve collaborative activities and social negotiation in the learning of online writing skills to encourage a small group to interact in the sharing of knowledge. Learning both a second language as well as a foreign language helps to learn new languages, new skills, new ways of thinking, feeling and acting that require the engagement and complete participation of physical, mental and emotional responses (Brown, 2008). This can be translated to mean that learning languages is an attempt made by people to improve themselves as human and social beings by educating themselves into a second language. When learning a second language, it is not enough simply to respond physically, but it must also be absolute in the mental and emotional use of a second language.

In his book *Psychology of Language Learning*, Mukalel (2003) argues that motivation is a deep desire that pushes oneself towards an individual's target. Motivation from a target may be simple or complex, near or far,

psychological, mental, social or intellectual. The power of motivation depends on what's in the mind. Every human behavior has to be driven to drive strength or motivational factors. The greatest motivation is the power itself, the passion, and the ambition that pushes toward the goal. In addition, Dörnyei (2014) clarified that encouragement is the most important thing in second language learning. The passion for learning a second language and long-term learning resistance in the learning process, including all factors involved in second-language learning, can be demonstrated. Without inspiration, no matter how important the individual's skill is, the goal can not be accomplished as precisely as any program and as well as any teaching that is intended for learners.

In terms of encouragement, wiki, as an online framework for the OCW, has increased the enthusiasm of learners to learn English, increased their interest in writing and encouraged their initiatives for social constructivist learning. Learners enjoyed performing group tasks in a wiki-mediated environment because they found it to be exciting, demanding, and fascinating (Wang, 2014). More dialog between the teacher and the student tends to give rise to productive conversations and have a positive impact on the student collaborative writing process, while a more directive-based approach hinders the collaborative writing process and increases the dependence of students on direct intervention by the teacher (Alghasab, Hardman, & Handley, 2019). It provides valuable insight into the role of a teacher in promoting a collaborative writing approach while using wiki. It also suggests that technological innovation such as wiki will not, on its own, bring about underlying pedagogical changes without the support of teachers, and that key pedagogical practices need to be addressed in order to ensure a wider repertoire of interactive and discourse-based practices while using wiki.

Collaborative learning generally includes interdependence or reliance on each other to solve problems or to accomplish shared goals (Heinemann & Zeiss, 2002). In this case, the collaborative process is important as it requires a mechanism of collective decision-making, dispute resolution, mutual confidence and respect, shared leadership and equal control (Gardner, 1998). In further, Abe (2020) argues that collaborative writing provides opportunities for learners who are lacking in individual writing, such as joint responsibility for the quality of the written product and mutual feedback to support the accomplishment of the task.

The OCW has a significant influence on developing the skills of learners in writing English essays, including experience in communicating to achieve an agreement, seeking solutions to problems or disputes that occur, receiving constructive input from both tutors and other learners, and the encouragement to continue to engage and effectively produce their writing (Sánchez-Gómez et al., 2017). Other work considers the effect of wiki on learners' recognition of the social norms associated with its use, as well as their attitudes in the social context, in particular with regard to their behavioral intentions (Altanopoulou & Tselios, 2017). The findings show the need for teachers to encourage and enhance the understanding of learners that wikis are easy to use, useful and communicate positive attitudes in responding to them.

Some of the challenges faced by UT as a distance learning institution is that learners are physically isolated from the teacher and other learners. UT learners are therefore expected to be able to study independently. Higher education learners are known as "learning to learn" (Schell & Janicki, 2013). This ensures that learners should have the freedom to be responsible for their own learning patterns, based on their own learning preferences, which they find suitable for themselves.

Philosophically, online learning is the embodiment of a learning-centered model, as this model is very powerful in encouraging active learning, cooperation, content mastery, and learning processes regulated by the learners themselves (Simonson, Zvacek, & Smaldino, 2019). This further reinforces the characteristics of online learning learners who are needed not only as independent learners but also as self-employed learners. This means that learners should be able to organize their own learning process or be more rational and secure in their institution, to engage in critical thinking, to be able to make their own decisions and to take action independently (Phi, 2019). In other words, learners can carry out the learning process individually and not only on the instructor's guidance or guidelines, but can also control their own learning time and decide the learning materials according to their own needs.

Self-regulation writing techniques are used on the basis of common requirements for self-improvement of the writing outcomes (Lin-Siegler, Shaenfield, & Elder, 2015). Such aspects are defined in several categories, making it easier for learners to self-assess their own learning. Barkley et al. (2014) suggests that self-assessment allows students to take stock of their own actions, to balance their performance against their own goals and against the performance of other learners. On the basis of the quotation, it can be seen that self-assessment

contains a reflection. If writing skills are performed on a regular basis and the self-assessment guide is used, learners can independently monitor the progress of their writing skills. The use of the word self-directed learners is outlined in more detail in Warring (2013) as follows.

Table 2. *Independent Learning Model*

Model	Characteristics
Dependent	Learners are unable/unwilling and/or insecure. The decisions are made by the teacher.
Interested	Learners cannot but be eager and/or optimistic. Decisions shall be made by the instructor with the clarification and support given to the learners.
Involved	Learners are competent but not ready and/or unsafe. Decisions shall be shared.
Self-directed	The learners are capable / willful and/or optimistic. The decisions are made by the learners.

4.3. Conclusion

The study indicates that the OCW has definitely had some positive impacts as seen by the improvement in the learning outcomes of the learners. The effect can also be seen from the quality of the writing, encouragement and excitement of learners, which is quite strong in their participation in learning activities, as well as positive experiences with other students. Similar to the stages of online learning based on the constructivism method built and implemented in field trials, the learners gained a great deal of knowledge and practical experience with OCW techniques. In the sense of distance learning, the difficulties faced by students are the availability of appropriate materials and examples through the use of appropriate online learning tools. The biggest challenge is how to turn online learning opportunities into writing skills that are very supportive of the learning essay writing process. In addition, the availability of authentic texts is very helpful for learners to better understand the type of essays they write as they can examine the concepts of the genre by following the examples presented.

As a pedagogical inference, the use of technology in the OCW has the ability to offer improved benefits and enhanced innovation to both students and educators. The research was limited primarily to studying the personal skills of learners, including motivation, cognitive skills and self-regulation skills. More work relevant to OCW activities is therefore required, focusing on self-confidence of learners. This factor is very critical in building the courage of learners to express their faith in the peer examination of other learners' writing.

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167-A Study on the Impact of Adaptive Learning System on Large-scale Adult English Learning Based on Disciplinary Knowledge Graph

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Abstract

How to assist learners in acquiring suitable learning resources for personalized learning has become a significant research topic in the field of intelligent education. With the advent of artificial intelligence (AI) and big data, adaptive learning systems have emerged as a promising approach to enhance the effectiveness of adult education. This study, which takes 1000 adult learning practices of non-English majors in the Open University of China (OUC) during the Spring Semester 2023 as an example, which possibly the first course learned by adaptive learning technology in China, aims to investigate how adaptive learning and disciplinary knowledge graph-based resources can facilitate personalized learning in Open and Distance Learning (ODL). It was found that with the support of the adaptive learning platform, the learner's learning needs, weaknesses and characteristics were intelligently analyzed. The system can provide personalized learning content and intelligent assessment so that meaningful and efficient learning was achieved. The study is of great practical significance for increasing efficiency and quality of adult learning, promoting intelligent education, and fastening teaching informatization process in ODL.

Keywords: Adaptive Learning System, Disciplinary Knowledge Graph, Personalized Study, ODL

1. Introduction

1.1. Background

In recent years, rapidly evolving educational technologies, such as artificial intelligence, big data, and virtual reality have had great influence on the traditional teaching content, mode and evaluation. How to assist learners in acquiring suitable learning resources for personalized learning has become a significant research topic in the field of intelligent education. Adult English learning has been facing multiple challenges, such as large numbers of learners, contradiction between work and study, and great difference in English proficiency in ODL. However, online course content and learning material sequencing are often designed by instructors in advance without taking into account personalized learning needs and characteristics. Therefore, it is urgent to explore learning behavior analysis and precise learning support services based on big data.

Pearson's Decoding Adaptive Learning report of 2016 defined adaptive learning as an educational technology that automatically adapts to each student individually and interacts with them in real-time. A semantic network, known as a disciplinary knowledge graph, provides the technical means for domain knowledge modelling, which is the core and fundamental problem in personalized adaptive learning systems. Therefore, knowledge graph is the key to building an intelligent education system. Adaptive learning can be conducted using a knowledge graph, aiming to create an individualized learning plan that selects the most appropriate learning materials based on a learner's latent traits or learning performance.

Adaptive learning systems are designed to customize learning experiences for individual learners based on their performance, preferences, and knowledge gaps. In the context of adult English learning, an adaptive learning system can help learners overcome challenges such as lack of motivation, limited time, and difficulty in identifying appropriate learning materials.

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However, despite the potential benefits of adaptive learning systems, there is a need for further research to fully exploit their capabilities. One of the main challenges is the integration of disciplinary knowledge into these systems. Currently, most existing adaptive learning systems rely on standardized tests or predefined criteria to evaluate learners' performance and provide recommendations for learning materials. This approach may not take into account the specific needs and interests of learners across different disciplines.

To address this issue, this study aims to develop an adaptive learning system that integrates disciplinary knowledge graphs into the learning process. A disciplinary knowledge graph is a representation of interdisciplinary knowledge that connects various subjects and concepts across different domains. By incorporating disciplinary knowledge graphs into the adaptive learning system, learners can benefit from a more personalized and comprehensive learning experience that takes into account their diverse interests and needs.

The practice was taken at the Open University of China (OUC). An English online course for non-English majors was successfully built on the adaptive learning platform of iFLYTEK based on the course syllabus and studied by 1000 adult learners from Fujian and Sichuan branches of OUC in the spring semester of 2023.

1.2. Significance

This practice of adaptive learning is the first English course, or possibly even the first course learned by adaptive learning technology in China. The significance lies in its potential to transform the way adult English learners acquire knowledge and skills. By leveraging the power of AI and big data, our proposed adaptive learning system can provide learners with tailored guidance and resources that match their learning goals and preferences. Moreover, This study makes full use of artificial intelligence technology to explore personalized learning, which responds to the call of lifelong education which is for everyone, suitable for everyone and accompanied by everyone.

The study is of great practical significance for increasing efficiency and quality of adult learning, promoting intelligent education, and fastening teaching informatization process in ODL. The study will help promote the achievements we have made in smart teaching, effectively expand the influence of OUC in remote teaching and research, and promote cooperation between OUC and the AAOU, which can help jointly advance the development of distance education.

1.3 Research Questions

The study aims to explore learning behavior analysis and precise teaching support services with the support of big data. The research questions are as follows:

1. What are the advantages of adaptive learning system for adult English learning?
2. Can adaptive learning effectively encourage adult English learning?
3. How to apply adaptive learning to improve instructional design so as to improve adult English proficiency?

2. Literature Review

2.1. Adaptive Learning System Development and Applications

The development of adaptive learning systems has been driven by the need to personalize learning experiences for individual learners. The term "adaptive learning system" was first coined by J. Allan in 1987, who defined it as a computer program that uses statistical algorithms to generate customized feedback to the learner based on their performance (Allan & Roeper, 2013). Since then, various types of adaptive learning systems have been developed, including content-based, task-based, and hybrid systems (Flanagan et al., 2006). These systems have been applied in various educational settings, such as K-12 education, undergraduate education, and professional development programs (Khan et al., 2014).

In large-scale adult English learning, ALSs can be used to address the challenges and needs of adult learners by providing personalized learning experiences that cater to individual learners' diverse needs and interests (Hwang et al., 2014).

2.2. Theoretical and Practical Frameworks of Disciplinary Knowledge Graph

Disciplinary knowledge graphs are representations of interdisciplinary knowledge that connect various subjects and concepts across different domains (Yin et al., 2015). These graphs consist of nodes that represent concepts or objects, and edges that represent relationships between them (Yin et al., 2015). The theoretical foundations of disciplinary knowledge graphs include multi-domain ontology, hypertextuality, and network analysis (Yin et al., 2015). In practice, disciplinary knowledge graphs have been used in various applications, such as scientific research, educational instruction, and information retrieval (Yin et al., 2015).

2.3. Challenges and Needs in Large-scale Adult English Learning

Large-scale adult English learning faces several challenges and needs, which necessitate the development of effective and efficient learning strategies. One of the main challenges is the limited availability of resources and materials suitable for adult learners' diverse needs and interests. Another challenge is the lack of motivation and engagement among adult learners, which can lead to low completion rates and poor learning outcomes (Selwyn et al., 2005). To address these challenges, there is a growing interest in developing ALSs that can provide personalized learning experiences that cater to individual learners' needs and preferences (Hwang et al., 2014).

In this study, we propose an adaptive learning system based on disciplinary knowledge graphs to address the challenges and needs of large-scale adult English learners. We believe that integrating disciplinary knowledge into the learning process can promote cross-disciplinary thinking and help learners develop a broader perspective on various topics. This will ultimately lead to better language proficiency and a deeper understanding of the cultural context in which English is used.

3. Methodology

3.1. Research Methods

A mixed-methods approach was used to investigate how adaptive learning and disciplinary knowledge graph-based resources can facilitate personalized learning in Open and Distance Learning (ODL).

The data was collected from 1000 adult learning practices of non-English majors in the Open University of China during the Spring Semester 2023. The data was collected through an online survey that will assess the level of engagement, knowledge points, and overall satisfaction with the adaptive learning system and disciplinary knowledge graph-based resources. The survey will include questions about the learners' experience with the adaptive learning system, their perception of the effectiveness of the resources, and their opinions on how to improve the system.

The qualitative method will involve conducting semi-structured interviews with a sample of learners who have significantly improved their knowledge points. The interviews will focus on the learners' experiences with the adaptive learning system and disciplinary knowledge graph-based resources, as well as their perceptions of the effectiveness of the system. The interviews will also explore the learners' motivations for using the system and their suggestions for improving it.

3.2. Data Analysis

The quantitative data collected from the survey will be analyzed using descriptive statistics to summarize the learners' levels of engagement, knowledge points, and overall satisfaction with the adaptive learning system and disciplinary knowledge graph-based resources. The data will also be analyzed using inferential statistics to test whether there is a significant difference between the groups of learners who have significantly improved their knowledge points and those who have not.

The qualitative data collected from the interviews will be analyzed using thematic analysis to identify common themes and patterns among the learners' experiences with the adaptive learning system and disciplinary knowledge graph-based resources. The analysis will also involve identifying any insights or recommendations for improving the system based on the learners' feedback and suggestions.

Overall, this study aims to provide insights into how adaptive learning and disciplinary knowledge graph-based resources can facilitate personalized learning in ODL by examining the learners' experiences with these systems and identifying areas for improvement.

4. Findings and Analysis

This study found that 359 people were very active in the adaptive learning system, indicating a high level of engagement and interest in the resources. However, only 229 people had improved their knowledge points, with some learners showing improvement in specific areas while others showed no significant improvement. These results suggest that the adaptive learning system may not be effective for all learners and that further refinement is needed to better meet the needs of individual learners.

Further analysis revealed that 58 people had significantly improved their knowledge points, indicating that the adaptive learning system was able to provide meaningful benefits to a subset of learners. The fact that all knowledge points improved suggests that the adaptive learning system was able to effectively target multiple areas of language learning and provide targeted feedback and support to improve learners' overall proficiency.

126 adult learners gave feedback in the survey. The result showed that 76.98% adult learners agreed that the diagnostic exercises can effectively diagnose your learning weaknesses. 78.57% agreed that the course is able to recommend learning content that suits you based on your identified learning weaknesses. 80.95% agreed that the learning content provided by the course aligns with the learning needs. 65.07% agreed that their English learning performance and efficiency have improved by adaptive learning. 69.84% agreed that they are becoming increasingly interested in learning English.

These findings suggest that while the adaptive learning system has potential as a resource for large-scale adult English learning, more research is needed to determine its effectiveness in different contexts and for different types of learners. Further studies could explore the factors that contribute to learner engagement and success with the system, as well as identify best practices for implementing and refining the system to improve its impact on language learning outcomes.

The main significance of adaptive learning is that it enables personalized education based on the individual needs and characteristics of each student. Additionally, adaptive learning can help teachers save time and resources by automating routine tasks such as grading and providing feedback. Overall, adaptive learning has the potential to revolutionize the way we teach and learn, making education more accessible, engaging, and effective for all students.

5. Discussion and Conclusion

The findings of this study on the adaptive learning system in large-scale adult English learning, based on the use of disciplinary knowledge graphs, have several implications for future research and practice. Firstly, the study highlights the advantages of using adaptive learning systems in adult education, as it was able to engage a significant number of learners and provide targeted feedback to improve their knowledge points. However, the study also identified some limitations of the system, such as its inability to effectively support all learners in achieving their language learning goals.

Secondly, the study suggests that the use of disciplinary knowledge graphs can be an effective tool for designing educational resources in large-scale adult English learning. The integration of these graphs into the adaptive learning system can help to contextualize language learning and provide learners with relevant and meaningful information. This approach has the potential to enhance learners' engagement and motivation, leading to better language learning outcomes.

Finally, the study provides insights into the future research and practice in adaptive learning systems for adult English learners. It is important to further investigate the effectiveness of adaptive learning systems in different contexts and for different types of learners. Additionally, more research is needed to explore how best to integrate disciplinary knowledge graphs into adaptive learning systems to maximize their impact on language learning outcomes.

In conclusion, the findings of this study suggest that adaptive learning systems can be a valuable resource for large-scale adult English learners, but their effectiveness may vary depending on the needs and characteristics of individual learners. The use of disciplinary knowledge graphs can enhance the effectiveness of these systems by providing targeted feedback and supporting learners in contextualizing language learning. Further research is needed to optimize the design and implementation of adaptive learning systems for adult English learners, taking into account the individual needs and characteristics of learners.

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169-Improving Applicant Support and Counselling Staff's Burden Through Chatbot Services: A Case of KNOU

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Abstract

This study tries to explore the effects of the rule-based chatbots, "소통이" [Sotoji], in KNOU. The chatbot system was introduced to improve applicant support and alleviate the burden on counseling staff. We have data from November 2021 to May 2023, to observe its utilization. Data shows concentrated usage during admission seasons, especially in spring. Conversations primarily occur during working hours, but a certain number of questions are handled in the evenings. Also, we can find that weekend engagement increases. It suggests that chatbots may be complementing human counselors. However, to assess the impacts on counseling staff, student experience, and learning outcomes, we will have surveys in the fall of 2023. Moreover, the integration of currently advancing generative A.I. and rule-based chatbots presents possibilities for personalized guidance, enhanced academic advising, and virtual class assistants. Also, it could mitigate language barriers for international students and non-native English speakers. However, responsible deployment, continuous evaluation, and a commitment to addressing challenges are essential to ensure a successful integration.

Keywords: Chatbot Services, Applicants Support, Counselling Staff.

1. Introduction

As of 2020, the response rate of the student support center at Korea National Open University (henceforth, KNOU) was reported to be only 61.2%. This low response rate not only leads to unanswered questions but also results in suboptimal handling of queries that require additional resources, causing unnecessary emotional labor for the counselling staff.

Chatbots offer a potential solution to address these challenges as they can effectively respond to routine and repetitive questions and can also provide support outside of regular business hours. Recognizing their benefits, KNOU started utilizing chatbot services for admissions counseling in November 2021. These chatbots operate through KNOU's online application platforms and can provide instant responses to inquiries. The implementation of chatbot services is expected to improve applicant support and alleviate the burden on counseling staff.

The primary focus of this study is to examine the implementation of chatbot services at KNOU and analyze their impact on applicant support and counseling staff work. In this paper, we will present basic statistics on their usage from November 2021 to May 2023. These metrics will provide valuable insights into the effectiveness.

We will assess how chatbot implementation can alleviate the workload on counseling staff by handling routine inquiries, allowing the staff to focus on more complex and resource-intensive cases. Factors such as workload reduction, job satisfaction, and emotional labor will be evaluated to determine the impact of chatbot integration on counseling staff work efficiency. However, because of admission schedule, these surveys will be implemented in the fall of 2023.

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1.1. ODDE and chatbot

In ODDE (Open Distance Digital Education), students require a robust support system to meet their multifaceted requirements. Students span a wide spectrum of social backgrounds and learning environments, and the provision of effective assistance is important. In distance education, where face-to-face interactions are limited, the need for timely and flexible communication becomes even more pronounced. With digital technology, interactions can occur without the constraints of time and space. However, this potential may be hindered by limited digital skills or inadequate access to devices. The heterogeneity in students' prior knowledge and learning capabilities further amplifies the challenges of delivering comprehensive support.

In parallel, ODL institutes encounter distinct challenges in providing these essential services. The sheer scale of enrolled students presents complexities in administering personalized assistance. Simultaneously, these institutions grapple with limitations in terms of financial and human resources. The integration of emerging technologies, while promising, also presents obstacles in terms of time-consuming adaptation and alignment with institutional visions.

Chatbots present a cost-effective means of offering support to a large number of students. These automated systems can engage with humans through text, oral speech, or other comprehensible formats. In business, health, entertainment and education, with low costs chatbots have become common due to their capacity to efficiently handle many customers all year round (Adamopoulou and Moussiades, 2020; Luo, et al., 2022; Ranoliya, et al., 2017). Moreover, an increasing number of Korean universities are embracing chatbots for admission and academic administration FAQs as a regular practice (Sohn, et al., 2021).

1.2. KNOU's 소통이

In 2019, KNOU inaugurated a new help desk center, which encompassed domains such as admissions, academic administrative processes, and information technologies. Health, career guidance, human rights, and academic inquiries were directed to their corresponding specialized departments.

From August 2019 to April 2020, among incoming 199,596 calls, 122,126 calls are answered (61.2%). Previously the answering rate was 46.8%. While there is a significant enhancement, there is still room for improvement.

Advancing its support infrastructure, KNOU embarked on the deployment of new chatbot services "소통이 [sotoŋi]" in November 2021, which initially confined to queries pertaining to admissions. In September 2022, it has upgraded to encompass overall academic counseling beyond admissions, extending its academic administrative processes.

It is a rule-based architecture that guides across 11 distinct categories and addresses a total of 406 unique questions. Users can access the service from the front webpage of KNOU. They can choose either navigate through categorized queries or independently type their questions. The system proactively suggests pertinent terms or queries while typing.

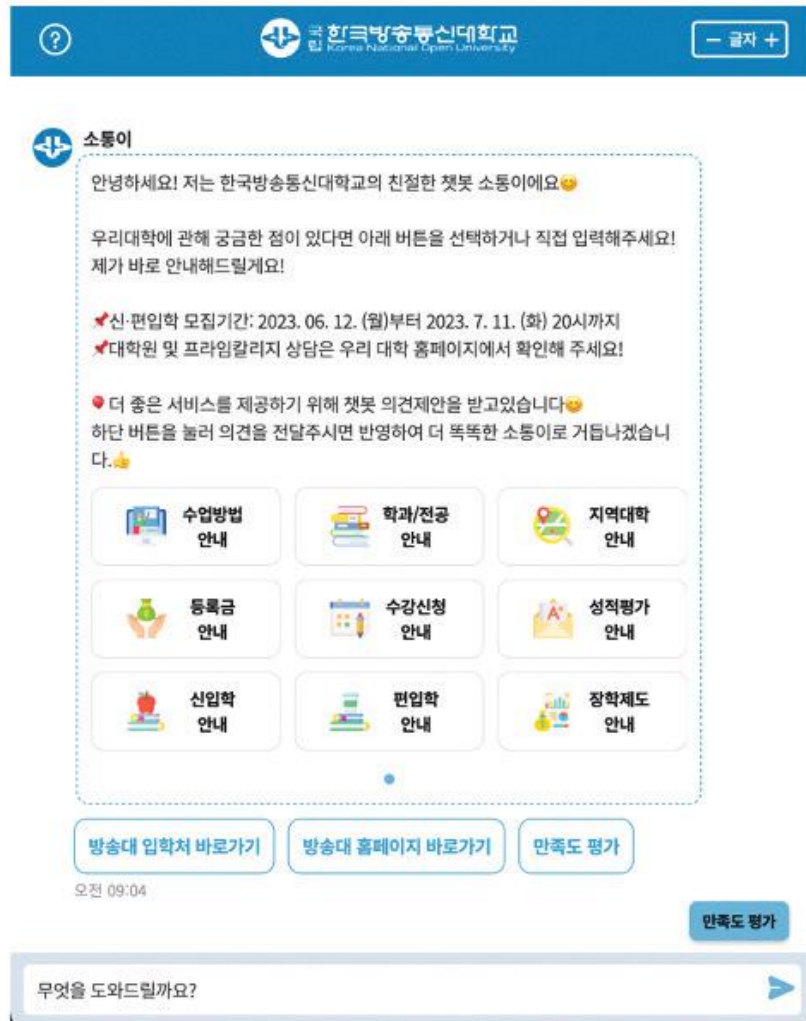


Figure 1. 소통이's welcoming page

2. Research Questions and Methods

To examine the true effectiveness of the "소통이", our goal is to analyze its usage patterns among both current and prospective students, while also assessing its impact on (prospective) students and the counseling workforce of call center. Furthermore, we focus on strategically maximizing the use of limited resources within an educational institution, utilizing quantitative measures for this purpose.

Embedded within this framework, our research questions are as followed:

- 1) Quantifying Utilization and Efficacy: Our initial inquiry focuses on the quantification of the utilization and efficacy of the "소통이" system. Through systematic analysis, we seek to ascertain the degree to which this innovative tool is embraced and the measurable impact it exerts on both students and employees.
- 2) Burden Alleviation and Efficacy Enhancement: The second question aims to evaluate its potential in mitigating the workloads carried by the counseling staff, while concurrently enhancing their overall efficacy.
- 3) Student Experience and Learning Impact: The third question delves into students' direct encounters with "소통이" and its effects on their learning.
- 4) Future Trajectory and A.I. Integration: Our final inquiry contemplates the innovative pathways through which this system will continue to improve student support, particularly with the rapid advancement of Artificial Intelligence.

2.1. Data from the chatbot system.

We could get the daily or monthly usage data from the chatbot system. From November 2021 to May 2023, we have daily usage data: cases of conversations which include systems greeting messages and questions and cases of questions. From December 2021 to May 2023, we have usage data in 24 hours. But this is constructed on the monthly bases, so we can know which are the busiest hours in the month, not the exact day.

In terms of the contents of conversations, we could get the top 50 frequently used keywords. Analysis of this data is not included in this paper. Briefly, it shows there are admission-related questions with categorized queries and much less typed questions which are almost negligible.

Table 1. Descriptive statistics of chatbot data

Categories	observations	periods	Used in this paper
Usage by dates	577	Nov. 2021 – May 2023, Daily	O
Usage by hours	432	Dec. 2021 – May 2023, Monthly	O
Frequently used keywords	1,100	Nov. 2021 – May 2023, Monthly	X

2.2. Survey on students and employees

소통이 has its dedicated native satisfaction survey sections. Initially, these sections were somewhat concealed within the service interface; however, they are now more prominently displayed. Despite this adjustment, a notable proportion of users have refrained from responding to these surveys. While the primary focus of these surveys pertains to prospective students, in an effort to accumulate an adequate number of responses, we are planning to incorporate related questions within the annual surveys administered to enrolled students. Surveys on employees also will be held during the fall semester of 2023.

3. Findings

3.1. Conversations and questions per day

Table 1 and 2 shows a comprehensive overview of the patterns and trends observed in daily conversations and questions segmented over years and weekend. Table 1 focuses on the volume of daily conversations over a span after introducing the "소통이." Conversations are including questions and system messages. Questions are a little more than half of conversations (52.12%). Over the successive years, both conversations and questions are decreasing. It may be related to decreasing applicants or other causes. It needs more research.

During the periods, conversations per weekday prominently exceeded those occurring during weekends. We can observe 82.94% of conversations happened on weekdays. However, in the subsequent years, we can observe a rise in the proportion of weekend conversations: 14.46%, 16.59%, and 18.44% respectively. We can see the analogous patterns in the question data.

Table 2. Descriptive statistics of daily conversations, by year and weekends

Year	Days	Conversations	Weekdays/ Weekends	Conversations	Conversations per weekdays/weekends	Proportions of weekdays/weekends
2021	61	49,020	45	41,765	928.11	85.20%
			16	7,255	453.44	14.80%
2022	365	190,599	261	158,349	606.70	83.08%
			104	32,250	310.10	16.92%
2023	151	73,735	108	59,379	549.81	80.53%
			43	14,356	333.86	19.47%

Table 3. Descriptive statistics of daily questions, by year and weekends

Year	Days	Questions	Weekdays/ Weekends	Questions	Questions per weekdays/weekends	Proportions of weekdays/weekends
2021	61	24,999	45	21,385	475.22	85.54%
			16	3,614	225.88	14.46%
2022	365	96,867	261	80,794	309.56	83.41%
			104	16,073	154.55	16.59%
2023	151	40,213	108	32,796	303.67	81.56%
			43	7,417	172.49	18.44%

Table 4 provides daily conversations and questions categorized by months. We can observe that there are fluctuations across the months, with January, June, July, and December experiencing more engagements.

Since the data was collected between November 2021 and May 2023, there were two data sets from November through May, but only one in other months. For comparison, we converted conversations and questions to daily averages.

Table 4. Descriptive statistics of daily conversations and questions, by month

Month	Days	Conversations	Conversations per day	Questions	Questions per day
1	62	68,499	1104.82	36,033	581.18
2	56	40,820	728.93	19,363	345.77
3	62	12,360	199.35	6,243	100.69
4	60	10,823	180.38	5,769	96.15
5	62	13,423	216.50	7,890	127.26
6	30	23,740	791.33	12,104	403.47
7	31	23,395	754.68	11,770	379.68
8	31	16,771	541.00	8,060	260.00
9	30	7,153	238.43	3,778	125.93
10	31	6,013	193.97	3,054	98.52
11	60	37,017	616.95	19,474	324.57
12	62	53,340	860.32	28,541	460.34

3.2. Conversations and questions by hours

Table 5 offers a breakdown of hourly conversations and questions within the "소통이" categorized by years and working hours. During working hours (Yes, 9:00 A.M. to 5:59 P.M.), there are more conversations than non-working hours (No, 6:00 P.M. to 8:59 A.M.). In overall, 67.06% of conversations happened during working hours whereas 32.94% conversations happened during non-working hours. Over the years, both working hours and non-working hours conversations are decreasing. However, conversations per hour in 2022 and 2023 show relatively steady engagement. The proportion of non-working hours in conversations is decreasing. We can observe similar patterns in the question data.

Compared to the voice call patterns data from the call center, the average proportion of inbound calls versus the total inbound calls during non-working hours in the same period is 85.93% versus 14.07%. This suggests that 소통이 has effectively served as a substitute for the call center's counseling workforce during their non-service hours.

Table 5. Descriptive statistics of hourly conversations, by year and weekends

Year	Working hours	Conversations	Conversations Per hours	Proportions	Questions	Questions per hours	Proportions
2021	Yes	17,176	1717.60	65.29%	8,893	889.30	65.51%
	No	9,133	652.36	34.71%	4,683	334.50	34.49%
2022	Yes	127,222	1060.18	66.75%	64,990	541.58	67.09%
	No	63,377	377.24	33.25%	31,877	189.74	32.91%
2023	Yes	50,993	1019.86	69.16%	27,933	558.66	69.46%
	No	22,742	324.89	30.84%	12,280	175.43	30.54%

Table 6 provides a distribution of conversations and questions within the "소통이" system across different hours of the day. From 9 A.M. to around 4 P.M., the proportions of conversations and questions, about 7.2%, are relatively stable. From around 5 P.M. to 10 P.M. they are slightly declined to about 4.5% but also relatively stable during hours. After around 11 P.M. they continuously declined to below 1%. At this moment, we have no hourly conversation data with exact dates. Thus, we cannot examine the hourly patterns on weekends or holidays.

Due to data collection occurring between December 2021 and May 2023, there exist two data sets from December through May, whereas only one for the other months. In the initial comparison, the monthly effect was not taken into account. Therefore, we aggregated the data on an hourly basis without considering the month-wise variations.

Table 6. Descriptive statistics of conversations and questions, by hours

Hours	Conversations	Proportions	Questions	Proportions
0	6,973	2.40%	3,655	2.43%
1	4,278	1.47%	2,206	1.46%
2	2,921	1.01%	1,498	0.99%
3	2,102	0.72%	1,093	0.73%
4	1,800	0.62%	899	0.60%
5	1,906	0.66%	883	0.59%
6	2,779	0.96%	1,312	0.87%
7	4,659	1.60%	2,283	1.52%
8	9,032	3.11%	4,443	2.95%
9	18,921	6.51%	9,478	6.29%
10	21,613	7.44%	11,091	7.36%
11	20,772	7.15%	10,790	7.16%
12	19,011	6.54%	9,928	6.59%
13	22,173	7.63%	11,577	7.68%
14	22,720	7.82%	12,019	7.98%
15	21,320	7.34%	11,238	7.46%
16	19,935	6.86%	10,540	7.00%
17	16,637	5.72%	8,786	5.83%
18	12,289	4.23%	6,369	4.23%
19	11,480	3.95%	5,839	3.88%
20	12,491	4.30%	6,469	4.29%
21	12,776	4.40%	6,678	4.43%
22	12,113	4.17%	6,355	4.22%
23	9,942	3.42%	5,227	3.47%
Total	290,643	100%	150,656	100%

4. Discussion and Conclusion

4.1. Discussion and further studies

As from Table 3, there are concentrated conversations and questions in the admission season. Because there are more applicants in spring admission (Dec. - Jan.) than in fall (Jun. - Jul.), we could observe more engagement in those months. We could say that 소통이 is being used for its purpose.

When comparing the inbound voice call data from the call center over the years from 2020 to 2022, the highest numbers of inbound calls were observed in February (vs. January) and August (vs. July). For example, the total numbers of inbound calls are 35,313 (Feb.) vs. 32,863 (Jan.) and 28,213 (Aug.) vs. 22,772 (Jul.) on average. This contrast in monthly usage patterns between 소통이 and the call center implies that 소통이 has primarily been used for application-related inquiries in applying processes, while the call center has been utilized for precise guidance in registration processes after acceptance.

From Tables 1 and 2, overall usage of 소통이 is declined. But it also shows that increasing in the weekends. In the case of hours, Tables 4 and 5 show that communications with 소통이 mainly occurred during working hours. Yet, it is worth highlighting that the usage proportion of 소통이 is twice as high as that of the call center during non-working hours, as discussed in the section 3.2. Also, we can observe that a certain number of questions have been handled in the evening after working hours with relatively flat distributions. Those suggest that chatbots could complement human counselors.

To validate its effectiveness, it's essential to compare it not only with voice call data from the call center during the same period but also with data from before the implementation of 소통이, while considering the trend of applicant numbers. Also, as we mentioned in section 2.2, surveys are needed to fully understand how 소통이 helps students and employees.

4.2. Future of chatbots in ODDE

The advent of generative A.I., particularly exemplified by LLMs (Large Language Models) like ChatGPT, offers the advancement of rule-based chatbots across several critical domains within higher education. These advancements, however, must be approached considerately, bearing in mind both the potential benefits and limitations that emerge from this technological evolution.

The first potential for rule-based chatbots to provide personalized guidance, as demonstrated by their capacity to analyze user inquiries and offer context-specific responses, holds promise in enhancing academic advising and aiding students in making informed decisions about their courses and career paths (Kessler, 2019). Furthermore, the integration of chatbots as virtual class assistants in online learning environments can potentially transform the educational experience by aiding students in comprehending complex concepts, engaging in fruitful discussions, and managing assignments more efficiently (Martin and Trang, 2019).

Through the multilingual capabilities of chatbots, we can mitigate language barriers. By facilitating effective communication with international students and non-native English speakers, these chatbots contribute to a more inclusive and accessible educational environment.

Nonetheless, it is crucial to exercise caution in the deployment of these advanced technologies. The potential for misinformation and biases inherent in the outputs of current LLMs necessitates stringent verification and validation processes. Even a single instance of misinformation in critical areas such as admission, administrative processes, and academic support could have far-reaching consequences and erode trust.

While awaiting the perfection of A.I. is not a viable strategy, it is essential to strike a balance between innovation and reliability. The integration of current A.I. APIs, such as those offered by OpenAI and Google, allows for the creation of experimental services with modest budgets. OpenAI's GPT-3.5 Turbo, for instance, presents a cost-effective option for text generation, ranging from \$0.0015 to \$0.004 per 1k tokens which is about 750 words, thus enabling institutions to explore the potential of A.I. without exorbitant expenses. GPT-4 is 20-30 times more expensive. The competitive pricing landscape in the A.I. industry ensures that comparable services from different providers maintain similar pricing structures.

In summary, the intersection of generative A.I. and rule-based chatbots presents a compelling opportunity to revolutionize and augment higher education. While the potential applications are vast and impactful, the

responsible and well-informed deployment of these technologies is paramount to harnessing their benefits while safeguarding against their limitations. The journey to integrate A.I. into higher education is an ongoing one, shaped by a delicate balance of innovation, ethical considerations, and prudent resource allocation.

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Note: The call center data will be provided upon request.

170-Adopting Agile-Blended Learning Approach in an Early Childhood Research Course

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Abstract

The need for innovative approaches to education delivery has prompted educators to explore “agile-blended learning” (AB learning) as a solution. AB learning offers flexibility, learner autonomy, collaboration, and technology mediation, empowering students to learn at their own pace and location using suitable devices. This study examined the application of AB learning in teaching an Investigations in Early Childhood Education course to 40 in-service kindergarten teachers and principals during the pandemic. Initially designed with self-study materials and face-to-face instruction, the course transitioned to online Zoom lessons and individual consultations due to social distancing measures. To compensate for the lack of in-person interaction, students were divided into groups to conduct investigations and deliver online presentations via Zoom, receiving immediate feedback through anonymous forms. Students’ feedback was collected through questionnaires, in-class discussions, email communications, and online discussion boards. The results indicated that students appreciated the flexibility and time savings afforded by the new delivery model but desired increased interpersonal interactions. This study demonstrated the efficacy of AB learning during the pandemic, contributing to the literature on innovative teaching methods and offering insights for effective online course development. The availability of individual consultations and multiple feedback methods facilitated personalized support and continuous improvement of course delivery.

Keywords: *Agile-blended learning, early childhood education, online learning, distance education, pedagogical innovation*

1. Introduction

The global landscape of education has undergone significant changes, presenting new challenges to traditional teaching and learning methods. In response, higher education has witnessed an increasing demand for innovative and practical approaches that enhance student learning and engagement while prioritizing public health guidelines. Agile methodology, known for its ability to adapt to changing circumstances and deliver high-quality outcomes, has been successfully applied across various industries. Although relatively new in education, the application of agile methods holds promise in providing a flexible and adaptable approach to teaching and learning. Meanwhile, blended learning, which combines face-to-face and online modalities, has emerged as a viable solution to deliver quality education while maintaining social distancing and safety measures.

This research paper aims to explore the potential of adopting “agile-blended learning” (AB learning) concepts in facilitating the teaching and learning of an “Investigations in Early Childhood Education” class during the COVID-19 pandemic. To achieve this objective, the paper begins by concisely reviewing the existing literature on blended learning and agile methodology in education. This review serves as a foundation for introducing the AB learning framework and its associated concepts. The subsequent sections of the paper report on the application of AB learning in the context of an “Investigations in Early Childhood Education” class, a core course in the Master of Education in Early Childhood Education program of the author’s university. The implementation details, outcomes, and implications of utilizing AB learning are presented and discussed in this particular setting. The paper concludes with a discussion that synthesizes the findings and their significance. Additionally, the limitations of the attempted application are acknowledged, and avenues for further research to advance the understanding and implementation of AB learning in education are proposed.

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1.1. Conception of Agile-blended Learning

Agile methodology is a project management approach that emphasizes flexibility and adaptability in response to changing circumstances (Kadenic & Tambo, 2023). It has been successfully applied in various industries, such as software development, healthcare, and manufacturing, to improve project outcomes (Serrador & Pinto, 2015). It is characterized by iterative and incremental processes, collaboration and communication among team members, and a focus on delivering value to the customer (Brhel, Meth, Maedche, & Werder, 2015).

Similarly, agile methodology in education is a learner-centered approach that emphasizes collaboration, flexibility, and adaptive learning by incorporating group work into the curriculum (Noguera, Guerrero-Roldán, & Masó, 2018). It involves iterative cycles of deliberate planning, execution, and evaluation to promote continuous improvement and learner autonomy (Lang, 2017).

Blended learning, on the other hand, is an instructional approach that combines face-to-face with online learning activities, providing students with the benefits of both learning modes (Li & Wong, 2019). It can enhance the flexibility, accessibility, and interactivity of learning, as well as promote self-directed learning and collaboration (Huang, Kuang, & Ling, 2022). Blended learning has become increasingly popular in higher education because it provides a solution to the challenges of traditional classroom-based instruction, such as limited classroom space, rigid schedules, and reduced student engagement (Puah, Iskander, Khalid, Looi, & Khor, 2021; Sahni, 2019). The COVID-19 pandemic has further accelerated the adoption of blended learning as a viable mode of teaching and learning, especially when social distancing measures need to be observed (Bryson & Andres, 2020).

Incorporating the principles and elements of agile methodology and blended learning, Li and his team (see Li, 2023a, 2023b) from Hong Kong Metropolitan University have developed a constructivist pedagogical approach known as “agile-blended learning” (AB learning). This innovative approach is tailored to meet the educational needs of busy adults in metropolitan areas. It prioritizes learning effectiveness, efficiency, and flexibility to accommodate the demanding schedules of metropolitan learners.

The AB learning framework draws upon the principles of both agile learning and blended learning, combining their core elements to create a comprehensive and effective educational model (Li, 2023a, 2023b; Figure 1.). Among the seven principles integrated into the AB learning framework, four are particularly significant as they are common to both agile learning and blended learning. These core principles are:

1. **Flexibility:** AB learning emphasizes the importance of flexibility in accommodating diverse learning styles and adapting instructional strategies to meet individual needs. This includes ensuring learners can access learning materials anytime, anywhere, and through any suitable device. The AB learning approach recognizes that learners may have work or family commitments and therefore offers multiple modes of student-instructor interaction. This flexibility allows learners to actively engage with instructors and seek support while considering their unique schedules and responsibilities.
2. **Learner autonomy:** AB learning promotes learner autonomy, enabling students to take ownership of their learning journey, set goals, and make informed decisions about their educational path. By adopting a self-directed approach, students can plan, design, and implement their education based on their individual needs and interests. This self-directedness facilitates learner autonomy through self-regulation and the ability to make independent choices (Mohamed, 2022; Noguera, Guerrero, & Appel, 2015).
3. **Collaboration:** AB learning promotes collaboration among learners to enhance learning effectiveness. It provides opportunities for group work, discussions, and peer feedback, fostering knowledge sharing and understanding. Collaboration in both in-person and online settings allows learners to engage in cooperative learning activities, benefiting from diverse perspectives and collective problem-solving efforts (Noguera et al., 2015; Wu & Luo, 2022). Through collaboration, learners deepen their understanding, develop critical thinking skills, and improve teamwork abilities, contributing to positive learning outcomes within the AB learning framework.
4. **Technology mediation:** AB learning utilizes educational technologies to enhance the learning experience. By leveraging online tools such as video conferencing, discussion forums, and multimedia presentations, AB learning promotes seamless communication, access to resources, and interactive engagement. It allows learners to choose their preferred mode of learning, whether face-to-face or online, synchronous or asynchronous (Huang et al., 2022). Technology mediation in AB learning enriches the learning environment and facilitates effective and flexible learning experiences.

By combining these core principles, AB learning provides a dynamic and adaptable approach to education, enabling busy adult learners in metropolitan areas to engage effectively with their studies while maintaining flexibility and autonomy. These principles, as depicted in Figure 1., serve as the foundation of the AB learning framework, shaping its implementation and guiding the design of instructional strategies for optimal learning outcomes.

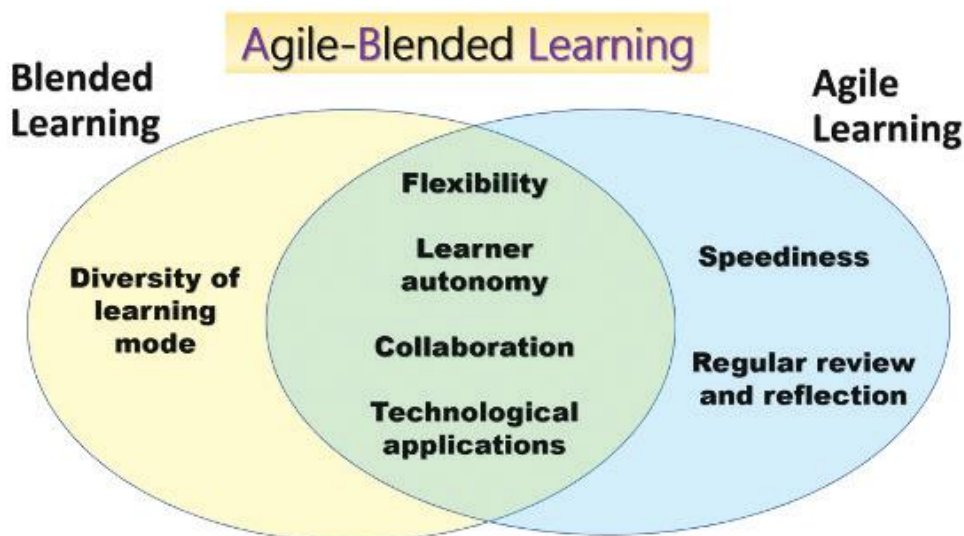


Figure 1. Core Principles of AB Learning (Source: Li, 2023b)

1.2. Experimenting with the Agile-blending Learning Concepts

As AB learning is a relatively new approach, its practical implementation and effectiveness in open education, particularly distance learning, have yet to be extensively tested and evaluated. Li, Wu, and Chan (2023) have proposed implementation guidelines for AB learning, encompassing various stages such as course planning, course design or redesign, and course implementation. They have recommended the adoption of AB learning in an undergraduate distance learning English language course. However, the reality is that university structures, policies, and support systems may hinder instructors' flexibility in modifying their pedagogical approaches. Moreover, both instructors and students may not be adequately prepared for the transition to AB learning.

The emergence of the COVID-19 pandemic presented an unexpected opportunity for the author of this paper to experiment with the AB learning approach. Although the Hong Kong government did not officially suspend tertiary institutes due to social distancing measures, most institutions voluntarily suspended face-to-face classes for an extended period. This backdrop compelled the "Investigations in Early Childhood Education" course to be reinvented.

The year-long course was initially designed to provide a comprehensive study of early childhood education research. It incorporated a combination of self-study materials and face-to-face lessons to ensure a well-rounded learning experience. The self-study materials included five chapters, each focusing on a different aspect of early childhood education research. The face-to-face component comprised 30 lectures and 15 tutorials, each lasting two hours. Half of the lessons focused on introducing research methodology in early childhood education, encompassing both quantitative and qualitative methods. The remaining lessons critically examined various research studies related to early childhood education in addition to the self-study materials. Moreover, students were guided through conducting their own mini-research study, which required them to each produce a research report as the final learning output.

In response to the suspension of face-to-face classes due to the COVID-19 pandemic, a comprehensive redesign of the "Investigations in Early Childhood Education" course was undertaken, incorporating the four core principles of the AB learning framework: flexibility, learner autonomy, collaboration, and technology mediation.

To address flexibility, the course structure was adapted to accommodate remote learning. The lectures and tutorials of the course were conducted in real-time via Zoom, allowing students to participate from any location. Students who wished to obtain more in-person support from their tutor could choose to attend the tutorials on campus. Video recordings of each lesson and related course materials were made available on the course's online platform, allowing students to review the materials at their convenience and pace.

Individual consultations with the tutor via Zoom, text messaging (WhatsApp), or phone were added to support learner autonomy in the course. These personalized sessions allowed students to seek guidance tailored to their specific needs, empowering them to take ownership of their learning journey and progress at their own pace.

Collaboration was fostered by dividing students into small groups of 4 or 5. Instead of focusing solely on listening to lectures and discussing the same research studies, each group was encouraged to choose their own area of interest. They conducted investigations and delivered online presentations via Zoom, fostering collaboration, knowledge sharing, and peer learning. Anonymous feedback forms facilitated immediate feedback, allowing classmates to provide constructive criticism and contribute to each other's growth.

Technology mediation played a crucial role in the course redesign. Zoom was the tool for lectures, tutorials, individual consultations, and online presentations, ensuring seamless communication and interaction despite the physical separation. The course's online platform and discussion board further facilitated access to video recordings, resources, and materials, effectively mediating the learning process through technology.

This investigation aimed to assess the potential of implementing AB learning concepts in enhancing the teaching and learning experience of the above Master-level early childhood research course. The study was guided by the following research questions:

1. How did the incorporation of AB learning concepts affect the learning experience, specifically regarding flexibility, learner autonomy, collaboration, and technology mediation?
2. What were the perceived benefits and challenges experienced by students within the AB learning environment?

The following section outlines the methodology employed in this study.

2. Methodology

2.1. Participants

There were initially 42 adult students enrolled in the course. Their ages ranged from 26 to 61 years old, with a mean age of 39.55 ($SD = 11.23$). The majority (97.6%) of them were females. Table 1. presents additional demographic and background variables of the sample. Subsequently, two female students withdrew from the course, so there were eventually 40 students. Informed consent was obtained from all participants, and strict measures were taken to maintain confidentiality and anonymity during data collection and analysis.

Table 1. Demographic Information of Respondents

Item	Respondent %
Current occupation and position	
Principal at kindergarten	21.4
Headteacher at kindergarten	23.8
Teacher at kindergarten	40.5
Others	14.3
Highest qualification obtained	
Bachelor of Education in Early Childhood Education	85.0
Other bachelor's degrees	10.0
Other master's degrees not in the field of Early Childhood Education	5.0
Studied some research methods	
Yes	66.7
No	33.3
Studied statistics	
Yes	31.0
No	69.0
Experience with distance learning	
Undergraduate program/ course	23.8
Postgraduate program/ course	26.2
No experience with distance learning	50.0

2.2. Instruments and Procedures

Students' feedback was collected using online questionnaires administered using Google Forms at the beginning and end of the course. The pre-course questionnaire mainly sought to obtain the students' educational and professional backgrounds (as shown in Table 1) and their learning expectations to help with the development of the course. The end-of-course questionnaire comprised closed-ended questions rated on a 5-point Likert-type scale from 1 (strongly disagree) to 5 (strongly agree) to assess students' satisfaction with the course and two open-ended questions to gather their perceived benefits and challenges experienced within the AB learning environment. Each questionnaire took approximately 10 minutes to complete.

In addition to the questionnaires, students' feedback was collected through ongoing in-class discussions and online discussion boards. These platforms allowed students to engage in continuous dialogue and share their thoughts and insights throughout the course.

2.3. Data Analysis

The data collected were analyzed using both quantitative and qualitative methods. The quantitative data were analyzed using descriptive statistics computed with Google Sheets.

Students' qualitative comments in the end-of-course were analyzed using a general inductive approach. The data were initially coded by a research assistant and organized into themes (as shown in the tables in the Findings section), which were then analyzed quantitatively and interpreted in relation to the research questions. Selected quotes from the questionnaires, in-class discussions, email communications, and online discussion board data are included below for illustration.

3. Findings

At the beginning of the course, students were asked to complete a brief questionnaire to assess their expectations regarding the course and the novel learning approach being employed. Their expectations of the course and the related difficulties are summarized in Table 2.

Table 2. Respondents' Expected Difficulties and Expectations on Course

Item	Respondent %
Expected difficulties	
Research method/process	39.5
Data collection & analysis	15.8
Deciding on a research topic	7.9
Completing assignments on time	13.1
Finding groupmates	5.3
Obtaining reference materials	7.9
Technological problems	2.6
None	7.9
Expectations on the course	
Learn about research methods	51.4
Be able to use these skills in daily practice	24.3
Teachers of the course to provide more guidance and support	5.4
Complete the course and graduate	18.9

Feedback from the students was collected and analyzed in an ongoing fashion to refine and support the course implementation and to evaluate the impact of incorporating AB learning concepts on the overall learning experience. Their views are summarized below.

3.1. Enjoying the Flexibility and Convenience

Our study highlights the significant utility of the AB learning approach in providing students with increased flexibility and convenience, enabling them to learn at their preferred pace and in their preferred time frame. When asked about the advantages of the AB learning arrangement in this course, most students (67.9%; Table 3) emphasized the importance of flexibility and convenience.

For instance, during the pandemic, this course allowed students to choose whether to attend classes in person or online. One of the participants, Student A, expressed appreciation for this arrangement, stating,

“I appreciate this arrangement a lot because it provides students like me who work full-time with the flexibility to arrange my learning without being restricted by location. It saves me the trouble of commuting and allows me to attend classes promptly.”

Echoing Student A's comment, many students' responses to the end-of-course survey's open-ended question about the advantages of AB learning emphasized that it enabled them to learn at their preferred pace and in any location. This aspect proved especially advantageous for working adults with busy schedules, as it effectively saved them commuting time. Furthermore, students recognized that the new learning approach allowed them to choose when and how they wanted to learn, resulting in improved comprehension of the coursework and heightened engagement in attending lessons.

3.2. Appreciating the Learner Autonomy

Another significant finding from our study suggests that the AB learning approach fosters learner autonomy. Approximately 21.4% of students specifically emphasized that the learning approach promotes learner autonomy by allowing them to decide on when and where they study, how they structure their study time, and the methods they employ for learning (Table 2). Providing individual consultations and multiple feedback methods further facilitated personalized support, which proved crucial, especially considering that students researched topics of their choice. This sense of ownership over their studies enabled them to learn according to their individual preferences and develop enhanced time-management skills. Consequently, they perceived this autonomy as instrumental in facilitating more effective learning experiences.

For example, another student, Student B, stated, “*Students could learn according to their own needs,*” highlighting the ability to tailor their learning to their specific requirements.

3.3. Longing for More Interpersonal Interactions and Collaborations

The course in this study implemented various strategies to facilitate collaboration and interaction among students and between students and teachers. Our findings revealed that students found online interactions valuable for their learning, and many acknowledged that despite certain aspects of the course being conducted online, teachers could provide timely guidance and feedback. However, despite including group discussions and projects, students desired increased interactions with teachers and peers. In response to the end-of-course questionnaire regarding the challenges they faced, 46.4% of students indicated that the absence of immediate real-life interactions posed a difficulty for their learning (Table 2). A selection of their responses is provided below:

- Student C: *“The online classes lacked student-teaching interactions and opportunities to collaborate with peers.”*
- Student D: *“I missed having discussions with peers during online classes.”*
- Student E: *“I struggled to adapt to the reduced peer interaction and limited opportunities for sharing during online classes.”*

3.4. Enhancing Learning and Access to Course Materials through Technological Integration

The findings also revealed that incorporating technology into teaching within the AB learning mode has significant advantages for the effectiveness and efficiency of learning. This study’s primary online learning tools were Zoom, the course’s online platform, and WhatsApp. Students agreed that these online tools greatly facilitated communication and interaction, bridging the gap created by physical separation. The online learning platforms effectively mediated the learning process by providing easy access to course materials.

The quantitative findings align with the qualitative feedback received, as students emphasized the timeliness of teacher guidance during online classes (Table 4). The quantitative results in Table 3 also indicated that most students agreed that online interactions (90%) and interactive online lessons (100%) were highly beneficial for their learning in this course. Utilizing online tools enabled them to attend classes and complete projects, which would otherwise have posed significant challenges during the pandemic.

One student (Student F) expressed gratitude towards the teacher for their commitment to monitoring each student’s learning progress. This personalized attention further enhanced the learning experience within the AB learning environment.

Table 3. Perceived Advantages and Disadvantages of the New Learning Approach

Item	Respondent %
Advantages	
Flexible and convenient (e.g., saves commute time, flexible location)	67.9
Learner autonomy (e.g., arranging own learning time and pace)	21.4
Safety during the pandemic	10.7
Disadvantages	
Lack of interactions	46.4
Lack of immediate guidance from teachers	14.3
Easily distracted	10.7
None	28.6

Table 4. End-of-course Evaluation Results

Item	Strongly Agree %	Agree %	Neutral %	Disagree %	Strongly Disagree %
Course-related					
The course was well-organized and ran smoothly	35.0	65.0	0.0	0.0	0.0
The course was stimulating and useful	35.0	50.0	15.0	0.0	0.0
The course has improved my competency in related academic/professional contexts	35.0	50.0	15.0	0.0	0.0
Learning outcome					
Learning outcomes of the course were clear	30.0	65.0	5.0	0.0	0.0
The course materials (e.g., course readings, textbooks, notes, audio-visual materials, etc.) helped me achieve the learning outcomes	20.0	55.0	15.0	10.0	0.0
The course activities (e.g., tutorials, day schools, discussions, assignments, etc.) helped me achieve the learning outcomes	25.0	55.0	20.0	0.0	0.0
The course met the stated learning outcomes	25.0	60.0	15.0	0.0	0.0
Course materials					
The course materials were well-written and organized in a manner that effectively guided my study	20.0	70.0	10.0	0.0	0.0
Self-tests/ activities/ exercises in the course materials facilitated my learning of the course	20.0	50.0	0.0	0.0	0.0
Multimedia and/or online course materials were effectively integrated to maintain my interest in the subject	25.0	55.0	0.0	0.0	0.0
Online teaching and learning					
I am satisfied with the online teaching of the course (e.g., audio and video quality, timely publishing of recordings, online interaction, etc.)	35.0	55.0	5.0	5.0	0.0
Real-time interactive online classes for this course were effective for my learning	30.0	70.0	0.0	0.0	0.0
Overall, I am satisfied with the tutor	40.0	50.0	10.0	0.0	0.0
Assessment and feedback					
Assessments (e.g., assignments, tests, projects, etc.) were appropriate and relevant to the course	30.0	60.0	10.0	0.0	0.0
Assessment requirements were communicated clearly in advance	25.0	60.0	15.0	0.0	0.0
Feedback on my assignments/projects was timely and useful for my study	25.0	60.0	15.0	0.0	0.0

Overall, findings from this study suggest that the AB learning model can facilitate effective learning and teaching in the age of digitalized education. Students welcomed the new class delivery model, which gave them greater flexibility and saved them travel time. However, students still sought more interpersonal interactions, indicating the need for further improvements in the delivery of lessons.

4. Discussion and Conclusion

This study aimed to explore the potential of adopting AB learning concepts in facilitating the teaching and learning of the “Investigations in Early Childhood Education” class. By intentionally addressing the principles of flexibility, learner autonomy, collaboration, and technology mediation in the course redesign, the course successfully adapted to the challenges posed by the pandemic and the increasing demand for online learning. The study identified several benefits of AB learning, including greater flexibility, convenience, and learner autonomy for students. These results support previous research on the benefits of blended learning (e.g., Huang et al., 2022; Li & Wong, 2019; Owston, 2018; Puah et al., 2021) and agile methodology (e.g., Lang, 2017;

Noguera et al., 2018) in higher education. The integration of technology and online resources provides students with increased flexibility and opportunities for active learning, as well as personalized feedback. The utilization of agile methodology fosters a student-centered approach to teaching and learning, emphasizing flexibility, experimentation, and continual improvement. These advantages can potentially enhance students' interest and motivation in learning, ultimately contributing to lifelong learning — a crucial aspect of employability in urban settings (English & Carlsen, 2019; Loew & Billet, 2022; Owston, 2018).

However, it is important to acknowledge the challenges associated with implementing AB learning. The lack of real-time immediate interactions with the instructors and peers might stem from various factors, including unfamiliarity with the new learning approach, the use of different technologies, and the highly flexible nature of AB learning itself. According to Li et al. (2023), one of the main challenges is the need for educators to adapt to the changing nature of teaching and learning, requiring them to possess agile techniques and the technical skills and knowledge to use various online tools and resources effectively. Investing in professional development opportunities may help educators enhance their understanding of AB learning and enable them to implement it successfully. Also, educators should provide ongoing support and guidance to students, alleviating their anxieties and fostering a sense of security in the student-centered learning environment. Educators may enhance student engagement and interaction through clear communication, regular feedback, and the design of collaborative activities that promote interaction and a sense of community among students.

Admittedly, the study had some limitations that need to be considered. The sample size was relatively small, and the investigation was conducted in a single course at one institution, which might limit the generalizability of the findings. The reliance on self-reported data from students might also be subject to response bias. Future research can address these by conducting larger-scale studies across multiple institutions and courses, incorporating objective learning outcome measures. Moreover, further exploration of strategies to optimize the implementation of AB learning and address the identified challenges is warranted. Investigating the long-term effects of AB learning on academic achievement, engagement, and retention would also provide valuable insights into its overall effectiveness.

Nonetheless, the findings of this study have shown the potential of AB learning to transform teaching and learning in open education by providing learners with a more flexible, autonomous, and convenient learning experience. However, it is helpful to consider methods of allowing more interactions for students to engage in their learning fully. By embracing the opportunities and addressing the challenges, educators can harness the power of AB learning to create meaningful and impactful learning experiences for students.

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171-Optimizing ODL Teaching Delivery via Cognitive-Emotive Intelligent Tool

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Abstract

The idea of educational technologies as cognitive tools stresses the value of learning through technology. When cognitive tools are designed with student-led learning in mind, especially in the ODL set-up, they perfectly help to extend and scaffold learners' higher-order cognition both when the technology is in use and even after the cognitive partnership has ended. Today, the concept of cognitive tools continues to offer a relevant and important lens through which learners can leverage the capabilities and affordances of technologies to learn. However, it remains the case that "cognitive tool technology offers substantial potential to improve learning but requires significant study to determine the additional elements that influence their successful application in the context of learning". Educational technologies are gradually able to detect and react to these additional elements which extend to humans' physical, emotional, and motivational changes. With these technological advancements, the cognitive tools concept needs to be re-examined to ascertain how it can be both applied and adapted for learners' self-managed learning as we move forward in the post-Covid-19 pandemic. In this study, the authors have investigated one of the elements, namely the emotion element, and developed a cognitive tool with emotion modeling to support learners in their self-managed learning of a programming subject in an ODL environment. The cognitive element of the tool supports problem-based learning for program generation, while emotion modeling is done via sentiment analysis to gauge learners' state of mind. This intelligent tool will provide dynamically changing learning paths with customized learning content to the learners based on their cognitive and emotional scores. The pilot evaluation of the effectiveness of this tool on students was carried out through a focus group (FG) discussion. The outcome of the FG discussion shows that cognitive tools enhanced with embedded emotion modeling (i.e., cognitive-emotive tool) can be an effective online learning tool for learners and provide insights for future studies.

Keywords: *Adaptive learning, cognitive tools, emotional analysis.*

1. Introduction

The idea of educational technologies as cognitive tools stresses the value of learning through technology. When cognitive tools are designed with student-led learning in mind, especially in self-managed learning, they perfectly help to extend and scaffold learners' higher-order cognition both when the technology is in use and even after the cognitive partnership has ended. Today, the concept of cognitive tools continues to offer a relevant and important lens through which learners can leverage the capabilities and affordances of technologies to learn. Cognitive tools have always been linked to adaptive learning whereby cognitive tools, defined as instruments that support or perform cognitive processes for learners, act as hooks for adaptively and intelligently supporting learners' learning processes (Van Joolingen, 1999). The cognitive states and learning styles of the learners are the most crucial proportions in an adaptive learning system (Chen & Zhang, 2008). The cognitive styles deal with cognitive activity such as thinking, perceiving, and remembering whereas learning styles are indicators of how learners perceive, communicate and respond to learning environments, including cognitive, emotional, and psychological behaviors (Yang et al., 2013).

Adaptive learning systems could clearly represent learners' knowledge structure and cognitive state that allow learning contents, learning activities, learning paths, and learning partners to be adjusted continuously, thus providing learners with appropriate learning resources and initiative to reflect on learning opportunities during the whole learning procedure (Wan & Yu 2020). Mastery of knowledge among learners can be measured according

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to levels and their distinctive levels respectively represents educational objectives achieved as proposed by Bloom which are knowledge, comprehension, application, analysis, synthesis, and evaluation (Jia et al., 2010). Since a learner's knowledge and achievement or measurement of the particular achievement is associated with learning, most adaptive learning system researches and literature focus on cognitive elements. In tandem with this notion, adaptive learning systems embed cognitive tool types of technology to elicit learners' performance that may serve as evidence to infer their level of cognition or cognitive state (Zhai, 2021).

2. The Problem

However, it remains the case that “cognitive tool technology offers substantial potential to improve learning, but requires significant study to determine the additional elements that influence their successful application in the context of learning”. Educational technologies are gradually able to detect and react to these additional elements which extend to humans' physical, emotional, and motivational changes. With these technological advancements, the cognitive tools concept needs to be re-examined to ascertain how it can be both applied and adapted for learners' self-managed learning especially in open and distance learning (ODL) as we move forward in the post-Covid-19 pandemic.

Cognitive load and motivation are related and understanding how factors such as motivation and cognitive load affect performance is important because learners are influenced by all of these factors simultaneously on any given task (Saeedi, 2016). Despite acknowledging that there should be efforts to combine learners' cognitive styles and personal traits or emotional states into a computer-based adaptive system, past research did not explore much on the emotional features that can influence the learning outcome via an adaptive learning system.

Echoing this, based on previous research done (Hwang et al., 2020), researchers concluded that many early studies mainly centered on the cognitive-based application of knowledge and skill to guide learners' path and pace of learning in adaptive learning systems, not much study has been done on reviewing learners' emotional factors. Other researchers such as Saeedi (2016), Feldon et al. (2019) and Plass & Kalyuga (2019) stressed that there is a clear connection between emotions and cognition. In academic settings, it was found that even if one is unaware of the effects of emotions on their learning, emotions are ubiquitous in the learning environment and affect learning effort and strategies, motivation to persevere, and academic outcomes (Coto et al., 2021). Thus, there is a general acceptance that emotions play an important role in learning and are critical to a learner's motivation and academic performance.

3. Objectives

In this study, the authors have looked into one of the elements and developed a cognitive tool with emotion modeling to support learners in their self-managed learning of a programming subject. The specific aims of this study are:

1. To propose cognitive-emotive elements for adaptive learning in a cognitive learning tool
2. To design & develop a cognitive-emotive learning tool
3. To evaluate the effectiveness of this cognitive-emotive adaptive learning tool.

4. Design and Development of Cognitive-Emotive Learning Tool

4.1. Emotion Modeling

In education, cognitive theories on emotion are very much related. Emotion models are the foundations of emotion detection (ED) systems; they define how emotions are represented (Acheampong et al., 2020). The models assume that emotions exist in various states thus there is a need to distinguish between the various emotion states. The major theories of emotion can be grouped into three main categories:

1. Physiological theories suggest that responses within the body are responsible for emotions.
2. Neurological theories propose that activity within the brain leads to emotional responses.
3. Cognitive theories argue that thoughts and other mental activities play an essential role in forming emotions.

ED evolved from sentiment analysis (or opinion mining) is a natural language processing (NLP) technique used to determine whether data is positive, negative, or neutral (Figure 1.). Sentiment analysis is often performed on textual data.

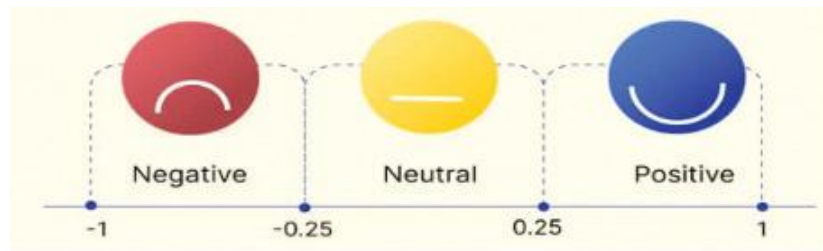


Figure 1. Sentiment analysis determines whether data is positive, negative or neutral

Acheampong et al. (2020) emphasised that there are two types of emotion models, namely discrete emotion models (DEMs) and dimensional emotion models (DiEM). For DEMs, the discrete model of emotions involves placing emotions into distinct classes or categories. The Ekman model distinguishes emotions based on six basic categories (Ekman, 1992). The theory asserts that there exist six fundamental emotions that originate from separate neural systems because of how an experiencer perceives a situation. Thus, emotions are independent. These fundamental emotions are happiness, sadness, anger, disgust, surprise, and fear. However, the synergy of these emotions could produce other complex emotions such as guilt, shame, pride, lust, greed, and so on.

Where else the Plutchik model as described by Plutchik (1980), postulates that there exist few primary emotions, which occur in opposite pairs and produce complex emotions by their combinations. Eight such fundamental emotions were identified by Plutchik (1980), that are, acceptance/trust and anticipation in addition to the six primary emotions posited in Ekman's research. The eight emotions in opposite pairs are joy vs sadness, trust vs disgust, anger vs fear, and surprise vs anticipation. For each emotion, Plutchik (1980) stressed that there exist varying degrees of intensities that occur as a result of how events are construed by an experiencer.

Any of the DEMs mentioned can be used to represent emotions when designing ED systems, depending on the researcher's preference. However, many researchers have indicated that a varied set of emotions may be required for various fields, for example, in the area of instruction and education. They proposed five categories (boredom, confusion, joy, flow, and frustration) for describing affected states in the learner system dialogue. Learners hardly feel fear or disgust, whereas they typically experience boredom or delight which is an argument for the need for domain-specific classes. In a study conducted by Bosch et al. (2013), it was found that flow/engaged (23%), confusion (22%), frustration (14%), and boredom (12%) were the major emotions learners experienced, while curiosity, happiness, anxiety, surprise, anger, disgust, fear, and sadness were comparatively rare. Boredom, flow/engaged, and confusion were also correlated with performance outcomes.

Where else, the dimensional emotion models (DiEMs) presuppose that emotions are not independent and that there exists a relation between them hence the need to place them in a spatial space (Figure 2.). Thus, dimensional models position emotions on a dimensional space (unidimensional, i.e., 1-D, and multidimensional, i.e., 2-D and 3-D) depicting how related emotions are and usually, reflecting the two main fundamental behavioral states of good and bad. Both unidimensional and multidimensional DiEMs are affected by the relative degrees (low to high) of their occurrences. Unidimensional models are rarely used, but their fundamental idea permeates most multidimensional models.

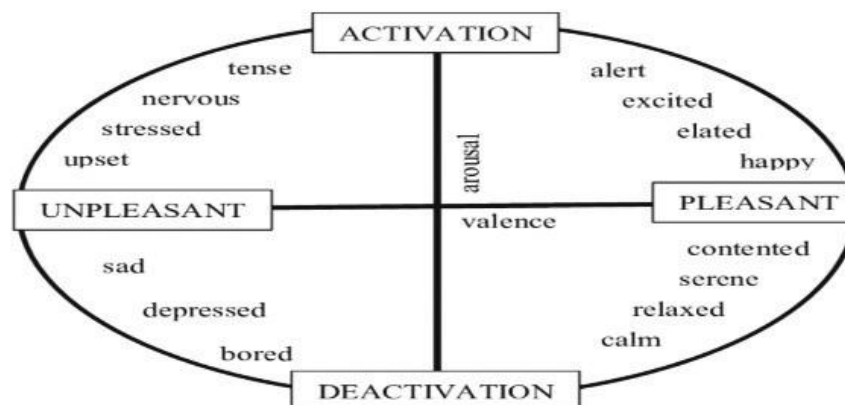


Figure 2. Dimensional emotion model (DiEMs)

Of the emotion models, the discrete models (DEMs) have been widely adopted for emotion classification works due to their simplicity although they do not fully exhaust a wider range of emotion classes, their intensities/degree of occurrences as compared with the dimensional models (DiEMs).

4.2. Cognitive-Emotive Modeling

In the Schachter–Singer theory of emotion (also known as the two-factor theory), emotions are the results of the interaction between two factors: physiological arousal and cognition, whereby physiological arousal is cognitively interpreted based on environmental context; this process culminates in emotional experience (Schachter & Singer, 1962). This theory opines that emotion is the result of a cognitive encounter. Thus, the emotional effect is triggered by a cognitive encounter. This has an implication in education to view cognitive-emotive as a combined process instead of seeing it as two distinct processes. For example, adaptive learning systems can consider the cognitive-emotive effect in determining the learning for the learners. Cognitive can be measured through a cognitive assessment, and emotion can be determined by asking the learners to indicate their emotional state or through test-analysis of a comment given by learners or any means using artificial technologies.

In our study, cognitive is modeled through assessment (i.e. cognitive assessment via a higher level of Bloom Taxonomy). A score of less than 50% is considered a low cognitive score (C-). while any score above or equal to 50% is considered good cognitive (C+). The emotion modeling in this study will be based on an earlier study done by Bosch et al. (2013) that categorized emotions in learning of programming into four categories, namely boredom, engaged, confused, and frustrated which are discrete emotion types. Thus, the following cognitive-emotive state of a learner can be traced as per Table 1.

Table 1. Eight Cognitive-Emotive paths identified in this study

	Cognitive-Emotive State	Explanation	Pedagogical Strategies for Intervention
1	C+●B	Good cognitive but the student is bored	Proceed to the next content Next lesson will be based on gamification
2	C-●B	Weak cognitive and the student is bored	Repeat the lesson with gamification Subsequent lessons will be based on gamification
3	C+●F	Good cognitive but the student is frustrated	Repeat the lesson by focusing only on the segment in that the student spending too much time Push a scaffolded multimedia lesson designed based on Mayer's cognitive theory of multimedia learning (Mayer, 2002)
4	C-●F	Weak cognitive and the student is frustrated	Repeat the whole lesson Use a persuasive approach based on the Fogg Behavior Model (Fogg Behavior Model, 2022)
5	C+●E	Good cognitive and the student is engaged	<i>NO INTERVENTION IS NEEDED FOR THE CURRENT LESSON AND PROCEED TO THE NEXT LESSON</i>
6	C-●E	Weak cognitive but the student is engaged	Repeat the lesson Push a scaffolded interactive lesson
7	C+●C	Good cognitive but the student is still confused	Repeat the lesson by focusing only on the segment in that the student spending too much time Push a scaffolded multimedia lesson designed based on Mayer's cognitive theory of multimedia learning (Mayer, 2002)
8	C-●C	Weak cognitive and the student is confused	Repeat the whole lesson Push an interactive video-based lesson to the student

Cognition State:

C- : Low Cognition, C+: High Cognition

Emotion State:

B=Boredom, F=Frustration, E=Engaged, C=Confusion

The pedagogy interventions given in Table 1 for each cognitive-emotive state are based on the literature reviews and authors' extensive experience in online teaching. The learners are not required to follow the flow shown in Figure 3. The ultimate target is to reach the C+●E status at the earliest.

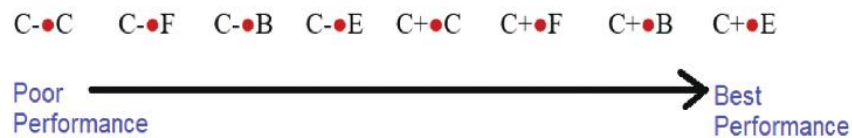


Figure 3. Cognitive-Emotive paths ranked based on their performance

5. Implementation of the Learning Tool

The following sections describe the design framework and the implementation of the cognitive-emotive adaptive learning system.

5.1. Design Framework

The proposed cognitive-emotive system was implemented using machine learning and rule-based approaches. A machine learning technique was used to capture the learners' emotional state, and a rule-based approach was used to provide the adaptation path to the learners. Figure 4. shows the general architecture of the system for a lesson.

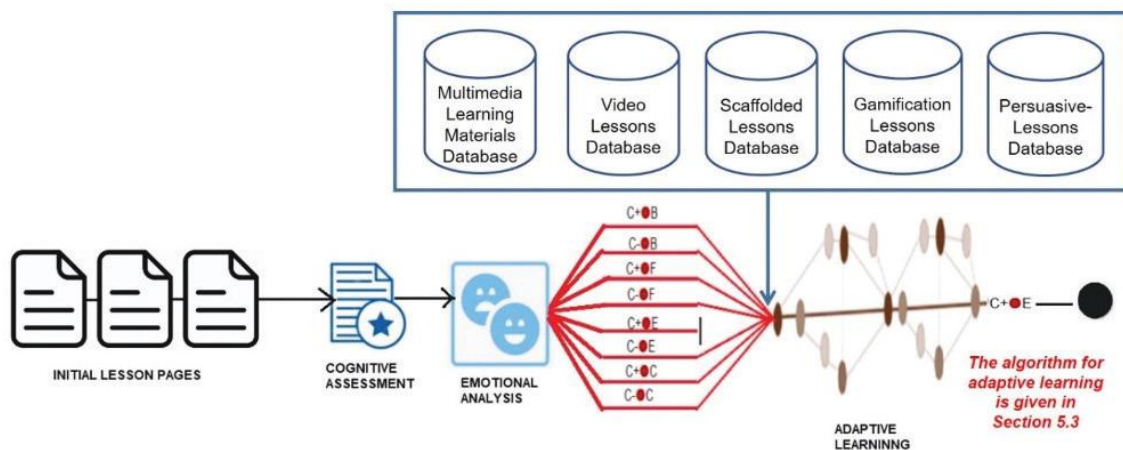


Figure 4. General architecture of the system for a lesson/concept

Cognitive assessment will be carried out through online quizzes based on a higher level of Bloom's taxonomy.

5.2. Automated Emotion Detection

Machine learning technique via the Naïve Bayes classifier was employed in order to determine the emotive state of the learner. Naïve Bayes classifiers, a family of classifiers that are based on the popular Bayes' probability theorem, are known for creating simple yet well-performing models, especially in the fields of document and text classification. It performs extremely well even with a small dataset. The authors have trained corpus taken from the learners' postings in the Learner Management System (LMS). Each learner's postings were classified in one of the following categories which were the major emotions learners' experienced based on the study conducted by Bosch et al. (2013):

- Boredom
- Engaged
- Confused
- Frustrated

Note: In this study, we have excluded the "neutral" emotion state as it warrants separate research by itself.

Emotion can be articulated in several means that can be seen, like speech and facial expressions, written text, and gestures. This study has adopted text-based emotion detection. Text-based emotion recognition has a key role in human-computer interaction. Emotion recognition in a text document is fundamentally a content-based classification issue, including notions from natural language processing and machine learning fields. In fact,

the emotions that prompt individuals to pen down certain words at particular times are what text-based ED is concerned about. Emotions are recognized with the help of words denoting emotions or class tags. The study does not emphasize other psychological traits of non-cognitive factors like temperament and motivation as these trait-based measures are very coarse-grained and assume fixed dispositions instead of malleable factors. Furthermore, these factors were not the focus of this study.

All the data have been pre-processed through the NLP technique:

- All the texts are changed to lowercase
- Words are tokenized
- Stop words and non-alpha words are removed
- Word Lemmatization
- Adoption of feature vectors

5.3. Adaptive Learning Algorithm

The algorithm used for the adaptive learning component as highlighted in Figure 4, is depicted in Figure 5. The adaptation is controlled through a rule-based artificial intelligence (AI) approach that will push the appropriate content to the learners based on their cognitive-emotive status. The ultimate target of a lesson loop is to achieve the C+●E status. If a learner/student fails to achieve the desired status within three loops in a single lesson, the instructor who facilitates the teaching delivery will be informed about this struggling learner. This ensures the instructor takes a timely intervention after concluding an adaptive learning session.

```

set counter=0
repeat until student completes the lesson or counter < 4
if (C+●B)
  Proceed to the next lesson
  Randomly push a gamification-based contents for the next lesson
  Set counter=0
else if (C-●B)
  if (counter < 4)
    repeat the current lesson
    Randomly push a gamification-based lesson
    Push the cognitive assessment to the student
    Capture latest emotion state of the student
    counter=counter+1
  else notify the instructor with the students cognitive-emotive status
else if (C+●F)
  if (counter < 4)
    determine the lesson page that the student spent long time
    randomly push a multimedia content on that lesson
    Push the cognitive assessment to the student
    Capture latest emotion state of the student
    counter=counter+1
  else notify the instructor with the students cognitive-emotive status
else if (C-●F)
  if (counter < 4)
    repeat the current lesson
    Randomly push a persuasive-based lessons
    Push the cognitive assessment to the student
    Capture latest emotion state of the student
    counter=counter+1
  else notify the instructor with the students cognitive-emotive status
else if (C+●E)
  exit the current lesson
  proceed to the next lesson in a normal web format
else if (C-●E)
  if (counter < 4)
    repeat the current lesson
    Randomly push a scaffolded interactive lesson
    Push the cognitive assessment to the student
    Capture latest emotion state of the student
    counter=counter+1
  else notify the instructor with the students cognitive-emotive status

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```

else if (C+●C)
  if (counter < 4)
    determine the lesson page that the student spent long time
    randomly push a scaffolded multimedia content on that lesson
    Push the cognitive assessment to the student
    Capture latest emotion state of the student
    counter=counter+1
  else notify the instructor with the students cognitive-emotive status
else if (C-●C)
  if (counter < 4)
    repeat the lesson
    randomly push interactive videos to the learner
    Push the cognitive assessment to the student
    Capture latest emotion state of the student
    counter=counter+1
  else notify the instructor with the students cognitive-emotive status

```

Figure 5. Algorithm used to control the adaptive learning process

Mayer’s cognitive theory of multimedia learning was used to design multimedia-based lessons for the C+●F and C+●C adaptive paths as the multimedia instructional messages are more likely to lead to meaningful learning. On the other hand, the Fogg behaviour model was used as persuasive lessons for those learners in the C-●F status. The persuasive model shows that three elements must converge at the same moment for a behavior to occur: Motivation, Ability, and Prompt.

5.4. Tool Implementation

A prototype has been developed for the “class” concepts covered in object-oriented programming. This was for a single lesson. The concept of “class” is an important concept of the subject. The authors have focused on a programming course as programming is a technical course and difficult to learn. A well-designed adaptive learning system can give adaptable and customized learning content that can accommodate the learning ability of the learners as well as their preferences (Anindyaputri et al., 2020). In addition, adaptive learning systems can also help learners with different capabilities to learn programming. The user interface of the tool was implemented through Java. The rule-based AI for the adaptation was built using Java Expert System Shell (JESS) and Java-based machine learning algorithms. A learner going through a lesson may be in various cognitive-emotive states, and the algorithm depicted in Figure 5.0 will be used to push the appropriate content to them. The contents will be randomly picked from the appropriate databases based on the learners’ cognitive-emotive state.

Figure 6. shows the plain web contents initially pushed to the learners at the beginning of the lesson. The learners navigate the lesson via the “Next Page” and “Previous Page” navigation buttons. This tool will provide dynamically changing learning paths to the learners based on their cognitive and emotional scores after the initial lesson.

The screenshot shows a web page titled "Introduction to class" with a sub-heading "Class". The text explains that a class is a blueprint for objects and uses the example of cars. It includes a diagram showing a "Student() Class" with attributes "Name" and "Age" and three "Object Student" instances: "Object Student: John" (Name: John Smith, Age: 23), "Object Student: Bob" (Name: Bob Smith, Age: 17), and "Object Student: Ali" (Name: Ali Zak, Age: 20). Below the diagram is the caption "Figure 1: Objects created from the class Student". At the bottom of the page are two buttons: "PREVIOUS PAGE" and "NEXT PAGE".

Figure 6. An example of contents pushed to the learners at the beginning of a lesson

Figure 7. shows the scaffolded lesson pushed to those learners in the C-●E status.

It's time to complete the class Product

The incomplete class Product is shown below. I have shown you the structure of the class Product. For example, the attributes (states) and method (behaviours) of the class have been indicated. Now, you will need to complete the class Product given below by filling-up the "boxes".

```

class Product {
    private double totalPrice=0;
    private double pricePerUnit;
    private int quantity;
    private String nameOfProduct;

    public  (double , int qty, String name) {
        pricePerUnit=qty;
        quantity= qty;
        nameOfProduct=;
    }

    public void determineTotalPrice() {
        totalPrice=quantity*pricePerUnit; //multiply the quantity and pricePerUnit and the result is assigned to totalPrice
    }

    public void display() {
        System.out.println("Product Name: "+nameOfProduct);
        System.out.println("Total Price: "+totalPrice);
    }

    public void changeProductName(String newName) {
         =newName; //change the name of nameOfProduct
    }
}

```

PREVIOUS PAGE NEXT PAGE

Figure 7. An example of a scaffolded lesson pushed to those learners in the C-●E status

Figure 8. shows the gamification lesson pushed to those learners in the C+●B status. Here, the learners solve a programming problem via gamification.

Its Game Time!!



Would you like to play the above game?

NEXT PAGE

Figure 8. An example of a gamification lesson randomly pushed for the C+●B learners

Figure 9. shows the persuasive lesson pushed to those learners in the C-●F status.

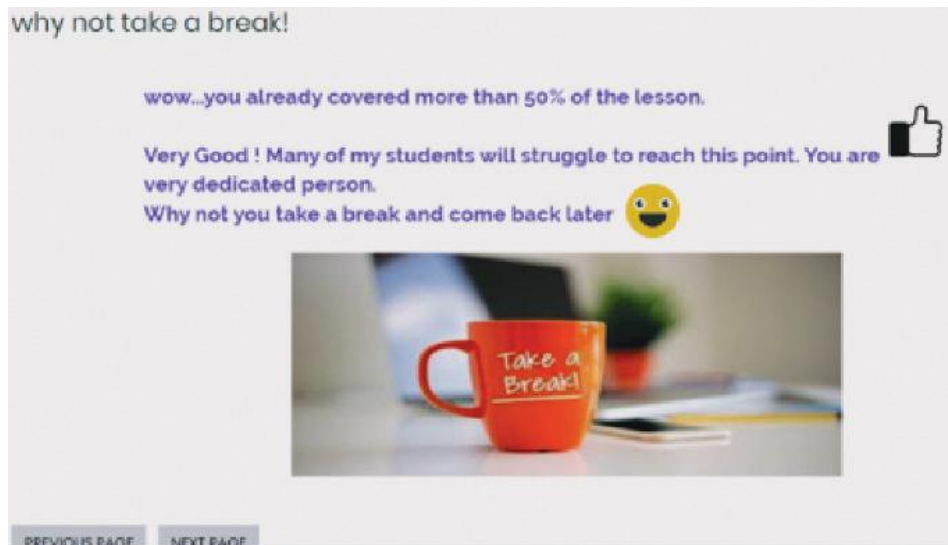


Figure 9. An example of a persuasive lesson capitalizing on motivation and hope is (Fogg Behavioural Model) randomly pushed to the C-●F learners

Figure 10. shows a multimedia lesson appeared on the interface for C+●E status.



Figure 10. An example of a multimedia lesson page randomly pushed to the C+●E learners

Figure 11. shows a video lesson appeared on the interface for C-●C status learner.

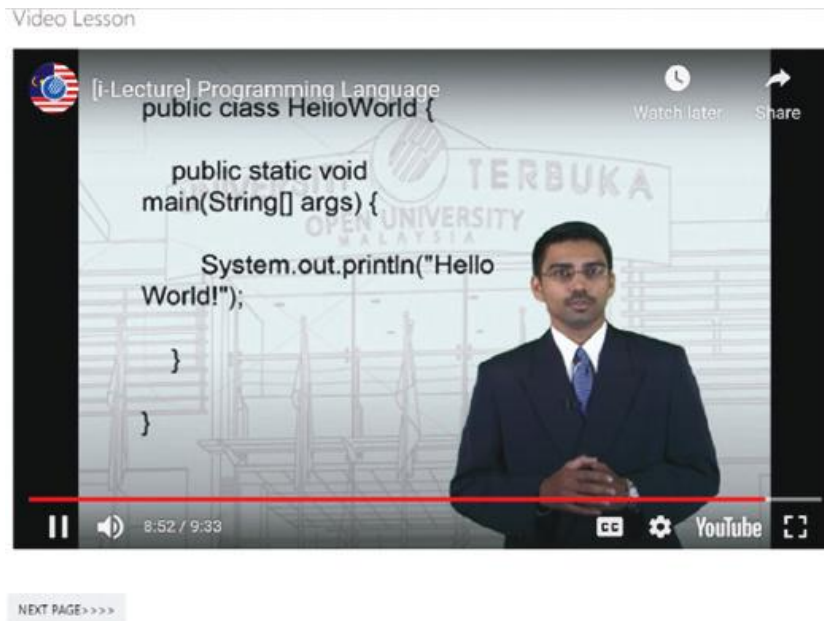


Figure 11. An example of an interactive video lesson randomly pushed to the C-●C learners

Figure 12. shows the cognitive assessment that will be pushed to the learners until they exit the lesson successfully.

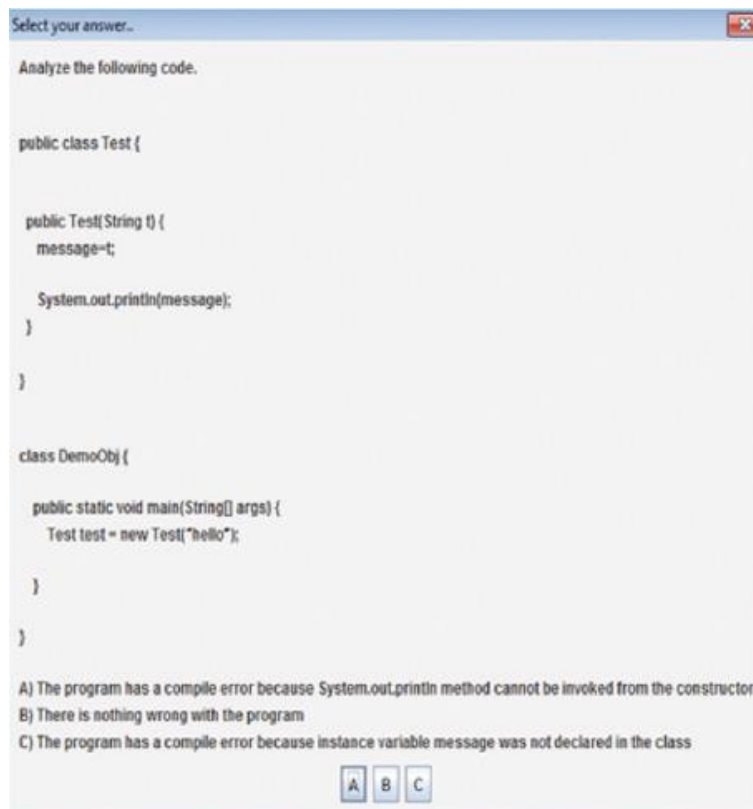


Figure 12. An example of the cognitive assessment page

Accordingly, Figure 13. shows a page that will be immediately displayed after the cognitive assessment to capture the learner's emotional state which was done through the machine learning technique.

Figure 13. The text-based emotional detection in the tool processed through the machine-learning technique

6. Prototype Evaluation

In order to gauge the effectiveness of this cognitive-emotive learning system, five learners enrolled in an IT programme have volunteered to use the system as part of a pilot study. The learners were briefed on the usage of the system, and they were given one week to complete the lesson inside the learning tool. Learner's feedback was obtained through a focus group discussion with these discussion themes which are:

- Learning experience
- Knowledge acquisition
- Are you happy with the sequence of contents given to you?
- Do you want such a learning tool in your other courses?
- How could the learning tool be enhanced?

Focus group was used in this study as it is an effective approach to obtain feedback from the users, especially during the pilot testing stage. The outcomes of the focus group discussion are presented in the following section.

6.1. Focus Group Outcomes

The feedback obtained from the five learners during the focus group discussion is given in Table 2. Some of the learners' feedback has been edited for clarity.

Table 2. The outcomes of the focus group discussion

Focus Group Themes	Learners' Feedback
Learning experience	<ul style="list-style-type: none"> • "It was a wonderful experience" • "Such as awesome tool" • "I enjoyed learning the subject in this tool" • "Interesting to learn the subject in a new way"
Knowledge acquisition	All the learners mentioned that their knowledge of the "class" concept increased after going through the lesson via the learning tool
Are you happy with the sequence of contents given to you?	All the learners gave a favourable response to this question
Do you want such a learning tool in your other courses?	All the learners wanted the learning tool to be expanded to other courses as well
How could the learning tool be enhanced?	<ul style="list-style-type: none"> • "Include a dashboard to show our progress" • "Chunk some of the videos into a smaller segment" • "Give more examples" • "Provide a compiler so that we can immediately type the programs to view its output" • "Allow us to move back to the previous lesson page" • "Allow to exit the system anytime and resume later from the last accessed page"

In summary, the learners gave a favourable response in this pilot evaluation. Some further enhancements as suggested by the learners will be considered for future work.

7. Conclusion

The paper has provided five main contributions:

1. Identification of the cognitive-emotive paths
2. Suitable pedagogical interventions for each of the cognitive-affective paths
3. Creation of an ML model to determine the emotional state of a learner/student based on text-based analysis
4. Algorithm creation for the adaptations
5. Design and development of a learning system that was able to dynamically change learning paths and contents based on the learners' cognitive-emotive states.

The above contributions will certainly help ODL institutions in providing an effective learning environment to their learners. The previous approach of “one size fits all” has become obsolete and now the learners are expecting lessons that are personalized and customized according to their own ability. By mixing AI and pedagogy, the authors have re-defined learning through the fusion of technology and pedagogy. The authors have created a natural and vibrant cognitive-emotive adaptive learning environment. Simulated Learning Environment (SLE) as the one presented in this study is not to replace the human instructor, but such a simulated learning environment can take over some of the instructor's tasks in ODL setting. In fact, as per concurred by Ayres & Langone (2008) and Rieg & Wilson (2009) in their previous studies, SLE permits combined learning in teaching pedagogy, problem-solving strategies, and content knowledge. The future of higher education will involve a close collaboration between humans and SLE. In the future, an instructor could become the product of the human instructor and the AI-based simulated learning with each playing a complementary role.

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Best Practice Award

Gold Medal

172-Leveraging Generative AI to Build a Bespoke Educational Chatbot

Nantha Kumar Subramaniam¹

Abstract

The current educational chatbot landscape predominantly features text-centric platforms that lack a cohesive pedagogical framework, resulting in a system that is primarily focused on answering questions rather than providing comprehensive and engaging learning experiences for students. This challenges educators to create more effective and well-rounded educational chatbots that incorporate pedagogical principles and move beyond mere question-answering capabilities. In this study, the author developed an educational chatbot for an undergraduate course on Java programming. This chatbot supports learning through problem-solving steps through a “learning by doing” approach that goes beyond text-based information by encompassing various visual and interactive elements. The chatbot is tailored to a learning outcome while providing feedback to students as they work through a problem. Additionally, it engages the learners in problem-solving sessions through conversation and a personalized learning experience. The educational chatbot utilizes a generative artificial intelligence (AI) tool known as Chatbot GPT (ChatGPT), developed by OpenAI to provide a sustainable and engaging contextualized conversation. ChatGPT is a conversational AI model based on the GPT (Generative Pre-trained Transformer) architecture capable of understanding and generating human-like text. In this educational chatbot, ChatGPT was used to extend the domain knowledge, provide advanced natural language processing capability to understand user queries, and provide continuous conversational engagement and learning. The pilot evaluation of the chatbot’s effectiveness on students was conducted through the qualitative method via a focus group discussion. Students were asked about their learning experiences using the chatbot and how much their knowledge of Java improved after engaging with the educational chatbot. The findings from the focus group discussion highlight that the customized chatbot, enhanced by ChatGPT technology, positively influences students’ learning experiences and understanding of the subject matter. The implication of these findings indicates that a customized educational chatbot powered by ChatGPT can enhance students’ learning through humanless interventions and autonomous experiences.

Keywords: *Artificial intelligence, chatbots, generative AI*

1. Introduction

In the dynamic and ever-changing realm of education, technological advancements continually redefine and transform the traditional paradigms of teaching and learning. One such groundbreaking technological innovation that has profoundly impacted modern-day education is the introduction of chatbots. Alan Turing’s groundbreaking 1950 paper, “Computing Machinery and Intelligence,” laid the cornerstone for the future development of conversational agents, which eventually became chatbots. By posing the provocative question, “Can machines think?”, Turing not only delved into the core of cognitive abilities but also initiated an exploration into the realm of crafting machines capable of emulating human conversations. His inquiry and insights sparked debates and spurred innovations, eventually leading to the advanced chatbots and conversational agents we see today.

Chatbots are computer applications that mimic human interactions using voice or text, or sometimes both, as highlighted by Frankenfield (2018). These digital tools are crafted to emulate the manner in which humans converse and engage in dialogues (Frankenfield, 2018). Leveraging artificial intelligence, chatbots can transform traditional lectures into a sequence of messages, presenting educational content in a format reminiscent of regular chat conversations (Singh, 2018). At their core, chatbots are sophisticated automated software tools designed to interact and communicate with users conversationally. Driven by the combined might of natural language processing (NLP) and advanced artificial intelligence (AI) mechanisms, chatbots can mimic human-like interactions, offering a wide array of applications that span from handling routine administrative functions to providing nuanced, subject-specific tutoring.

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2. Problem Statement

Chatbot is increasingly being used for educational purposes. Chatbot technology has the potential to provide quick and personalized services to everyone in the sector, including institutional employees and students (Okonkwo & Ade-Ibijola, 2021). However, as we delve deeper into the educational chatbot ecosystem, a noteworthy observation emerges. Most of these platforms are heavily inclined toward text-based and un-contextual interactions. This predominant text-centricity often sidesteps the critical element of a solid pedagogical foundation. Consequently, instead of being holistic teaching tools that can captivate and immerse students in a comprehensive learning journey, many of these chatbots narrow down their functionalities to be mere question-answer systems. This current state emphasizes the pressing need for these digital assistants to transcend beyond simple query responses and evolve into platforms that can offer a more rounded, engaging, and transformative learning experience for students.

3. Purpose of Study

This paper aims to suggest a new form of student-interaction mechanism for learning through an instructional-based intelligent chatbot to facilitate the learning of Java programming within an Open Distance Learning (ODL) framework. The focus on a programming subject was deliberate, given the inherent challenges associated with grasping programming concepts (Gomes & Mendes (2007), Guzdial & Guo (2014)). A chatbot is uniquely equipped to support and enhance the programming learning process.

4. Chatbot Design & Development

The following sections describe the design and development of the chatbot proposed in this study. The chatbot was built using Java, encompassing both the front-end and back-end processes.

4.1. Chatbot Interface

The chatbot's interface, as depicted in Figure 1, is organized for optimal user interaction and learning. The chatbots facilitate the learners by engaging them in a "one-to-one" learning session for more than 1 hour with the ultimate aim of solving the given programming problem successfully. It consists of a dedicated chat area where real-time interactions with the chatbot occur, a work area that provides a space for hands-on exercises, problem-solving, and visualizations for a given problem, and an input area where users can type in their queries, responses, or code snippets. These defined sections ensure a streamlined and focused learning experience for the users while engaging with the chatbot.

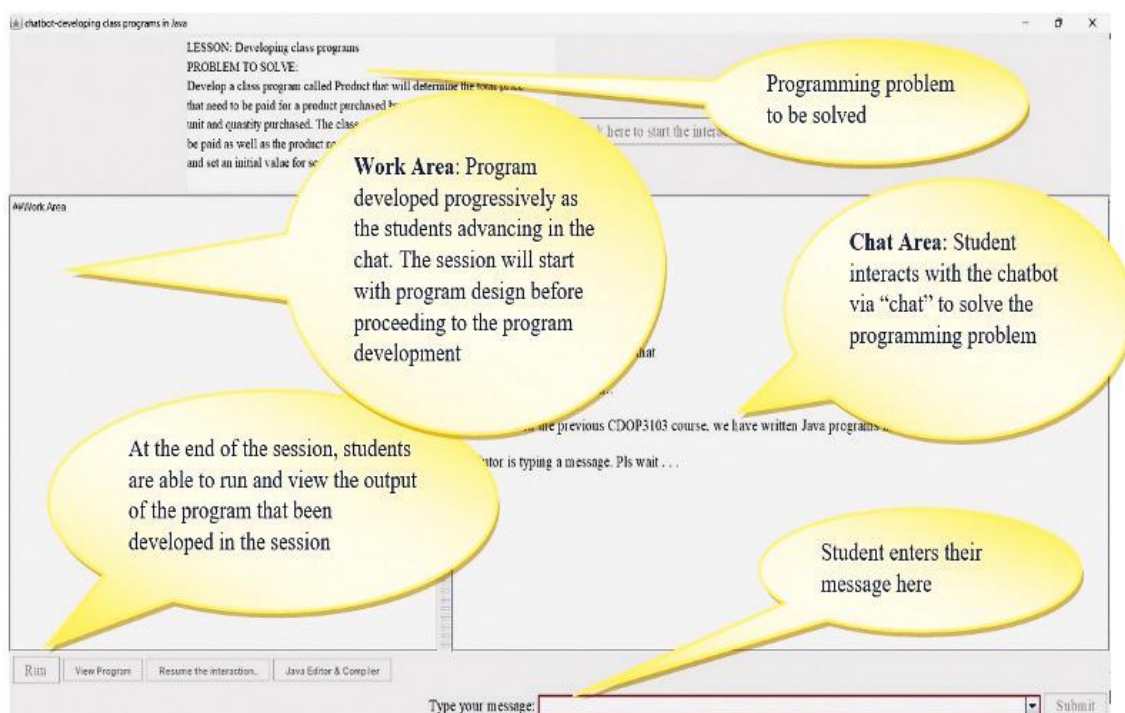


Figure 1. The interface of the chatbot and its main features

4.2. Chatbot Architecture

The architecture of the chatbot developed in this study is shown in Figure 2.

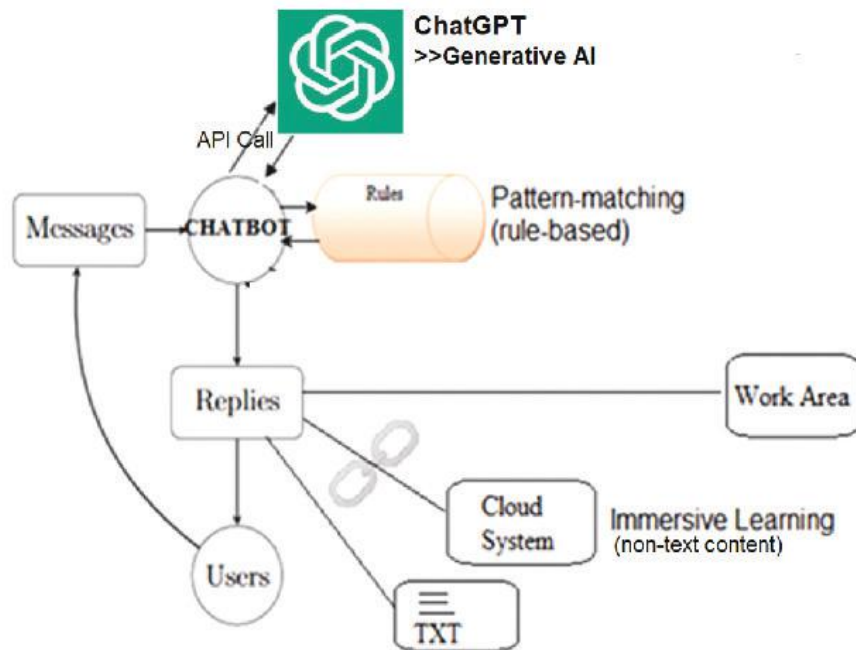


Figure 2. The architecture of the chatbot developed in this study

User messages, particularly those from learners, are central to the chatbot's function. These inputs prompt relevant responses from the chatbot. While learners can send messages to the chatbot whenever it is their turn, the chatbot dictates when they can input their message. This structure guarantees organized and clear conversations without mixed-up messages. The chatbot developed in this study is tailored to a specific programming problem from a particular topic. The chatbot communicates with learners through the automated tutor. Depending on the context of the query and the current phase of the discussion, these responses provided by the chatbot can manifest in various formats, such as:

- Plain text formulated by the chatbots' rule-based engine
- Plain text fetched from ChatGPT through application programming interface (API) call
- Java Programs fetched from ChatGPT through API call
- QR codes by the chatbots' rule-based engine
- Links to immersive learning materials by the chatbots' rule-based engine
- Links to hands-on exercises by the chatbots' rule-based engine

ChatGPT, which is linked to the chatbot developed by the author, is a model developed by OpenAI tailored for conversational applications. It represents state-of-the-art neural network models in the domain of natural language processing (NLP). These models can generate coherent and contextually relevant text over long passages, making them suitable for a wide range of tasks, including chatbots. ChatGPT engages in back-and-forth interactions with users. In this study, the chatbot developed by the author is linked with ChatGPT through the Application Programming Interface (API) call. API is a way for one program to interact with another. API calls are the medium by which they interact. An API call, or API request, is a message sent to a server asking an API to provide a service or information.

The dialogue and engagement between a student and the automated mentor in the chatbot is centered around a designated problem, as shown in Figure 3.

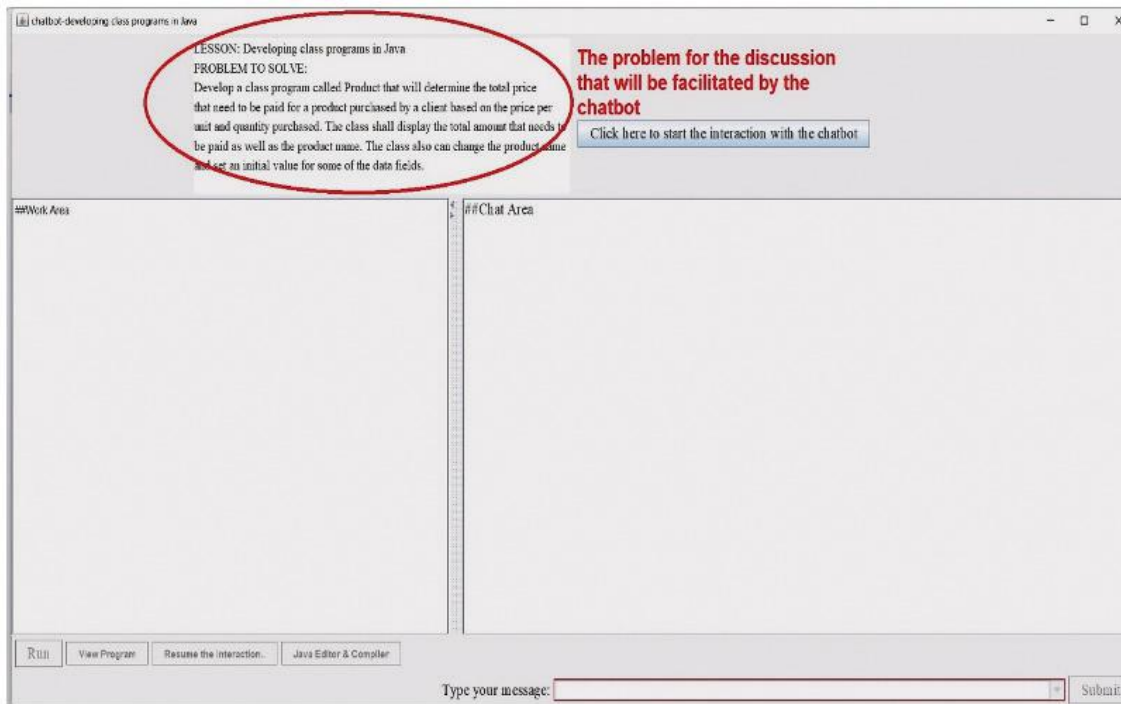


Figure 3. The chatbot is anchored by a programming problem

To ensure students gain a thorough understanding of the topic the chatbot addresses, it delves deeply into all facets of the given problem. For instance, the chatbot’s facilitated conversation commences with the foundational concept of the program—essentially the inception stage of program development. It then guides the learner through the program’s creation and execution. This structured approach ensures learners not only solve the problem at hand but also grasp the full developmental journey of a program, from ideation to operational completion. The chatbot’s instructional flow is structured in a phased approach to optimize learning outcomes, as shown in Figure 4.

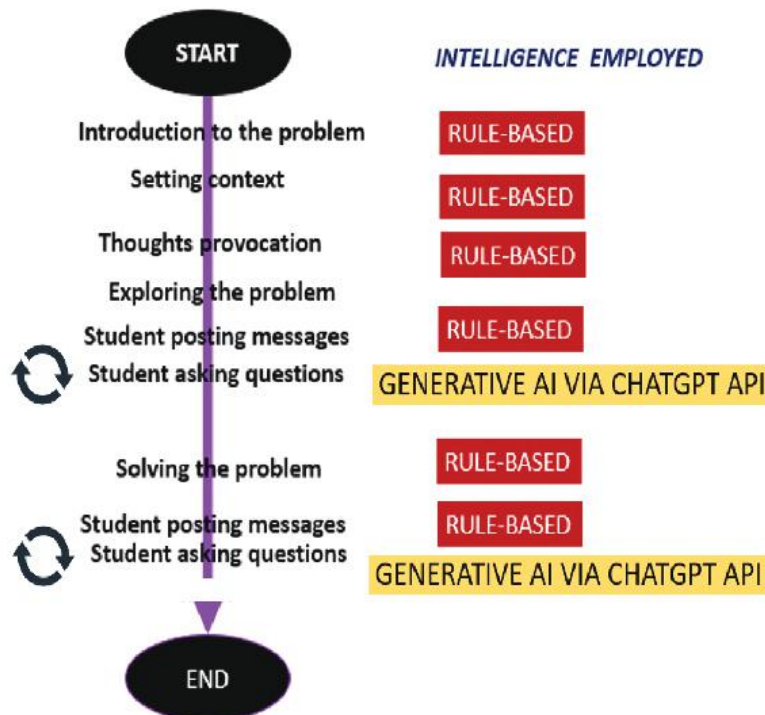


Figure 4. The flow of the interactions when a learner interacts with the chatbot and the supported intelligence

The instructional flow shown in Figure 4 is described below.

- i. **Structured Engagement:** Initially, students interact with the chatbot in a predefined, rule-based manner, ensuring focused learning aligned with set objectives. This setup offers students consistent and clear guidance on specific topics.
- ii. **Flexible ChatGPT Interaction:** After the structured phase, the chatbot shifts to a more adaptable mode, letting students pose any questions. ChatGPT, with its superior language abilities, responds with context-aware and adaptive answers, facilitating in-depth exploration and doubt clearance in a personalized context
- iii. **Return to Structured Mode:** Post the flexible interaction, the chatbot switches back to the rule-based system, reinforcing primary learning objectives and maintaining lesson structure, all while integrating insights from the exploratory phase.
- iv. **ChatGPT's Comprehensive Review:** As the lesson wraps up, ChatGPT steps in once more for a reflective engagement, enabling students to review the lesson, ask additional questions, and get feedback, ensuring a holistic grasp of the subject matter.

An example of a response formulated by the chatbot using a rule-based technique is shown in Figure 5.

```

...Chat Area--Connected++
Dr Nantha>> Now, let me test your knowledge on OOP
Dr Nantha>> Which that need to be created first: class OR object OR both need to be created together at the same time??
You>> **No respond
Dr Nantha>> It seems you are not sure with the answer...
Dr Nantha>> Try again...choose the correct answer..
You>> class
Dr Nantha>> Well done..you are correct
Dr Nantha>> in OOP, class is the most fundamental element. We need to create the class first before the object can be created

```

Figure 5. Response formulated through the rule-based technique in the chatbot for a student's response

An example of a response formulated by the chatbot by utilizing the ChatGPT is shown in Figure 6.

```

You>> what is class?
Dr Nantha>> A class in Java is a blueprint for creating different objects which have similar properties. It's a template or prototype that defines variables and methods common to all objects of a certain kind. A class encapsulates data for the object. It includes fields (variables) and methods to describe the behavior of an object. For example:
```java
public class Car {
 String model;
 int year;
 public Car(String model, int year) {
 this.model = model;
 this.year = year;
 }
}
```
Here, 'Car' is a class with properties model and year.
You>> what is data field?
Dr Nantha>> A data field, also known as a member variable or instance variable, is a part of a class in Java. It's used to store state information for an object created from that class. For instance:

```

Figure 6. Response formulated by ChatGPT in the chatbot for a student's question

The chatbot goes beyond conventional text-based responses to enhance the understanding of programming concepts, offering a more comprehensive and interactive learning experience. As illustrated in Figure 7a and Figure 7b, the system utilizes a variety of multimedia elements to cater to diverse learning preferences and provide a deeper grasp of programming nuances. By incorporating visual and interactive elements, the chatbot addresses the challenges often faced by learners who might find purely textual explanations insufficient. For instance, complex programming constructs or data flows can be better visualized through diagrams, animations, or interactive modules. These non-textual elements not only make the learning process more engaging but also offer a multi-dimensional perspective, ensuring that learners can absorb and retain the information more effectively. In doing so, the chatbot acknowledges the varied cognitive styles of learners and strives to make programming concepts more accessible and intuitive for all.

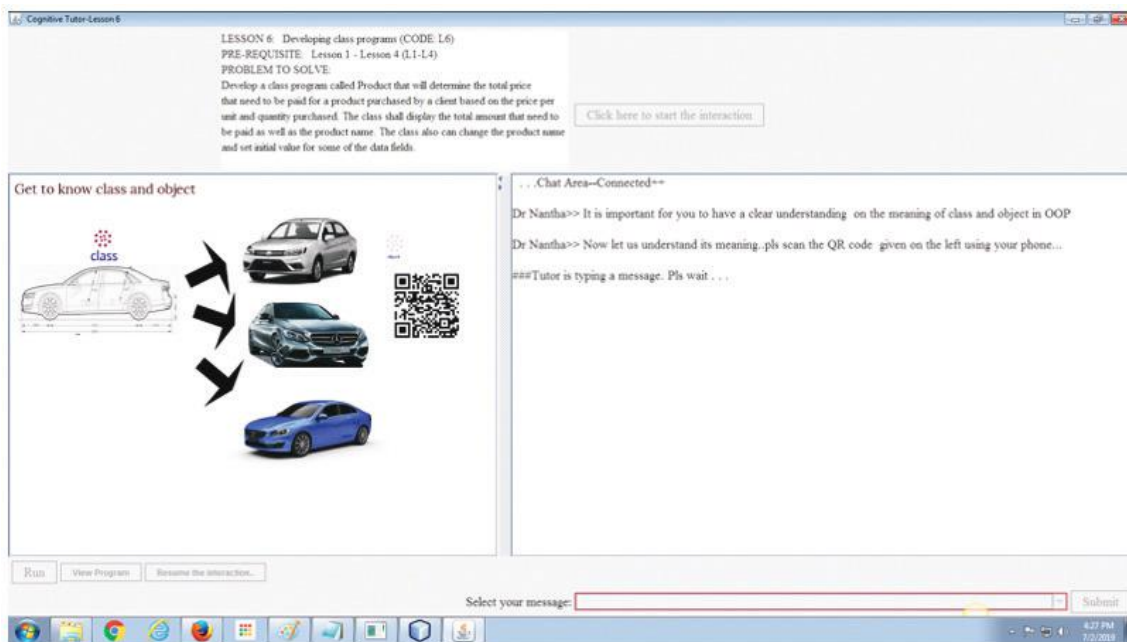


Figure 7a. Non-text content presented by the chatbot to a student during the learning session

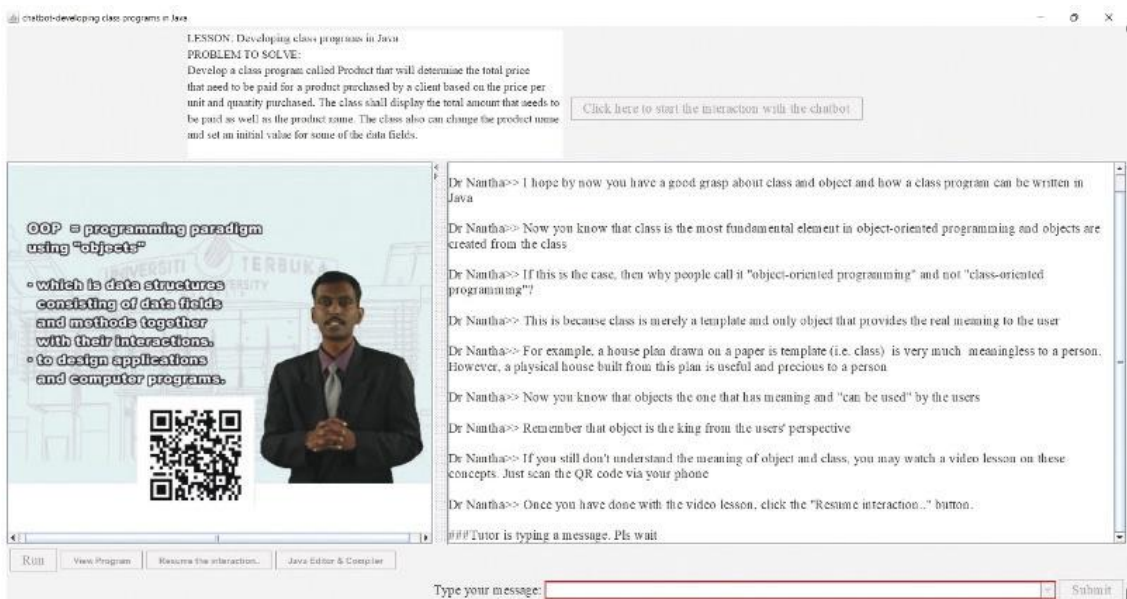


Figure 7b. Non-text content presented by the chatbot to a student during the learning session

4.3. Pedagogical Principles of the Chatbot

The instructional chatbot presented in this paper employs both problem-based learning (PBL) and active learning methodologies. PBL, as described by Wood (2003), is a student-focused method where learners gain knowledge of a topic by addressing open-ended challenges. Engaging with this chatbot furnishes students with opportunities to:

- Collaborate and operate autonomously
- Engage in critical thinking and analysis
- Assess their own learning trajectories
- Tackle genuine problems in an intriguing and motivating manner

On the other hand, active learning, as outlined by Revans (2011), involves students actively participating in their educational journey. This participation encompasses undertaking significant tasks and contemplating the evolution of their learning, as highlighted by Prince (2004). The chatbot incorporates interactive activities (Figure 8), enabling students to hone their skills and tackle problem-solving tasks, epitomizing the active learning experience they facilitate.

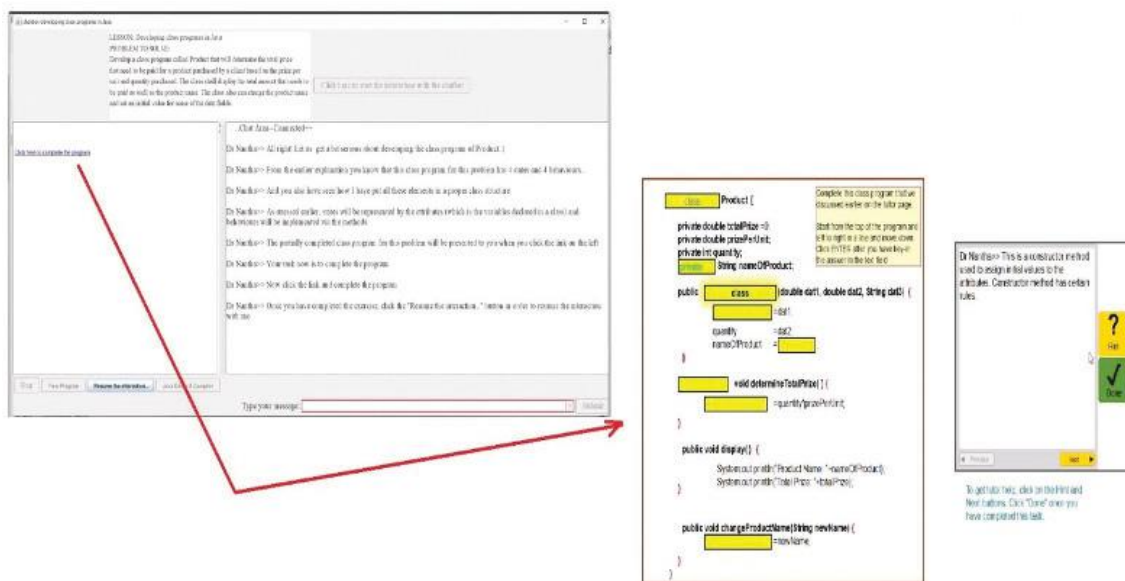


Figure 8. Interactive Exercise, which was linked to the chatbot

5. Pilot Evaluation of the Chatbot

During the beginning of the May-2023 semester, students enrolled in the Java Programming course were introduced to the chatbot developed by the author. This is an ODL course offered at the undergraduate level. The chatbot was made available through the university's learning management system. They were urged to actively engage with the chatbot individually, utilizing their features and benefits throughout the semester. As the semester neared its conclusion, it was essential to evaluate the chatbot's influence and efficacy in the educational context. To this end, five students were randomly selected to share their experiences and insights about the chatbot. These students participated in a focus group discussion designed to dive deep into the chatbot's practical implications and benefits. The decision to employ a focus group for feedback was rooted in its proven efficacy, particularly during initial stages like pilot testing. This method facilitates rich, qualitative insights by encouraging participants to share detailed feedback, discuss their experiences, and even respond to others' viewpoints. Such discussions often unearth nuances that might remain overlooked in more structured forms of feedback. The following section will detail the findings and insights derived from the focus group discussion, shedding light on the chatbot's utility and effectiveness as perceived by its primary users: the students.

5.1 Findings

The students' feedback was overwhelmingly positive in response to the thematic questions:

- **Perceived Benefits from Chatbot:** A consensus emerged among the participants regarding the chatbot's utility. They unanimously reported that the chatbot aided in clarifying complex subjects, offering immediate assistance, and addressing specific queries, which contributed to a more comprehensive understanding of the concepts covered by the chatbot.
- **User Experience with Chatbot:** Students described their interactions with the chatbot as intuitive and dynamic. They particularly appreciated the chatbot's ability to deliver instantaneous, relevant responses, enhancing their engagement and motivation to learn.
- **Impact on Understanding of the Subject Matter:** An encouraging outcome was the noticeable improvement in students' grasp of the concepts covered by the chatbot. The structured guidance and personalized feedback offered by the chatbot were highlighted as major catalysts in promoting a deeper understanding of the subject matter.
- **Enhancement in Programming Skills:** Beyond theoretical understanding, the students also acknowledged a tangible improvement in their practical skills, especially in creating computer programs using the concepts covered in the chatbot. The chatbot's assistance in real-time problem-solving was deemed invaluable.

The overwhelmingly positive feedback from this pilot study elucidates the significant potential of chatbots in ODL learning environments. They not only facilitate academic understanding but also cater to the unique learning pace and style of individual students, making education more adaptable and personalized. However, while these findings are encouraging, it is important to approach them with a degree of caution. The small sample size of this pilot study means that results, though promising, may not be generalized. A more expansive study with a diverse set of participants would be instrumental in validating and reinforcing these findings.

6. Conclusion

A unique way to deliver online courses by capitalizing on the powerful student-interface interaction structure has been proposed in this paper. This was done through an instructional-based intelligent chatbot that the author had developed. Most of the chatbots that had been developed by other researchers for teaching and learning are text-based and less intelligent. However, the chatbots developed in this study have machine-learning features via ChatGPT and are enriched with visuals and animations. This is done in order to make online learning more meaningful and engaging. These two elements can make learning more effective. The ChatGPT that was linked in the chatbot developed by the author through API call has shown tremendous potential in generating human-like text, pushing the boundaries of what chatbots can achieve in terms of quality of interaction, depth of content, and breadth of knowledge. While these chatbots were initially crafted for a programming course, they can be readily adapted for other courses, including those that are non-technical.

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178-A Set Covering Approach to the Student Service Centers Location

Darsih Idayani¹, Asmara Iriani Tarigan², Elin Herlinawati³, Ulul Hidayah⁴

Abstract

Distance education is a teaching and learning process conducted remotely through various communication media. Unlike traditional learning, distance education relies on print media (modules) and non-prints (audio/video, computer/Internet, radio, and television) instead of face-to-face meetings. Universitas Terbuka (UT) is one of the universities in Indonesia that implements a distance education system. UT established student service centers facilitating administrative and academic services to cater to the students' needs. The management is carried out by UT or a partner appointed and bound by a cooperation agreement. However, Indonesia is a vast archipelagic country with 34 provinces. The coverage of the student service centers cannot reach all locations in Indonesia. Most are located in Java and Sumatra, even though students and prospective students also reside outside Java and Sumatra. Therefore, it is necessary to determine the strategic locations of student service centers so all students in the country can be assisted in their learning. This study aims to determine the strategic locations of the student service centers by considering the number of students, the distance between provinces, and the area topography. The Set Covering Problem (SCP) model is used to determine the locations of the minimum number of facilities so that the development and operations are cost-effective but remain optimal in fulfilling the demands. SCP was first expressed in integer programming that used linear programming to solve the problem. An integer programming problem is a mathematical optimization or feasibility program in which some or all variables are restricted to be integers. The branch and bound method solved the model using the General Algebraic Modeling System (GAMS) software, a high-level mathematical programming and optimization modeling system that provides a programming language compiler and various related solvers. Finally, the potential locations of the student service centers are suggested.

Keywords: *Distance education, student service center, set covering problem, facility location problem*

1. Introduction

Distance education is a teaching and learning process conducted remotely through various communication media. Unlike traditional learning, distance education is facilitated by print media (modules) and non-print media (audio/video, computer/Internet, radio, and television), not face-to-face meetings. Distance education and open and flexible learning policies have greatly extended accessibility to higher education worldwide. However, distance education is more than just a move away from learning in the classroom. The complete paradigm shift requires proper technologies and techniques to support the delivery of learning materials outside the classroom across any distance.

Universitas Terbuka (UT) is one of the universities in Indonesia that implement the distance education system. The student support is provided by the student service centers spread throughout Indonesia. The Strategic Business Plan 2021-2025 states that one of the components of UT's strategic map is the service coverage (UT, 2020). This initiative is undertaken by establishing a regional office in each province and at least one student service center in each regional office. In other words, each province will have at least a student center, depending on the number of regional offices. However, if the locations of the student service centers are not well-planned, they will not be able to support all students across Indonesia.

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Previous studies have examined UT's student service centers, mostly evaluating the service quality, effectiveness, and level of student satisfaction (Alashaari & AlTameemy, 2021; Ciobanu, 2013; Herman, Puspitasari, & Padmo, 2015; Mowes, 2005; Nsamba & Makoe, 2017; Tait, 2003; V., 2012). However, none has discussed the determination of the centers' locations to optimize the reach. Such strategic locations can be determined mathematically using a mathematical optimization approach, i.e., the Set Covering Problem (SCP), which can minimize costs while meeting the demands. So far, SCP has never been used to determine the locations of student service centers. Past research has only used SCP to establish an Unmanned Aerial Vehicle (UAV)-based wireless network in a disaster area and determine the number and locations of gas detectors and vehicle routes to minimize costs and reach the demand (Giroto, Tsukada, & Vianna, 2022; Machado, Mauri, Boeres, & Rosa, 2021; Park, Nielsen, & Moon, 2020; Vianna, 2019). In Indonesia, SCP has been used to determine the locations of fire stations, temporary disposal sites, emergency rooms, clinics, bus stops, gas stations, base transceiver stations, rice warehouses, gas filling stations, and the assignments of the navy patrol boats and bases (Idayani, 2022).

In this article, the locations of the student service centers are determined by considering the area topography or accessibility, as well as the number of students and regional offices. In other words, the sites must fulfill the accessibility condition, i.e., reachable by students and prospective students from nearby districts and cities. Under this condition, it is possible to have multiple student service centers in one province, depending on the demand. The Set Covering Approach (SCA) is used in developing a mathematical model to determine the centers' locations under operational constraints. The branch and bound method solve the model using the General Algebraic Modeling System (GAMS) software.

2. Literature Review

2.1. Set Covering Problem (SCP) Model

The Set Covering Problem (SCP) model is used to determine the locations of the minimum number of facilities to cover the demand. Each demand node (each sub-district, district, or province) has at least one facility built or located within a maximum distance or travel time from a facility (Laporte, Nickel, & da Gama, 2015; Revelle, Williams, & Boland, 2002). The distance or travel time depends on the problem to be solved.

SCP was first expressed in integer programming by Toregas et al., who used linear programming to solve a problem (Toregas, Swain, ReVelle, & Bergman, 1971). In an SCP model, the goal of an objective function is to make decisions. In this case, the objective function of SCP aims to minimize the number of facilities needed to cover the demand and determine the optimal locations to reduce the development or operational costs. Despite the existing constraints, the outcome should give optimal services (fulfill every demand). These constraints are formulated in the constraints function. In addition, to ensure that the decision variables are in binary numbers, namely $\{0,1\}$, they must also be defined in the modeling. The SCP formulation follows (Caprara, Toth, & Fischetti, 2000; Daskin, 2008; Revelle et al., 2002).

Objective function

$$Z = \sum_{j \in J} x_j \quad (1)$$

subject to

$$\sum_{j \in N_i} x_j \geq 1, \quad \forall i \in I \quad (2)$$

$$x_j \in \{0,1\} \quad \forall j \in J \quad (3)$$

where

i, I = the index and set of demand nodes, $i \in \{1, 2, \dots, n\}$;

j, J = the index and set of eligible nodes, $j \in \{1, 2, \dots, m\}$;

d_{ij} = time to travel or the (shortest) distance between nodes i and j ;

S = time or distance standard for a facility at node j to be eligible to serve node i ;

N_i = set of nodes j within the standard time S of node, that is, $N_i = \{j | d_{ij} \leq S\}$;

x_j = binary decision variable (1 if a facility is opened in node j , 0 otherwise).

Equation (1) is the objective function that minimizes the total number of facilities to cover the demand from all nodes by at least one facility. Equation (2) is a constraint that ensures at least one facility is opened to cover every demand node within the time or distance standard. Equation (3) represents the binary decision variable.

3. Method

The theories related to linear programming, especially the SCP and its applications, were studied. Data on the student service centers was collected using interviews and documentation methods. The structured interviews were conducted with a regional office's head. The documentation aims to collect data on student service centers, regional offices, and the number of students.

Based on the data obtained, an optimization model to determine the locations and the number of student service centers is formulated using the Set Covering Problem (SCP) model. The model was built using the GAMS optimization software—a high-level mathematical programming and optimization modeling system that provides a programming language compiler and various related solvers (Team, 2020). Rosenthal (2010) states that GAMS delivers a high-level language for representing large and complex models. Using GAMS allows model specifications to be changed quickly and safely using unambiguous statements of algebraic relations. In addition, the model's description does not depend on the solution algorithm.

4. Results and Discussion

4.1. The Student Service Centers' Location Problems

The student service centers offer administrative and academic services, either managed by UT directly or by a partner appointed and bound by a cooperation agreement (Pandiangan et al., 2021). So, the two types of student service centers are (1) owned by UT and (2) owned by partners. Partners can be individuals, groups, or legal entities. The student service centers extend UT's technical services in the regional offices. Operationally, the student service center is under the supervision and guidance of the head of the regional office. The purposes of the student service center are:

- introducing and increasing understanding of UT among various levels of society;
- recruiting prospective new students;
- maintain retention, persistence, and student learning success;
- providing or building UT student learning readiness;
- increasing student and stakeholder access; and
- building partnerships with various parties.

Based on these objectives, it can be summed up that the targets of the student service center are students, prospective students, and partners (tutors, instructors, supervisors, or alums).

According to Pandiangan et al. (2021), the locations of student service centers are determined based on the demographic and geographical analysis for medium and long-term operations. The indicators are the potential population of high school graduates of productive ages (18-50 years), the number of UT students, the strategic locations, the accessibility from several nearby districts or cities, and the availability of public transportation.

Given the critical role of student service centers, UT is committed to establishing student service centers throughout Indonesia. To date, 87 student service centers have been established in 19 out of 34 provinces in Indonesia (UT, 2023a). However, not all student service centers were established based on UT's plans. Most

of them were built based on the partners' requests. Of the 87 student service centers, only four are owned by UT: in Balige (Medan Regional Office), West Nias (Medan Regional Office), Tanjungpandan (Pangkalpinang Regional Office), and Tuban (Surabaya Regional Office). The partners own the rest.

Under this condition, the locations of student service centers are not evenly distributed throughout Indonesia. Most of them are on Java and Sumatra, which cannot cater to the needs of students and prospective students outside Java and Sumatra. Figure 1 shows the existing student service center distribution based on the number of UT students as of 29 April 2023 (UT, 2023b).



Figure 1. The Distribution of Student Centers Location Based on the Number of Students

4.2. Proposed Model

Based on the characteristics of the problems described earlier, a set covering approach is used through the SCP (1)-(3) models, developed according to the needs of the selection problem of the locations, i.e., to cater to all students but with a minimal number of facilities. So, (1)-(3) is developed into

objective function

$$Z = \sum_{j \in J} x_j \quad (4)$$

subject to

$$\sum_{j \in N_i} r x_j \geq f_i, \quad \forall i \in I \quad (5)$$

$$x_j \geq g_j, \quad \forall j \in J \quad (6)$$

$$x_j \in \{0,1\} \quad \forall j \in J \quad (7)$$

where

i, I = index and set of demand nodes (province), $i \in \{1,2,\dots,n\}$;

j, J = index and set of candidate student service centers, $j \in \{1,2,\dots,m\}$;

r = capacity of the student service center per year;

f_i = demand (number of students) of node i ;

g_j = the minimum limit of the student service center of node j ;

N_i = set of nodes j within the condition to open the student service center;

x_j = binary decision variable (1 if the facility is opened in node j , 0 otherwise).

4.2.1. Objective Function

Our main objective (4) is to minimize the number of new student service centers and determine their locations to cater to all students. The establishment and management costs will be lower with fewer new centers. However, these new centers should still cater for all students. The x_j variable is a binary decision variable with a value of 1 if the student service center is established in province j and 0 otherwise (Idayani, Puspitasari, & Sari, 2020). The j index denotes the set of provinces that may be the location of new student service centers (eligible locations). There are 34 provinces in Indonesia, so $j=1,2,3,\dots,34$, i.e. x_1 = Nangroe Aceh Darussalam, x_2 = North Sumatra, x_3 = South Sumatra, x_4 = West Sumatra, x_5 = Bengkulu, x_6 = Riau, x_7 = Riau Islands, x_8 = Jambi, x_9 = Lampung, x_{10} = Bangka Belitung Islands, x_{11} = East Kalimantan, x_{12} = West Kalimantan, x_{13} = Central Kalimantan, x_{14} = South Kalimantan, x_{15} = North Kalimantan, x_{16} = Special Capital Region of Jakarta, x_{17} = Banten, x_{18} = West Java, x_{19} = Central Java, x_{20} = Special Region of Yogyakarta, x_{21} = East Java, x_{22} = Bali, x_{23} = West Nusa Tenggara, x_{24} = East Nusa Tenggara, x_{25} = North Sulawesi, x_{26} = West Sulawesi, x_{27} = Central Sulawesi, x_{28} = Gorontalo, x_{29} = Southeast Sulawesi, x_{30} = South Sulawesi, x_{31} = North Maluku, x_{32} = Maluku, x_{33} = West Papua, and x_{34} = Papua.

The objective function consists of x_j variable, so the objective function (4) can be written as

$$Z = \sum_{j=1}^{34} x_j \quad (8)$$

4.2.2. The First Constraint: The Number of Students

The first constraint (5) is the number of students as the service demand in each province. Ideally, student service centers in one province or the borders can serve all of the service demands in the province. However, they must remain on the same island so that students can reach the student service center quickly and affordably. Hence, the decision variable is $x_j=1$. If it is not on the same island or province border, then the decision variable is $x_j=0$ (see Table 1).

The constraint of students' numbers represents inequality (5). It was formed to ensure that the student service centers can serve all students by considering the service capacity. In other words, the capacity of a student service center must be greater than or equal to the number of students or the demand. The number of students in an area where a student service center will be opened is a constant on the right-hand side of the constraint (f_i). In addition, the capacity of a student service center is considered. The capacity is approximately 1,000 students (r) per year. It will be the divisor for the number of students to simplify the inequality. So, constraint (5) can be broken down into 34 constraints with the same two constraints, and it becomes 33 constraints (9)-(41).

Table 1. Binary Decision Variable

| x_j | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 | 34 | | | |
|-------|---|---|---|---|---|---|---|---|---|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|---|---|---|
| 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 2 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 3 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 4 | 0 | 1 | 0 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 5 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 6 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 7 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 8 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 9 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 12 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | |
| 14 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 16 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 17 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 18 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 19 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 20 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 21 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 22 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 23 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 24 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 26 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 27 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 28 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 30 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | |
| 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |
| 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 33 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | |

$$x_1+x_2 \geq 18.826 \tag{9}$$

$$x_1+x_2+x_4+x_6 \geq 36.701 \tag{10}$$

$$x_3+x_5+x_8+x_9 \geq 54.338 \tag{11}$$

$$x_2+x_4+x_5+x_6+x_8 \geq 48.955 \tag{12}$$

$$x_2+x_3+x_4+x_5+x_8+x_9 \geq 77.630 \tag{13}$$

$$x_2+x_4+x_6+x_8 \geq 41.470 \tag{14}$$

$$x_7 \geq 11.146 \tag{15}$$

$$x_3+x_4+x_5+x_6+x_8 \geq 53.201 \tag{16}$$

$$x_3+x_5+x_9 \geq 45.833 \tag{17}$$

$$x_{10} \geq 7.907 \tag{18}$$

$$x_{11}+x_{12}+x_{13}+x_{14}+x_{15} \geq 48.737 \tag{19}$$

$$x_{11}+x_{12}+x_{13} \geq 36.412 \tag{20}$$

$$x_{11}+x_{12}+x_{13}+x_{14} \geq 43.113 \tag{21}$$

$$x_{11}+x_{13}+x_{14} \geq 30.585 \tag{22}$$

$$x_{11}+x_{15} \geq 23.520 \tag{23}$$

$$x_{16}+x_{17}+x_{18} \geq 103.501 \tag{24}$$

$$x_{16}+x_{17} \geq 59.233 \quad (25)$$

$$x_{16}+x_{18}+x_{19} \geq 136.762 \quad (26)$$

$$x_{18}+x_{19}+x_{20} \geq 104.658 \quad (27)$$

$$x_{19}+x_{20} \geq 60.390 \quad (28)$$

$$x_{19}+x_{21} \geq 97.474 \quad (29)$$

$$x_{22} \geq 10.567 \quad (30)$$

$$x_{23} \geq 4.778 \quad (31)$$

$$x_{24} \geq 9.907 \quad (32)$$

$$x_{25}+x_{28} \geq 5.710 \quad (33)$$

$$x_{26}+x_{27}+x_{30} \geq 13.625 \quad (34)$$

$$x_{26}+x_{27}+x_{28}+x_{29}+x_{30} \geq 18.932 \quad (35)$$

$$x_{25}+x_{27}+x_{28} \geq 8.228 \quad (36)$$

$$x_{27}+x_{29}+x_{30} \geq 12.745 \quad (37)$$

$$x_{26}+x_{27}+x_{29}+x_{30} \geq 17.033 \quad (38)$$

$$x_{31} \geq 1.970 \quad (39)$$

$$x_{32} \geq 2.395 \quad (40)$$

$$x_{33}+x_{34} \geq 7.273 \quad (41)$$

4.2.3. The Second Constraint: The Minimum Number of Student Service Centers

The second constraint is the minimum number of student service centers in each province (6). The initiative to increase service coverage is by establishing at least one regional office in each province and at least one student service center in each regional office (UT, 2020). In other words, the number of student service centers must be greater than or equal to the number of regional offices in the province.

Each province has one regional office, except West Java (x_{18}) with two regional offices, and Central Java (x_{19}) and East Java (x_{21}) with three regional offices. Then the number of student service centers must be greater than the number of regional offices in each province (6). There are 34 constraints (42)-(75), i.e.

$$x_1 \geq 1 \quad (42)$$

$$\vdots \quad \vdots$$

$$x_{17} \geq 1 \quad (58)$$

$$x_{18} \geq 2 \quad (59)$$

$$x_{19} \geq 3 \quad (60)$$

$$x_{20} \geq 1 \quad (61)$$

$$x_{21} \geq 3 \quad (62)$$

$$x_{22} \geq 1 \quad (63)$$

$$\vdots \quad \vdots$$

$$x_{34} \geq 1 \quad (75)$$

4.3. Potential Location as an Optimal Solution

By using the GAMS software, the completion of the optimization model with the objective functions (8) and constraints (9)-(75) is obtained after six iterations. The result was 427 student service centers to be built (see Table 2). Most student service centers proposed (95 units) are in Central Java Province. The students can visit any student service center in the neighboring province to access the services.

Table 2. Suggested Student Service Centers' Locations

| No | Province | Student Service Center |
|-------|-----------------------------------|------------------------|
| 1 | Nangroe Aceh Darussalam | 1 |
| 2 | North Sumatra | 34 |
| 3 | South Sumatra | 39 |
| 4 | West Sumatra | 1 |
| 5 | Bengkulu | 7 |
| 6 | Riau | 1 |
| 7 | Riau Islands | 12 |
| 8 | Jambi | 6 |
| 9 | Lampung | 3 |
| 10 | Bangka Belitung Islands | 8 |
| 11 | East Kalimantan | 45 |
| 12 | West Kalimantan | 1 |
| 13 | Central Kalimantan | 1 |
| 14 | South Kalimantan | 1 |
| 15 | North Kalimantan | 1 |
| 16 | Special Capital Region of Jakarta | 94 |
| 17 | Banten | 1 |
| 18 | West Java | 9 |
| 19 | Central Java | 95 |
| 20 | Special Region of Yogyakarta | 1 |
| 21 | East Java | 3 |
| 22 | Bali | 11 |
| 23 | West Nusa Tenggara | 5 |
| 24 | East Nusa Tenggara | 10 |
| 25 | North Sulawesi | 5 |
| 26 | West Sulawesi | 5 |
| 27 | Central Sulawesi | 3 |
| 28 | Gorontalo | 1 |
| 29 | Southeast Sulawesi | 4 |
| 30 | South Sulawesi | 6 |
| 31 | North Maluku | 2 |
| 32 | Maluku | 3 |
| 33 | West Papua | 7 |
| 34 | Papua | 1 |
| Total | | 427 |

Figure 2 shows the distribution of the suggested student service center locations based on the number of students. Central Java, Jakarta, East Kalimantan, South Sumatra, North Sumatra, Riau Islands, Bali, East Nusa Tenggara, West Java, and Bangka Belitung Islands are the ten provinces with the highest number of student service centers. The similarities among these ten provinces are having many students, located in the island's center, or on an island where students' access to other provinces is limited.

Currently, 87 student service centers are located in 19 out of 34 provinces. It means that 15 provinces do not have a student service center (see Figure 1). If, in the next few years, UT does not establish a new student service center in locations with an increasing number of students, then UT will not be able to meet the demand for these services optimally. So far, the number and locations of student service centers have been determined by UT depending on regional offices' or partners' requests. UT should take the initiative to establish a student service center or propose cooperation with partners without waiting for partners to submit applications. The results of this study can be used as consideration in determining the locations and number of student service centers in each province. In detail, to select the location in each province (in which district), it is necessary to implement a more in-depth calculation and analysis based on the distribution of students, the distance traveled between districts in each province, and the distribution of prospective students.



Figure 2. Distribution of Suggested Student Center Locations Based on the Number of Students

5. Conclusion

The conclusion is that the SCP model can solve the problem of determining the locations of student service centers. The constraints are, among others, the number of students and regional offices. In further research, the model can be developed by considering the number of prospective students so that the center's reach is not only for student services but also for recruiting prospective students or promotion. Moreover, the distance traveled between districts in each province can be considered to optimize the coverage of a student service center.

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179-Balancing the Potential and Limitations of Large Language Models: Exploring Teaching Projects in Western European Economic History and History of Economic Thought Classes

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Abstract

This paper aims to describe early experiences using Large Language Models and propose teaching projects, especially for two classes. In the spring semester of 2023, in the Western European Economic History course, students are allowed to use generative AI tools on condition of self-reporting. 4% of students (10 of 249) acknowledged the use of ChatGPT and the other unidentified tool. Those who used ChatGPT had slightly higher averages across categories, although these differences lacked statistical significance. Concerns were raised about the access disparity, with some students facing challenges related to digital proficiency and English language comprehension. Upcoming the fall semester of 2023, in the History of Economic Thought course, we will provide clear instructions for using ChatGPT and survey questions to understand the detailed AI usage in assignments. In conclusion, we discuss the reflections from this experience and explore ways to promote critical awareness of the limitations of LLMs and develop skills that enable students to discern accurate information from erroneous outputs generated by them.

Keywords: *Language Models, Teaching Projects, Economic Classes.*

1. Introduction

After its introduction, ChatGPT has demonstrated its capability to pass standardized tests in various fields. Gilson et al. (2023) created two question banks from AMBOSS which have respectively 87 and 102 questions for the United States Medical Licensing Examination Steps 1 and 2. Additionally, they created two more question banks from the National Board of Medical Examiners which have 100 questions each. On the four datasets, ChatGPT answered correctly 64.4%, 57.8%, 44%, and 42%. A threshold of 60% is often considered the benchmark passing standard for both steps. Terwiesch (2023) tested ChatGPT with an operations management course exam containing bottleneck problems, inventory turns, complex process analysis, and queueing analysis. It achieved a B to B- grade on the exam. Also, it showed mistakes in simple calculations and the incapability to handle advanced questions. In law, Choi et al. (2023) use real exams at the University of Minnesota Law School in constitutional law, employee benefits, taxation, and torts. ChatGPT got C+ which is a passing grade for all four courses.

In economics, Geerling et al. (2023) reported that ChatGPT achieved the rankings of 91st percentile for Microeconomics and 99th percentile for Macroeconomics in The Test of Understanding in College Economics compared to students who take the exam at the end of their principles courses.

Certainly, the emergence of generative A.I., especially large language models (LLMs) such as ChatGPT, presents a significant challenge to traditional assessment methods. However, they also show remarkable abilities for summarizing literature, cleaning data, programming, making graphs, and so on (Bryan, 2023; Korinek, 2023).

Although there are inherent challenges that come with swift technological progress, it is crucial for teachers, learners, and other stakeholders to effectively incorporate these potent tools into higher education thoughtfully.

In this paper, I will describe early experiences using LLMs and suggest teaching projects for the upcoming fall semester of 2023.

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2. Certain Aspects of LLMs

2.1. Understanding LLMs

2.1.1. “Stochastic Parrots”

LLMs represent one of the most remarkable advancements in artificial intelligence. They are often called “Stochastic Parrots (Bender et al., 2021).” It is crucial to understand that LLMs are not truly comprehending conversations in the way humans do. Rather, their prowess lies in anticipating the subsequent word in the context of provided queries or statements. LLMs focus on predicting the next word in a sequence based on the vast amounts of existing language data they have been trained on. This predictive capability is fascinating but also serves as a reminder of the model’s boundaries in truly understanding nuanced human conversation.

Currently used LLMs such as ChatGPT, LaMDA, PaLM, and Bard are foundation models which serve as the bedrock for numerous applications across various domains. These models, trained on vast datasets, act as generalized tools capable of understanding and generating human-like text. However, despite their versatility, it is essential to recognize that these models largely derive their knowledge from the data they were trained on. This means they reflect the biases, nuances, and trends present in that data. As with all foundation models, their efficiency and accuracy depend not only on the breadth and quality of their training data but also on the specific fine-tuning and adaptation processes they undergo to suit applications or industries.

2.1.2. Prompts Engineering

Prompt engineering is a crucial aspect of harnessing the power of LLMs effectively. It involves meticulously crafting inputs to elicit desired outputs from the model. Bryan (2023) categorizes primarily four methodologies to instruct these “virtual parrots.”

For instance, when a sentence begins with “The Sun”, an LLM predicts its continuations like “is”, “shines”, or “rose,” based on its trained data. We can guide the model to use certain linguistic structures:

1. Zero-shot prompt: We can ask “Tell me about the weather yesterday” to get a response in the past tense.
2. Zero-shot context definition: If we add “What will Hemingway say”, the model might draw from its vast training data and reply with something reminiscent of Hemingway’s work, possibly “The sun also rises.”
3. Few-shot context definition: More context is furnished to guide the model’s responses. For instance, after being provided with “Examples: The moon is 0.24 million miles from Earth.” we may be obtained “The sun is 93 million miles from Earth.”
4. Fine-tuning for specific applications: To make the model adept in specialized domains, it might need tailored training. For instance, to make a virtual teaching assistant in economics, we can train the model with specific sets such as economics textbooks or articles, statistical data, and other related learning materials.

Thus, prompt engineering stands as a potent tool in dictating the versatility and applicability of LLMs.

2.2. Challenges of LLMs in Open Distance Digital Education

2.2.1. Advantages

LLMs could be used in various ways: code writing, debugging assistance in programming, data cleaning, writing assistance, literature summarizing, etc. Also, they can be used in chatbots, translating assistants, and other conversational applications. In education, these features could be developed for tutoring: LLMs can assist students with explanations on various topics, provide answers to queries, and even be used in doing homework.

LLMs have the potential to assist instructors in enhancing teaching strategies that were previously challenging to implement due to constraints related to time and effort. They can help students understand theoretical and abstract ideas with multiple examples. Diverse explanations and comparisons generated by the models could be used to address prevalent misunderstandings. They could make numerous low-stakes tests for students to retrieve information and assess their knowledge. These models could be used to assess students’ learning by identifying confusion in their answers. To reinforce learning, teachers can request the model to produce questions that evaluate students understanding of new and previously learned concepts over the duration course (Mollick and Mollick, 2023).

The linguistic barrier presents substantial limitations in accessing and utilizing such materials for instructional purposes. Particularly, when considering educational materials in the fields of Western economic history and the history of economic thought, it is evident that a significant portion of these resources is written in languages other than Korean. The emergence of translating models, however, holds promise in mitigating these language-related challenges.

The integration of AI-powered translation tools within the educational context offers notable advantages. Firstly, it substantially reduces the time and effort required for manual translation, as AI algorithms can rapidly process and generate accurate translations. This efficiency allows instructors to devote more time to instructional planning and engaging with students. Secondly, translation AIs can enhance the accessibility and inclusivity of educational resources, ensuring that a wider range of students can benefit from the wealth of knowledge available in foreign language materials.

Nonetheless, it is important to acknowledge that translation AIs, while valuable, may not be flawless. They may encounter difficulties in accurately capturing the nuanced meanings or cultural contexts embedded within the original texts. Therefore, instructors should exercise caution and employ critical evaluation when relying on AI-generated translations. It is imperative to strike a balance between utilizing AI technologies for language support and fostering a comprehensive understanding of the subject matter.

2.2.2. Disadvantages

LLMs are fundamentally statistical models that generate word sequences, making them capable of producing both correct and incorrect responses. Due to their statistical nature, LLMs lack contextual understanding and may produce misleading or erroneous information.

Certainly, the capabilities of LLMs especially in assisting tasks are commendable. However, their applications come with a set of drawbacks.

Relying heavily on LLMs for tasks like homework assistance could result in students depending too much on these tools, leading to reduced critical thinking and problem-solving skills. They might get into the habit of seeking instant answers rather than diving deep into understanding concepts. If not monitored, students might misuse LLMs to bypass genuine learning, such as using them to complete assignments without understanding or generate content that isn't their original work. It could strengthen the dependency on these tools.

While LLMs can generate diverse explanations and comparisons, they might sometimes provide oversimplified or even misleading information. There is a risk that they could propagate existing biases in the data they were trained on, which could perpetuate misconceptions.

As pointed out, while translating models can bridge linguistic gaps, they may not always capture cultural nuances, idiomatic expressions, or the intricate meanings of academic texts. Solely depending on them might lead to a loss of context or even misinformation.

Consequently, educators must adapt their instructional approaches to effectively leverage the benefits of LLMs while mitigating the risks associated with their propensity to generate incorrect responses. It is essential to promote a critical awareness of the limitations of LLMs and develop skills that enable students to discern between accurate and erroneous information generated by these models.

3. Findings

3.1. An Overview of Mid-Term Paper in the Spring Semester of 2023

During the Spring 2023 semester, students enrolled in the “Economic History of Western Europe” course had the option to utilize ChatGPT or other generative AI tools for writing brief essays on the British Industrial Revolution. Those who opted to use generative AI were required to disclose this. No supplementary resources on how to use ChatGPT or similar tools were provided.

The course content engaged deeply with debates on the British Industrial Revolution, particularly focusing on the rise in living standards and the role of intellectual properties. Although the lectures were recorded in 2019, students were directed to supplement their knowledge with articles published post-2019. There was one obligatory article written in Korean, which included summaries of two optional papers written in English.

The assessment was divided into two sections: the first consisted of 6 true/false questions based on quotes from the given articles, with each question carrying 1 point. The latter section comprised 4 short essay questions. Questions 7 and 9 sought summaries concerning the evolution of living standards or the impact of intellectual properties. Meanwhile, questions 8 and 10 asked students to contrast the 2019 lecture content with insights from newer publications. Each of these essay questions was worth 6 points.

For the essay section, students were awarded points for the clear and explicit inclusion of specific content. This encompassed diverse metrics of living standards, source references, comparisons between pre- and post-1820 periods, the assertion that there was no significant welfare improvement prior to the 1820s, the prevalence of child labor; discussions on the significance of intellectual properties, and data-backed examinations of their effects.

3.2. Detailed Results

Table 1 presents the descriptive statistics, comparing students who utilized ChatGPT for their assignments to those who refrained. Of the participants, only 10 students acknowledged the use of generative A.I. Among them, one student mentioned employing New Chat, the exact nature of which remains unclear, while nine confirmed the use of ChatGPT.

Table 1. Descriptive Statistics

| Using ChatGPT | Cases | Total Points (s.d.) | Late Submissions (s.d.) |
|---------------|-------|---------------------|-------------------------|
| Yes | 10 | 24.9 (6.06) | 0.84 (0.42) |
| No | 239 | 24.03 (7.33) | 0.8 (0.37) |

Table 2 contrasts statistics from students who used ChatGPT with their counterparts who did not, spanning various categories. Students using ChatGPT had slightly higher averages for all categories, plagiarism, points for T/F questions, and points for short essays. However, these differences lacked statistical significance.

Table 2. Comparative Statistics

| Using ChatGPT | Categories | Points | F | Prob>F |
|---------------|-----------------------|---------------|------|--------|
| Yes | Plagiarism | 52.50 (18.17) | 3.51 | 0.0621 |
| No | | 41.60 (13.33) | | |
| Yes | T/Fs
(Q1-6) | 5.70 (0.48) | 0.02 | 0.8878 |
| No | | 5.67 (0.58) | | |
| Yes | Summarizing 1
(Q7) | 5.10 (1.37) | 0.47 | 0.4950 |
| No | | 4.70 (1.83) | | |
| Yes | Comparing 1
(Q8) | 4.70 (1.64) | 0.00 | 0.9584 |
| No | | 4.67 (1.82) | | |
| Yes | Summarizing 2
(Q9) | 4.60 (1.58) | 0.01 | 0.9152 |
| No | | 4.54 (1.88) | | |
| Yes | Comparing 2
(Q10) | 4.80 (1.62) | 0.32 | 0.5710 |
| No | | 4.45 (1.91) | | |

In both cases, the plagiarism rate was high. However, it should be noted that students filled in their answers on the assignment form, so the questions were common, and most of the answers were presented as citations. It seems that automated plagiarism detection tools may have shortcomings.

While we did not explicitly explore the rationale behind students opting out of generative AI tools, we received multiple emails querying the registration or login process for ChatGPT. This suggests potential challenges related to digital proficiency and English language comprehension.

4. Discussion and Conclusion

4.1. Proposed plan for the Fall Semester of 2023

For the upcoming fall semester, we have strategized a comprehensive approach to embed technology, particularly generative A.I., into the academic workflow. Recognizing the potential challenges and the learning curve associated with integrating new tools, we will be providing clear, step-by-step instructions for students on how to use ChatGPT effectively. This guidance is anticipated to ease the transition and encourage wider acceptance of the technology.

Our essay-writing module is structured in two distinct stages. Initially, students will delve into the seminal work *The Wealth of Nations* by Adam Smith, focusing specifically on Chapter 7. This foundational reading is intended to give students a solid grounding in understanding the role of price and markets.

Following this, students will engage with Vernon Smith's paper, which offers a critical perspective on the Neoclassical understanding of markets. Not only does Vernon Smith challenge prevailing views, but he also provides a hearty appraisal of the Scottish tradition in economic thought. By juxtaposing these two pieces, we aim to foster rich, critical thinking among students, encouraging them to understand and evaluate the evolution of economic thought through the ages.

To have insights into the real-world usage and dependence on AI tools within the learning process, we are looking for more granular details about their interactions with the technology. Students will be prompted to specify the outputs generated by the AI tools – what did the AI help produce, be it sentences, paragraphs, whole essay drafts, or other results?

Moreover, they will be encouraged to elucidate the methods employed. For instance, did they use AI for initial brainstorming, refining drafts, or for final proofreading? Lastly, the scope of AI adoption will be a crucial metric. This would cover the extent to which AI was relied upon, whether for no adoption, partial adoption with editing, partial adoption without editing, whole adoption with editing, or whole adoption without editing.

This structured approach to self-reporting will offer us a layered perspective, enabling us to understand not just the prevalence but also the depth and manner of AI tool adoption in higher education.

4.2. A Few Considerations for Moving Forward

As indicated by Brynjolfsson et al. (2023), a generative AI-based conversational assistant enhances productivity. Notably, there is a marked increase of 14 percent in issues resolved per hour on average. The benefits are especially for novice and low-skilled workers. In contrast, the impact appears minimal for their experienced and highly skilled counterparts.

However, the road to such achievements in education is not without hurdles. Technical barriers remain a tangible concern. The requisite infrastructure and technical expertise are necessary for the seamless deployment of LLMs. They are not uniformly available across all educational institutions or student groups. Such disparities raise genuine concerns about potential inequalities in accessing these cutting-edge tools. Moreover, the financial implications associated with the deployment of advanced AI models can't be overlooked. The inherent costs might be beyond the reach of many institutions or individual educators.

It is evident that LLMs possess a transformative potential that extends well into the realm of education and possibly beyond. However, their assimilation into academic and other spheres necessitates a concerted approach. It is imperative that as educators and policymakers, we don't just embrace the technology but also equip our students with the requisite skills and knowledge. This would enable them to adeptly navigate the intricacies of these AI-based tools, leveraging their vast potential in an informed and discerning manner.

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180-Measuring Faculty Readiness for AI Implementation in Higher Education

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Abstract

Many activities and daily lives are being influenced by Artificial Intelligence (AI), including the world of higher education in Indonesia. The use of AI in learning has become an important issue for educators and academics today. The debate arises regarding positive advantages and how higher education institutions adapt to all changes in the learning perspective of students. Educators use the implementation of AI in higher education to guide teachers, improve instructional systems, learn how students learn, and make administrative decisions that shape higher education policy. Artificial intelligence (AI) in education is undoubtedly important if it is implemented effectively for learning objectives and supported by school systems. The purpose of this research is to investigate how educators and policymakers can utilize AI and be able to adapt AI in the learning aspect. At the same time, AI has been an enormous issue today, not only for lectures but for many perceptions. A theory of Researchers tested hypotheses managing the Unified Theory of Technology Acceptance and Use (UTAUT) approach and obtained survey results from 351 respondents. The constructs of the model are Perceived Risk (PR), Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Condition (FC), Attitude (ATT), and Behavioral Intention (BI) to interpret the Adoption of AI in Higher Education (AAHE). Results reveal that the hypotheses are all accepted. The model is expected to assist policymakers in accelerating the acceptance of AI in higher education. This study is constrained by current limitations, such as the number of respondents can be enlarged to better understand AI from the perspective of students or users. According to the conclusions drawn from this study, AI is still new. It needs to be researched further by academics regarding its use in the education sector and how it provides important information into Indonesia's education and teaching system.

Keywords: AI, Behavioral Intention, Higher Education, Indonesia

1. Introduction

There is a growing prevalence and increased acceptance of artificial intelligence (AI) in several aspects of our daily lives. With the advancement of technology and digitalization in every industry, we live in the future. Although artificial intelligence (AI) was formally recognized as a topic of study in the 1950s, its application was still in its early stages and had yet to reach non-academic fields. Recently, AI has penetrated the commercial world and the public discourse because of the growth of massive data and improved processing capacity (Kaplan & Haenlein, 2019). Based on the various forms of intelligence it exhibits, namely cognitive, emotional, and social intelligence, artificial intelligence (AI) can be classified into analytical AI, human-inspired AI, and humanized AI. Alternatively, AI can be categorized into different stages of evolution, such as Artificial General Intelligence (AGI), Artificial Narrow Intelligence (ANI), and Artificial Super Intelligence (ASI) (Kaplan & Haenlein, 2019). The origins of artificial intelligence (AI), although challenging to ascertain precisely, can be traced back to the 1940s, focusing particularly on 1942. This important period noticed the publication of the short story "Runaround" by Isaac Asimov, an esteemed American science fiction writer. Moreover, there are three stages in the evolution of AI: past, present, and future.

In Indonesia, technology adoption has recently started to exploit improvements in artificial intelligence (AI) to improve services (Yusriadi et al., 2023). The fourth industrial revolution and the development of society 5.0, particularly in Indonesia, make it possible for future expansion even though the conditions still need to be optimum. The Industrial Revolution 4.0 gave rise to technological disruption, which ultimately created a

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new culture in every aspect of life. With the development of technology and the internet, which is increasingly widespread, its use is in great demand by the world community. AI applications are proven to help humans work more quickly and efficiently (<https://databoks>). Figure 1 below shows the Artificial Intelligence/AI applications with the highest usage in Indonesia.

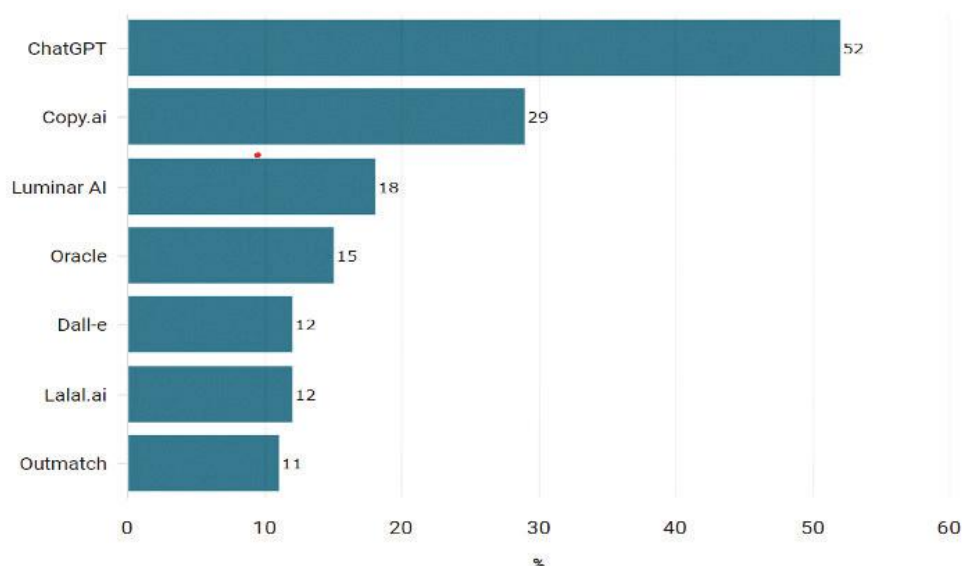


Figure 1. Artificial Intelligence/AI applications with the highest usage in Indonesia (April 2023)

Source: <https://databoks.katadata.co.id/>

Based on survey findings from the popular platform, it is known that 45% of workers and employers in Indonesia have used AI applications. According to the survey, ChatGPT is Indonesia's most widely used AI application. It is recorded that 52% of respondents have used the generative AI platform. Meanwhile, Dall-e and Lalal.ai are also used by 12% of respondents, and only 11% of respondents claimed to use Outmatch to support their work. While the use of Copy.ai is as much as 29% of respondents. Then, the next position is Luminar AI and Oracle, which are used by 18% of respondents and 15% of respondents, respectively. The survey also shows that most respondents use AI applications more than once a month, namely as much as 40%. Then followed by respondents who use the application once a month (27%) and once every two months (11%).

Multiple nations have developed AI with a variety of applications and functions. As an illustration, Venezuela has implemented an innovative smart card identification system called the "carnet de patria." This identification card integrates government databases associated with social programs, potentially facilitating governmental surveillance of individuals' financial records, medical backgrounds, and electoral participation. The US also has studies on AI-enabled social media surveillance that assist in predicting large-scale population behaviors (Ahmed, 2018). The utilization of artificial intelligence (AI) in deportation operations by the United States Immigration and Customs Enforcement (ICE) agency is facilitated through the adoption of an Investigative Case Management System. This system, developed by Palantir and powered by Amazon Web Services, assists ICE in its investigative and case management processes (Hao, 2018). Automated surveillance equipment, both military and state-sanctioned, is deployed in China to monitor significant sectors of the population, with a particular emphasis on marginalized individuals. The use of facial recognition technologies at the Hong Kong border, as discussed by Alice Shen in 2018, together with the deployment of robotic drone drones in several provinces throughout the nation and the highly publicized social credit tracking system (Chen, 2018)

Currently, within the urban setting of Jakarta, Indonesia, artificial intelligence technology has been implemented in the transportation sector. This utilization has been documented by Solihati & Indriyani. (2021), who have identified several specific applications. 1) The process of identifying a vehicle's plate number. 2) The "people counted" feature computes the magnitude of human movement within specific regions. 3) The practice of transportation numbering involves systematically counting and categorizing various types of vehicles, including motorcyclists, as they pass through a given area. The system can categorize a total of 23 distinct variations of motor vehicles. 4) The field of transportation housing involves calculating and estimating the

research related to intelligence, AI development, and AI processes. Until the early 2020s, AI research was associated with students, emotional intelligence, and multiple intelligences. From this explanation, AI is a topic that needs further investigation. For example, at this time, there is a trend of AI research in education related to the adoption and perceptions of students or teachers towards AI.

There is a global endeavor to enhance learning through educational technology. However, successful educational technology deployment largely depends on obtaining approval and effectively disseminating the technology (Gogus et al., 2012). Most prior acceptance studies have been conducted in Western nations with strong technological infrastructure. These studies typically featured participants who were young professionals working in technology-related fields and with a high level of knowledge and expertise in this domain. Hence, the primary objective of this study is to authenticate the UTAUT implementation paradigm, with a particular focus on its applicability within the context of Indonesia.

2. Literature Review

2.1. Artificial Intelligence

Numerous scholars have attempted to define AI. Kaplan & Haenlein. (2019) defined AI as the capacity of a structure to precisely explain and learn from input data and then apply what it has learned to accomplish a specific goal. Although there is no widely accepted definition of AI, it is certain that, besides computer science, AI encompasses numerous other fields, including information science, psychology, linguistics, neuroscience, philosophy, and mathematics. Russell & Norvig. (2016) define “AI” as machines or computers replicating cognitive functions, such as learning and problem-solving, typically associated with human intelligence.

The characteristics of AI can be categorized into two overarching groups: AI as viewed through the evolutionary stages (artificial general intelligence, artificial narrow intelligence, and artificial super intelligence) and AI as viewed through various types of AI systems (analytic AI, human-inspired AI, and humanized AI) (Kaplan & Haenlein, 2019). Yufei et al. (2020) have identified and documented ten distinct applications of artificial intelligence (AI) that have been effectively employed within the realm of education. The aforementioned applications encompass a range of features such as an automated grading system, periodic reminders, feedback from instructors, virtual educators, individualized learning, adaptive learning, augmented reality/virtual reality, precise reading capabilities, intelligent campus technologies, and remote learning opportunities. As per the findings of Helm et al. (2020) Artificial Intelligence (AI) can be defined as a field within computer science that aims to mimic or emulate human intelligence through the utilization of algorithms and machine learning methodologies.

All developed, and developing nations desire education supported by cutting-edge technology. Today’s technology has evolved so rapidly that the term disruptive technology has been established. One of them is artificial intelligence technology. AI provides various conveniences for users, in this case, lecturers and education staff, in carrying out work related to the learning process in tertiary institutions. In order to expand the scope of higher education with the application of modern technology, numerous governmental entities are currently increasing their financial allocations (Buckner, 2011). According to Bodner et al. (2001), the enhancement of AI adoption can contribute to enhancing higher education quality.

In Indonesia, the presence of AI has yet to be fully used in learning media in schools due to the uneven distribution of adequate infrastructure. However, AI also provides new optimism and hope to improve and provide access to quality education for students in remote areas (Ginanjari, 2023). For this reason, it is necessary to adapt technology, especially AI, so that the community can feel the benefits. It is believed that the UTAUT model (Venkatesh et al., 2003) is useful for interpreting the intention of individuals to embrace new technology, such as AI. Numerous researchers have made modifications to this model by excluding specific constructs and incorporating additional constructs that are pertinent to the particular context of their investigations (Chatterjee & Bhattacharjee, 2020).

2.2. Unified Theory of Technology Acceptance and Use (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) according to Marikyan & Papagiannidis. (2023), examines the acceptance of technology as determined by the effects of performance expectancy, effort expectancy, social influence, and facilitating conditions. According to Venkatesh et al. (2003), the influence

of predictors is moderated by age, gender, experience, and voluntary use. The UTAUT model included four primary constructs, namely performance expectancy, effort expectancy, social influence, and facilitating conditions, in addition to four moderating variables, namely age, experience, gender, and voluntariness of usage (Im et al., 2008)

Performance expectancy (PE) refers to the extent to which an individual believes that using a system will enhance their job performance. Effort expectancy (EE) pertains to the degree of convenience associated with utilizing a specific system. Social influence is a frequently used term in academic literature, referring to the extent to which an individual believes influential individuals support the notion that they should adopt and utilize a new system. Facilitating conditions (FC) pertain to the degree to which an individual perceives the existence of technical and organizational infrastructure that fosters and empowers the efficient utilization of a particular system.

Intermittent and partial acceptance of unfamiliar technological advancements characterizes the process of societal adaptation to novel objects. Various theories have been developed within this context based on reasoned action and planned behavior approaches. Notably, the Technology Acceptance Model (TAM) (Davis, 1989) has garnered considerable attention within educational environments, with subsequent iterations such as TAM2 and TAM3 also being explored (Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). The Unified Theory of Acceptance and Use of Technology (UTAUT) was formulated by Venkatesh et al. (2003) as a comprehensive amalgamation of prior theories in the field. (Gogus et al., 2012) elucidated the utilization of technology by examining the underlying factors of use intention, which are subsequently influenced by performance expectations, effort expectations, and social influence.

3. Method and Development of Hypotheses

Partial Least Square (PLS) regression analysis has been adopted to validate the conceptual model and hypotheses. We have compiled a set of questions derived from the scholarly work of (Chatterjee & Bhattacharjee, 2020). The inquiries primarily referred to various elements of artificial intelligence technologies within the higher education sector. The research conducted by Onalapo. (2019) provided empirical evidence supporting the validity of the UTAUT model as a useful framework for predicting the utilization of smartphones for mobile learning among postgraduate students in developing nations. In this research, we adopted the UTAUT model but did not consider the moderators (age, gender, experience, and voluntariness) used in this model. The consideration of these moderators in the current context was not initially contemplated due to the prevailing belief that their impact on stakeholder attitudes would be negligible, given the assumption that all stakeholders possess literacy skills. In the subsequent section, we shall explain the process of formulating hypotheses by utilizing constructs such as Perceived Risk (PR), Performance Expectancy (PE), Effort Expectancy (EE), Facilitating Condition (FC), Attitude (ATT), and Behavioral Intention (BI) in order to interpret the phenomenon of Adoption of Artificial Intelligence (AI) in the context of Higher Education (AAHE).

3.1. Perceived Risk (PR)

Perceived Risk (PR) is a construct that encompasses both behavioral insecurity and environmental insecurity (Chatterjee & Bhattacharjee, 2020). Susanto & Goodwin, 2011) conducted a study demonstrating that the reduction of PR has a notable impact on user attitudes. Likewise, it can be interpreted in a manner consistent with Eiser. (1994) findings, wherein perceived danger is regarded as an indicator or manifestation of attitude rather than a causal factor. It is well acknowledged that artificial intelligence (AI) serves as a technological tool employed in the context of blended learning within the field of education. However, it is important to acknowledge that not all individuals are receptive to embracing technology or may hold reservations about unfamiliar advancements. In alternative terms, individuals who oppose a particular technology or activity perceive it as possessing a higher risk than those who advocate for its advancement (Eiser, 1994). Hence, a positive correlation exists between the adverse emotions experienced by users of artificial intelligence in higher education and their perceptions regarding the potential risks associated with this technology. Based on the above arguments, a hypothesis is proposed that:

H1: Perceived Risk (PR) significantly negatively influences the users' Attitude (ATT) towards adopting AI in Higher Education.

3.2. Performance Expectancy (PE)

The user's perception of new technology is that it represents a mechanism or structure that offers improved performance. According to (Cox, (2012) research, a conceptual alignment exists between performance expectancy and other constructs, including perceived usefulness, outcome expectancy, and relative advantage. These assumptions have been employed in previous theories of adoption. In this instance, the term "perceived usefulness" is synonymous with "performance expectancy," as stated by Chatterjee & Bhattacharjee. (2020). Based on the previously mentioned arguments, the subsequent hypothesis is formulated.

H2: Performance Expectancy (PE) significantly positively influences users' Attitude (ATT) in Adopting AI in Higher Education.

3.3. Effort Expectancy (EE)

In a study by Chatterjee & Bhattacharjee. (2020), the researchers examined the relationship between effort expectation and behavioral intention. The findings revealed that perceived risk, performance expectancy, and effort expectancy significantly influence behavioral intention, with attitudes as a mediating factor. The association in question is substantially supported by additional studies by Hung et al. (2013). Based on the aforementioned discussions, the subsequent hypothesis is constructed

H3: Effort Expectancy (EE) significantly positively influences Attitude (ATT) towards adopting AI in Higher Education.

3.4. Facilitating Condition (FC)

According to Oliveira et al. (2014), in the specific context of Portugal, the adoption of m-banking services is directly influenced by favorable factors and behavioral intents. In the present setting, mobile banking services are regarded as a novel technological advancement for individuals. (Oliveira et al., 2014) state that initial trust, performance expectancy, technology attributes, and task technology fit collectively influence consumer behavioral intention. Artificial intelligence (AI) has drawn significant attention and interest across various domains, including higher education. Its potential impact on users has been widely recognized, with the technology anticipated to elicit substantial responses. According to a study conducted by Venkatesh et al. (2012), there exists a direct relationship between FC and Behavioral Intention (BI). Furthermore, it has been observed that the utilization of e-filing among US taxpayers is accompanied by a notable interpretation of taxpayers' behavioral intentions by Facilitating Conditions (Carter et al., 2012). Based on the aforementioned considerations, we propose the following hypothesis:

H4a: Facilitating Conditions (FC) has a significant positive impact on the Behavioral Intention (BI) of the users in Adopting AI in Higher Education

Additionally, there is a hypothesis suggesting that FC exhibits a significant and favorable impact on Effort Expectation (EE). According to Chatterjee, Sheshadri, and Bhattacharjee (2020), there is a belief that facilitating a robust technical infrastructure or offering introductory training in the implementation of a new technology encompassed by FC could enhance users' understanding of the system. Based on this perspective, the following hypothesis is postulated:

H4b: Facilitating Conditions (FC) significantly positively influences Effort Expectancy (EE).

3.5. Attitude (ATT)

(Fishbein & Ajzen, 1975) presented findings in their publication indicating the existence of two distinct attitudes: general attitudes toward physical objects and attitudes toward engaging in specific behaviors related to an object or target. These attitudes will be denoted as attitudes toward a behavior, specifically the attitude toward adopting new technology in higher education. Multiple studies have presented empirical support for a favorable association between attitude and behavioral intention in the adoption of technology (Chang et al., 2012; Ingham et al., 2015; Wagner et al., 2016) Attitude (ATT) serves as a significant mediating factor in the interpretation of Behavioral Intention (BI), as evidenced by numerous prior studies (Cox, 2012). Through this discourse, a hypothesis is formulated:

H5: Attitude (ATT) of individuals in Adopting AI in Higher Education significantly positively influences users' Behavioral Intention (BI).

3.6. Behavioral Intention (BI) and Adoption of AI In Higher Education (AAHE)

According to (Gutierrez & Zhang, 2007), behavioral intention (BI) is a robust predictor of the subsequent performance of specified actions. In addition, it is worth noting that behavioral intention (BI) serves as a moderating variable, significantly influencing the performance of the behavior in accordance with the stated intention (Nasrallah, 2014). From a crucial strategic standpoint, the subsequent hypothesis is formulated:

H6: Behavioral Intention (BI) of users to Adopt AI in Higher Education Education significantly positively influences the Adoption of AI in Higher Education (AAHE)

4. Findings

The respondents used in this study were lecturers and administrative staff at one of the state universities in Indonesia. Of the 552 respondents we contacted to fill in the online questionnaire, as many as 359 respondents filled out, consisting of 348 lecturers and 39 administrative personnel; data collection was carried out within one month. Table 1 illustrates the demographic information regarding the respondents.

Table 1. Demographic Profiles

| Variables | Number Of Respondents | Percentage (%) |
|----------------------|-----------------------|----------------|
| Job | | |
| Administrative Staff | 39 | 10.08% |
| Lecturers | 348 | 89.92% |
| Gender | | |
| Man | 161 | 45.9 % |
| Woman | 190 | 54.1 % |
| Age | | |
| 20 – 30 | 187 | 17.95% |
| 30 – 40 | 71 | 53.28% |
| 40 – 50 | 25 | 20.23% |
| 50 – 60 | 5 | 7.12% |
| >60 | 187 | 1.42% |
| Years of Work | | |
| 1 – 3 | 177 | 50.43% |
| 4 – 6 | 78 | 22.22% |
| 7 – 10 | 40 | 11.40% |
| > 10 | 56 | 15.95% |

4.1. Convergent Validity

Convergent validity is evaluated based on item loading, composite reliability of each scale, and abstracted average variance for each construct. According to Hair et al. (2012), standardized loading values should be larger than 0.70, and AVE values should be greater than 0.5 (Hair et al., 2021). Consequently, certain items were eliminated (ATT1, EE1, EE2, PE1) because their loading value was less than the minimum threshold. The result demonstrates that the data sets' reliability, items, and composite are higher than the recommended threshold of 0.70. In addition, the AVEs were significantly surpassing the recommended value of 0.5. Table 2 demonstrates the result that the scales used possessed convergent validity.

Table 2. Estimation of Outer Loading, CR, and AVE

| Constructs | Items | Loading | CR | AVE |
|------------------------------------|-------|---------|-------|-------|
| Adoption of AI in Higher Education | AAHE1 | 0.831 | 0.891 | 0.672 |
| | AAHE2 | 0.840 | | |
| Attitude | AAHE3 | 0.782 | 0.891 | 0.672 |
| | AAHE4 | 0.826 | | |
| | ATT2 | 0.841 | | |
| | ATT3 | 0.811 | | |
| | ATT4 | 0.801 | | |
| Behavioral Intention | ATT5 | 0.826 | 0.936 | 0.745 |
| | B11 | 0.872 | | |
| | B12 | 0.889 | | |
| | B13 | 0.907 | | |
| | B14 | 0.766 | | |
| Facilitating Condition | B15 | 0.874 | 0.896 | 0.635 |
| | FC1 | 0.837 | | |
| | FC2 | 0.808 | | |
| | FC3 | 0.850 | | |
| Effort Expectancy | FC4 | 0.772 | 0.845 | 0.647 |
| | EE3 | 0.735 | | |
| | EE4 | 0.801 | | |
| | EE5 | 0.871 | | |
| Perceived Risk | FC5 | 0.708 | 0.909 | 0.715 |
| | PR1 | 0.872 | | |
| | PR2 | 0.932 | | |
| | PR3 | 0.774 | | |
| Performance Expectancy | PR4 | 0.795 | 0.870 | 0.627 |
| | PE2 | 0.784 | | |
| | PE3 | 0.867 | | |
| | PE4 | 0.709 | | |
| | PE5 | 0.800 | | |

4.2. Discriminant Validity

The method of extracting pairwise correlations between factors is used to evaluate discriminant validity. Fornell and Larcker (1981) introduced this procedure for comparing correlation with extracted variance. When diagonal values are substantially greater than those of the off-diagonal elements in the corresponding rows and columns, discriminant validity is confirmed. The diagonal values equal the square root of each factor's AVE value. The result is displayed in Table 3; this result demonstrates that all constructs have discriminant validity.

Table 3. Estimation of Outer Loading, CR, and AVE

| Discriminant Validity | ATT | AAHE | BI | EE | FC | PE | PR |
|-----------------------|--------|--------------|--------------|--------------|--------------|--------------|--------------|
| ATT | 0.820 | | | | | | |
| AAHE | 0.737 | 0.820 | | | | | |
| BI | 0.485 | 0.341 | 0.863 | | | | |
| EE | 0.528 | 0.504 | 0.258 | 0.804 | | | |
| FC | 0.470 | 0.417 | 0.147 | 0.401 | 0.797 | | |
| PE | 0.681 | 0.616 | 0.301 | 0.547 | 0.455 | 0.792 | |
| PR | -0.370 | -0.369 | -0.160 | -0.224 | -0.216 | -0.335 | 0.846 |

4.3. Structural Model Analysis and Hypothesis Testing

Bootstrapping with Smart PLS and 5000 subsamples was utilized to calculate the inner model's path coefficients (Table 4). The results of the structural model evaluation (Figure 3) indicated the strength of hypothesized relationships between the study constructs. We have also estimated the R^2 values, which refer to the proportion of the dependent variable's variance that the independent variable or variables can predict. This coefficient indicates the extent to which the independent variable or variables can explain the dependent variable. The results are shown in Table 3

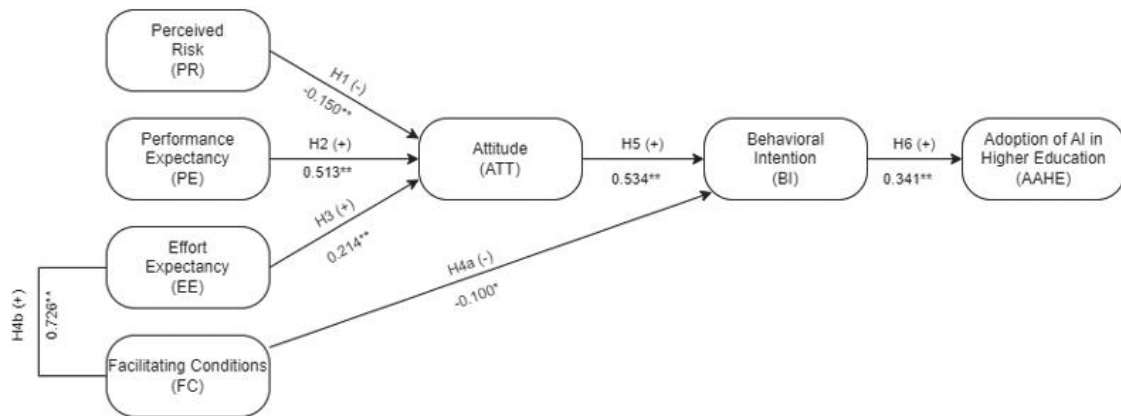


Figure 4. Structural Model with Path Coefficient and Significance; * $p < 0.01$; ** $p < 0.001$

Table 4. T-Statistics of Path Coefficient (Inner Model) with R^2 estimation

| Hypothesis | Path | Path Coefficient | T Statistics | P values | R^2 | Decision |
|------------|-----------|------------------|--------------|----------|-------|---------------|
| H1 | PR → ATT | -0.150 | 3.187 | 0.001 | | Supported |
| H2 | PE → ATT | 0.513 | 7.322 | 0.000 | 0.518 | Supported |
| H3 | EE → ATT | 0.214 | 3.161 | 0.001 | | Supported |
| H4b | FC → EE | 0.400 | 8.080 | 0.000 | 0.160 | Supported |
| H4a | FC → BI | -0.100 | 1.969 | 0.038 | 0.241 | Not Supported |
| H5 | ATT → BI | 0.534 | 11.717 | 0.000 | | Supported |
| H6 | BI → AAHE | 0.341 | 7.002 | 0.000 | 0.117 | Supported |

The PLS test results support all seven hypotheses presented in this study. PR, PE, and EE have significant effects on ATT, with PR having a negative effect with a -0.150-path coefficient and a 0.001 significance level; these three variables can explain 51.8% of ATT. FC significantly influences EE, as indicated by a path coefficient of 0.400, a p-value of zero, and an explanatory power of 16%. FC and ATT significantly influence BI with path coefficients of -0.100 and 0.534 and p-values of 0.038 and 0.000, respectively. And finally, the influence of BI on AAHE has a significant positive result with a path coefficient of 0.341 and P-values of 0.000, which can account for 11.7% of AAHE.

5. Discussion and Conclusion

5.1. Key Finding

The results highlight that:

1. The attitude of stakeholders at higher education institutes towards adopting AI is significantly influenced by Perceived Risk (PR) and Effort Expectancy (EE). The impact of PR is found to be detrimental, while the impact of EE is beneficial.
2. The presence of facilitating conditions (FC) has been proven to have a significant and favorable influence on the stakeholders' effort expectancy (EE). However, it has a negative influence on Behavioral Intention

(BI). Thus, the results of this study fail to confirm research hypotheses (4b). This result is different from the previous research by Chatterjee & Bhattacharjee. (2019) due to differences in the research environment

3. The adoption of Artificial intelligence (AI) in higher education is strongly and favorably influenced by behavioral intention (BI).
4. The model presented in this study serves as a straightforward framework that can assist relevant authorities in implementing artificial intelligence (AI) technologies to enhance the overall performance of higher educational institutions in Indonesia.

5.2. Limitation and Future Research

This study is currently in an early stage and has room for improvement. The use of artificial intelligence (AI) in universities in Indonesia is constrained by instruments that have yet to be used optimally. Further exploration of various AI techniques is a promising topic of study. Furthermore, the potential for increasing the number of responses can be enhanced by seeking participation from individuals beyond the scope of educators and administrative employees. The ethical implications surrounding the adoption rate of artificial intelligence (AI) at Indonesian institutions remain a subject of ongoing debate. Hence, all syntheses possess a predictive nature. Moreover, this study excluded the four moderator models suggested by Venkatesh et al. (2003), which directly impact the context of this study because the participants are situated within an educational setting. Subsequent investigations may explore utilizing the four moderator models to forecast the effectiveness of the Unified Theory of Acceptance and Use of Technology (UTAUT) model.

5.3. Theoretical Implication

Integrating artificial intelligence (AI) will significantly impact education and the pedagogical landscape. The influence of policy orientations on using artificial intelligence (AI) will affect the learning system within tertiary institutions. While lecturers traditionally serve as significant educators, it is evident that the advent of AI technology has significantly impacted learning patterns and will indeed have a transformative effect on the field of education. Within the context of the educational journey, the efficacy of technical elements is reinforced by administrative staff who emphasize providing students with prompt and precise service. By leveraging the competencies and proficiencies of personnel and the availability of requisite resources and infrastructure, the tasks at hand will become more readily attainable. In the present setting, artificial intelligence (AI) is deployed to offer enhanced convenience and efficiency in providing technological services. One example of the services is that artificial intelligence (AI) can potentially improve and facilitate the student graduation registration procedure.

The attitudes of Indonesian higher education stakeholders towards the use of AI are influenced by perceived risk (PR) and effort expectancy (EE). This perspective will enhance users' inclination to utilize and embrace artificial intelligence. The presence of a facilitating condition benefits individuals' expectations of the effort required to use a particular technology or system.

5.4. Practical Implication

The constructs of performance expectancy, effort expectancy, social influence, and facilitating conditions have implications for management practice in higher education (Thakur, R. (2013).

The notions of PE and EE pertain to the degree to which the adoption of technology is advantageous for higher education institutions, as they encompass technical considerations that can be implemented by users, such as lecturers and administrative personnel. The technology selection should prioritize user-friendliness and avoid excessive complexity, ensuring ease of use and alignment with the specific requirements of higher education institutions. For instance, the implementation of artificial intelligence (AI) technology can enhance work efficiency while maintaining the precision of tasks. However, it is imperative to prioritize the level of security when utilizing AI in pre-existing systems to alleviate user concerns over potential data loss resulting from malicious hacking activities.

Stakeholders within higher education institutions have the potential to enhance internet facilities conducive to integrating innovative technology. Failure to do so may result in the underutilization of advanced AI technology due to the inability to effectively employ it. Furthermore, it is imperative for stakeholders to provide comprehensive training programs for both employees and lecturers to mitigate the risks of fraudulent activities caused by the utilization of AI technology.

5.5. Conclusion

The presence of AI will change the education and teaching system. Policy directions regarding the use of AI will influence the learning system in tertiary institutions. Even though lecturers are the primary educators, nowadays, it is undeniable that AI technology has changed learning patterns and will inevitably make a difference in teaching. In the learning process, technical factors are supported by administrative personnel prioritizing the accuracy and speed of service to students. With the skills and expertise of employees and supporting facilities, the work will be more accessible. In this context, AI is here to provide ease and speed of technical services. AI can be developed to assist the registration process for student graduation. Perceived Risk (PR) and Effort Expectancy (EE) impact the attitudes of Indonesian higher education stakeholders to adopt AI. This attitude will motivate the user's intention to use and adopt AI. Facilitating Condition positively affects Effort Expectancy (EE)

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187-Video Development in Asynchronous Learning in Abstract Algebra Course at the Universitas Terbuka

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Abstract

The algebraic ability of students in asynchronous learning (online tutorial) Abstract Algebra courses still needs to improve. Meanwhile, algebraic ability is needed to train students to think critically and creatively, which humans must master in the industrial era 4.0. Developing a video complementing asynchronous learning is necessary to make it easier for students to understand Abstract Algebra material. This research aims to produce valid e-learning videos in Abstract Algebra courses in Universitas Terbuka asynchronous learning. The type of research is research and development. Sources of research data are students taking Abstract Algebra courses, content experts, instructional designer experts, and media and language experts. The research instruments were questionnaires and algebra proof abilities test. Data were analyzed by descriptive qualitative. The results of the study show that: 1) Content experts give an average score for each indicator (5 indicators) of 4.2 (maximum score of 5). Content experts consider that the material presented in the video is correct, accurate, not misconstrued, current, up-to-date, appropriate in terms of scope and adequacy, supports the development of students' algebraic proof abilities, has links with other material in mathematics or other fields; 2) Instructional design experts assess the delivery strategy of the material in the video according to student characteristics, the delivery strategy facilitates understanding of the material, is contextual, the selection of video media is very appropriate. Average score 4.4 (4 indicators); 3) Media and language experts consider that the quality of the use of graphics and visuals (tables, diagrams, charts) is good and by the objectives, the content of the material, and student characteristics. The use of the language of communication is appropriate and to the objectives, content, and student characteristics. The level of interactivity and ease of navigation is good. The average score for the six indicators is 4.1; 4) Students consider the video easy to use and can increase student interest and motivation when used individually or in groups. Video can be used as a substitute for teaching lecturers. The average score for the 5 indicators is 4.7, and 5) Algebraic proof ability test grids and questions were given a score of 4.3 by experts (4 indicators). The experts' input was that the presentation of the video was made even more interesting by making the letters colored in different colors and accompanied by music. At the same time, students provide input so that there are more videos about examples of questions and how to solve them. This research is very important for improving the mathematical proof abilities of UT students. Further research is needed to test the effectiveness of the video.

Keywords: *Abstract Algebra, asynchronous learning, mathematical proof abilities, online tutorials.*

1. Introduction

21st-century learning is characterized by using digital equipment in interaction activities between lecturers and students and between students and students. One of the digital equipment is video. E-learning using video helps students and lecturers in distance learning (Beilstein et al., 2017). Website-based video e-learning also makes it easier for students to understand concepts (Bates et al., 2016). Using video in e-learning for Abstract Algebra courses can streamline learning in achieving its goals (Bétrancourt & Benetos, 2018). In addition, video e-learning at the Universitas Terbuka (UT) can shape student competencies related to skills and attitudes (Wardani, 2004). Learning Algebra using websites (videos) can increase learning outcomes by 54.05%, and as many as 56.76% of students are interested in learning Abstract Algebra (Fadli, 2010).

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Abstract Algebra is one of the expertise courses in the UT Mathematics Education Study Program that needs attention to the quality of its students abilities. The value of students' mathematical proving abilities in asynchronous learning (online tutorial) UT Abstract Algebra courses still needs improvement, as presented in Table 1 below.

Table 1. *The Average Score of Students' Mathematical Proof Ability in Abstract Algebra Course*

| Semester | 2020.1 | 2020.2 | 2021.1 | 2021.2 |
|---------------|--------|--------|--------|--------|
| Average score | 53 | 47 | 52 | 44 |

Table 1 shows that students' mathematical proving abilities still need to improve. Students need more than understanding knowledge and concepts in Abstract Algebra to make proofs (Arikan et al., 2015). Likewise, Agustyaningrum et al. (2021) says that students' abilities in mathematical proof and solving algebraic problems still need improvement. One of the contributing factors is that the online learning that has been carried out so far needs to display a complete proof process. This information was obtained based on the results of interviews with students. In addition, as many as 66.2% of students made mistakes in solving algebra problems due to errors in solving strategies (Gasco & Villarroel, 2012). Therefore, it is necessary to make improvements through the application of the e-learning video model to improve students' mathematical proving abilities in Abstract Algebra courses.

The research aims to produce valid e-learning videos to improve the ability of algebraic proofs. This research is very important because, as an institution with an open and long-distance system, UT must be able to organize quality education programs to produce competent, reliable, and competitive human resources.

Most of the mathematics consists of proving (Agustyaningrum et al., 2020). The proof of the theorem is a finite sequence of claims. Each claim is logically derived from the previous claim and theorems whose truth has been established. Mathematical proof is a sequence of logical statements that explain why a given proposition is true (Agustyaningrum et al., 2020). Meanwhile, Stefanowicz (2014) states that mathematical proof is absolute, which means that if one theorem is proven to be true, it will be true forever. Thus, mathematical proof explains a property in mathematics that is true based on the properties or previous definitions that have been proven true.

2. Method

The type of research used is Research and Development (R&D). The characteristic of R&D research is to produce a product (Erfani, 2019; Winaryati et al., 2021). The product is a video that is used in asynchronous learning to improve mathematical proving abilities in Abstract Algebra courses. The R&D model used is the Thiagarajan 4D model, with define, design, development, and dissemination stages (Winaryati et al., 2021).

The define stage determines learning objectives, identifies students' prior knowledge, student constraints following tutorials, and the form of e-learning video that students want. The design stage includes the following activities: 1) determining the material to be videoed based on learning objectives; and 2) making instrument and questionnaire grids.

The development stage includes the following activities: 1) creating power points; 2) developing test questions and questionnaires; 3) developing videos; 4) validating the instrument; 5) carrying out an evaluation of the results of video development by content experts, instructional design experts, and media and language experts, as well as students; and 6) revise videos and develop new videos.

The dissemination stage includes the asynchronous learning process after revising the video learning material based on content expert input. Asynchronous learning includes pre-test activities before the learning process, giving videos in the learning process, and giving post-tests and student response questionnaires at the end of the learning process. This article only reviews the results of the first 3 stages, namely define, design, and development.

Research data sources are students, content experts, instructional designer experts, and media and language experts. The amount of each data source is as follows.

Table 2. Number of Data Sources

| Data Sources | Amount |
|------------------------------|--------|
| Student | 15 |
| Content expert | 3 |
| Instructional design experts | 3 |
| Media and language expert | 3 |

The instruments used in this study were: a mathematical proving ability test and questionnaires for content experts, instructional design experts, media and language experts, and students.

Data was collected through tests, filling out questionnaires, and interviews. Data were analyzed by descriptive qualitative. Videos are developed using several methods: PowerPoint with voice recordings or via the recorded Zoom application.

Powerpoint with animation is arranged systematically so students can easily understand the material. Systematic means paying attention to the order from easy/simple to difficult/complex. Presentation of material using an inductive or deductive approach. The inductive approach begins by giving examples, definitions, examples of properties, properties, and proofs, as well as examples of application. Meanwhile, the deductive approach begins with definitions, examples, properties, and proof, as well as examples of application.

3. Findings and Discussion

This research aims to produce valid e-learning videos in Abstract Algebra courses in Universitas Terbuka asynchronous learning. The type of research used is the Thiagarajan 4D R&D model, with the stages of define, design, development, and dissemination. However, this paper only reports the results of the first three stages, namely define, design, and development.

3.1. Define Stage

At this stage, the activities are determining general learning objectives, identifying students' prior knowledge, student constraints following tutorials, and the form of e-learning videos that students want. The resulting general learning objectives are: after attending this lecture, students can prove the properties that apply to sets, functions, groups, subgroups, and group homomorphisms.

Information about students' prior knowledge, constraints in following asynchronous tutorials, and the desired form of e-learning video was obtained through interviews with five students. Based on the results of the interviews, information was obtained that students still needed to improve in understanding the properties of abstract sets and distinguishing injective, surjective, and bijective functions. Astuti & Haryadi (2022) said that one of the student's areas for improvement in the concept of opportunity is understanding the concept of sets. Material sets and functions are prerequisite material in understanding Abstract Algebra material. Difficulties in prerequisite material have an impact on the quality of learning at the next level (Laja, 2022). Based on the results of tracing the student's initial understanding, the discussion of sets and functions at the beginning of the Abstract Algebra course should be even more detailed.

The obstacle students face in asynchronous tutorials is that material and discussions are only in pdf or slide form, so students need help understanding the material. The lecturers should have provided stabilization at the end of the discussion, resulting in various student understandings (Batmang et al., 2021). Lecturers cannot provide feedback (Ene & Upton, 2018; Ebner & Gegenfurtner, 2019). Students expressed a desire to vary the presentation of the tutorial, such as adding a video in PowerPoint or showing a lecturer teaching.

3.2. Design Stage

The material that will be videoed at this stage is produced based on the learning objectives produced at the defined stage. Materials that will be videoed include 1) Associations; 2) Division; 3) Mapping; 4) Binary Operations; 5) Groups; 6) Sub Groups; 7) Group Homomorphism. Group theory is material that is difficult for students to understand (Arikan et al., 2015). Group material comprises groups, subgroups, permutation groups, cyclic groups, group isomorphism, and homomorphism (Beachy & Blair, 2019).

This stage also produces instrument grids. The instrument consists of two: a video assessment questionnaire and a test. Video assessment questionnaire to determine the validity of the video based on assessments from content experts, instructional design experts, media and language experts, and students. Meanwhile, the test instrument measures students' mathematical proving abilities.

The proving ability test grid includes indicators: 1) Reading and understanding mathematical proof; 2) Presenting proof of the truth of a statement mathematically; 3) Developing mathematical arguments to prove or disprove a statement; and 4) Do the proof directly or indirectly, or by mathematical induction. Meanwhile, the questionnaire grid is as follows.

Table 3. Instrument Grids

| Number | Evaluator | Assessed | Number of Indicators | Number of statements/questions |
|--------|------------------------------|-----------------|----------------------|--------------------------------|
| 1 | Content expert | Video | 5 | 17 |
| 2 | Instructional design experts | Video | 4 | 8 |
| 3 | media and language expert | Video | 7 | 21 |
| 4 | Student | Video | 5 | 12 |
| 5 | Content expert | Test instrument | 4 | 8 |

3.3. Development Stage

This stage produces power points as video creation scripts, proving ability test and assessment questionnaires, videos, and the results of video and test assessments. The number of power points generated is 25 pieces, so the number of videos produced is also 25 pieces. The proving ability test is an essay with 8 questions from 4 indicators. Each indicator consists of 2 questions.

The expert carries out content validity before the instrument is used. The number of experts who validated the instrument was three people. The validator's way of working is crossing out the parts of the instrument that must be repaired and providing improvements through track changes. The three experts also provided suggestions for improvement. Suggestions and corrections from experts are then accommodated and become the final instrument to assess the video and test instrument.

Furthermore, video validation and test instruments were carried out at this development stage.

a. Video validation

The videos that have been developed are validated by content experts, instructional design experts, media and language experts, and students. The number of content experts, instructional design experts, and media and language experts is three people each. Meanwhile, the number of students were used as subjects to rate the video was 15 people. The video rating uses a Likert scale with 5 (options): strongly agree, agree, undecided, disagree, and strongly disagree. The results of the video assessment are presented in the following figure.

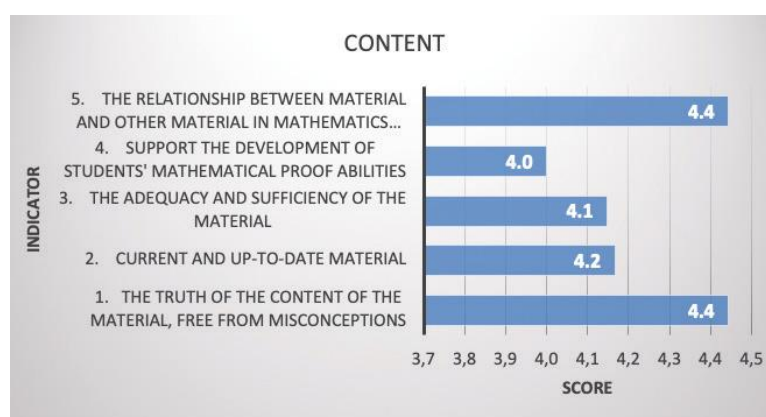


Figure 1. The Results of The Material Expert's Assessment of The Video

Content experts assess each indicator with an average of above 4. This shows material experts agree or strongly agree that the material presented in the video is correct, accurate, not misconstrued, current, up-to-date, according to learning objectives, supports the development of students' mathematical proof abilities, as well as having links with other material in mathematics or other fields. The correct material is needed in making videos because learning through videos can improve learning outcomes (Khairani et al., 2019). The interrelationship between materials is one of the characteristics of contextual learning. Contextual learning through video can affect learning outcomes (Nortvig et al., 2018).

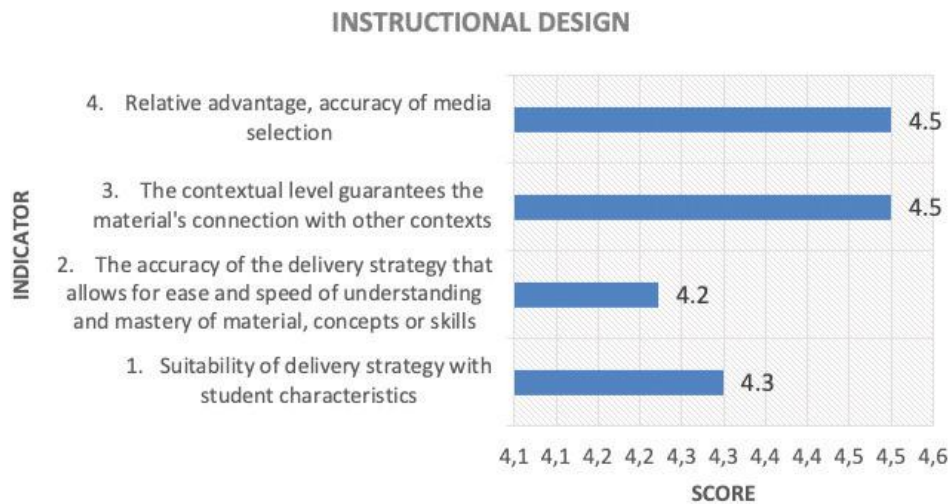


Figure 2. The Results of The Instructional Design Expert's Assessment of The Video

Likewise, learning design experts agree or strongly agree that the material delivery strategy follows the characteristics of students; the delivery strategy makes it easier for students to understand the material and context, and the selection of video media is very appropriate. Learning is required to follow the development of science and technology to present a class atmosphere that follows the needs of the times and in accordance with the character of students (Wisada et al., 2019).

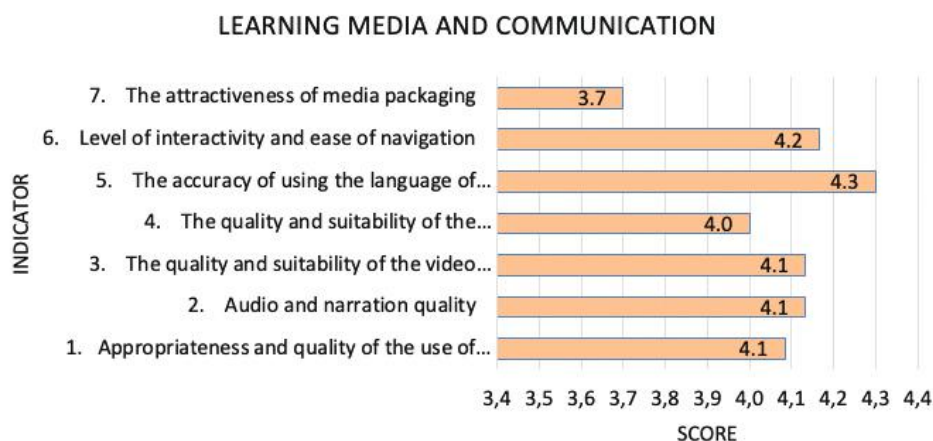


Figure 3. The Results of The Media and Language Expert's Assessment of The Video

Media and language experts agree or strongly agree that graphics and visuals (tables, diagrams, charts); audio and narration; videos, and animations are of good quality and follow the objectives, content, and student characteristics. The material in learning videos must be packaged in a multimedia manner, including text, animation, sound, and video, according to the demands of the material (Khairani et al., 2019). The language of communication is appropriate and follows the objectives, content, and student characteristics. The level of interactivity and ease of navigation is good. However, regarding the attractiveness of media packaging, media and language experts agreed or doubted. The demand for video content is not only of educational value but

also attracts attention and facilitates the learning process of students (Nugraha, 2019). Interesting not only in animation but also in video packaging. Thus, the resulting video must be made even more attractive in terms of packaging.

Students consider the video easy to use and can increase student interest and motivation when used individually or in groups (Figure 4). Students also agree or strongly agree that videos can be used for individual learning by students and teaching aids for lecturers. Like Seo et al. (2021), videos can be used as independent learning media or tools to enhance the learning process. Videos can also encourage students' higher-order thinking skills and provide convenience and speed in mastering material, concepts, and skills according to related topics. Students are assisted in understanding the material using video (Khairani et al., 2019).

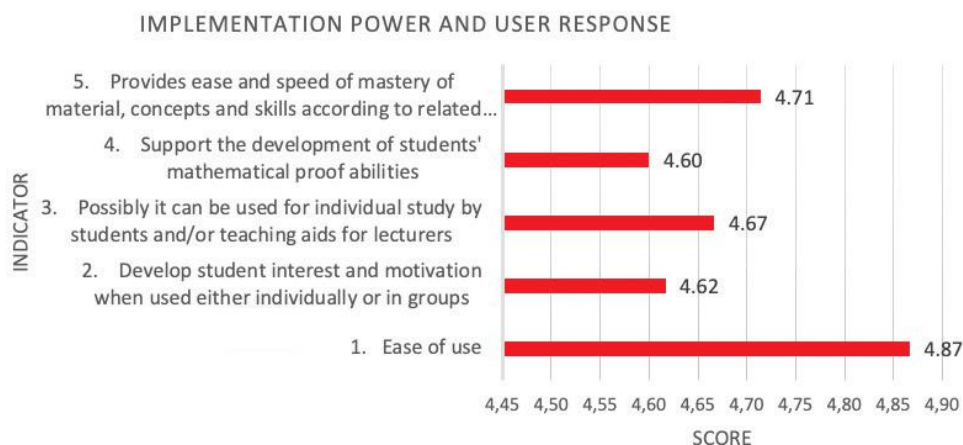


Figure 4. The Results of The Student Assessment of The Video

From the results of expert and student assessments, the video is considered good for each indicator, except for the attractiveness indicator. Even though the value of 3.7 is close to 4, attention needs to be given to video improvements related to attractiveness. Media experts provide comments and suggestions for the video to make it more interesting, namely: 1) the material is very appropriate; 2) the language is good; 3) please reduce the running speed of the text; 4) the design is more attractive images added; 5) interspersed with music when learning starts; 6) more directed two-way communication; 7) For learning materials it is relatively sufficient, but because the material is abstract, the animation is relatively flat, but if there is an animation for emphasizing certain important concepts, it can be in a different color, or with a different font size too, or with flash animation, this will strengthen students' understanding and recall.

Abstract Algebra course is an abstract course. The discussion of material is more deductive, beginning with definitions, proving properties, and giving examples. Most of the discussion contains theorem proofs or properties. Therefore, the presentation in the video is more of an abstract material which is very boring to watch. Nonetheless, the upcoming videos are more interesting per the expert's input. Learning media is needed that is good and appropriate for abstract objects (Khairani et al., 2019).

Meanwhile, comments from students were: 1) the videos provided were easy to understand, and I understood more; 2) quite good, when it's hard to access, it's just a network problem; 3) already very good and innovative; 4) it's easier to understand material from videos than from modules, so it's best if all material has videos.

Suggestions from students are as follows. 1) Examples are more numerous and more varied; 2) The appearance of the text in the video is enlarged so that it is read clearly; 3) The duration of the video for each material is added and adjusted according to the material; 4) The slide animation used is more colorful/illustrative and varied; 5) Text running on the slide distracts the focus of the material; 6) Include more examples of problems in each theorem; 7) All materials are made into videos; 8) It is necessary to add back sound music so that students will be more engrossed in learning.

Based on input from material experts and students, what needs to be added to the video are: 1) there is no need for running text; 2) it should be interspersed with music; 3) given attractive colors and pictures. Interesting ranks

highest as student motivation to learn through video (Nugraha, 2019); and 4) create a two-way communication. Increased student video engagement improves exam results (Baker, 2016).

b. Validation of proving ability test by a content expert.

The results of the content expert's assessment regarding the mathematical proving ability test are presented in the following figure.

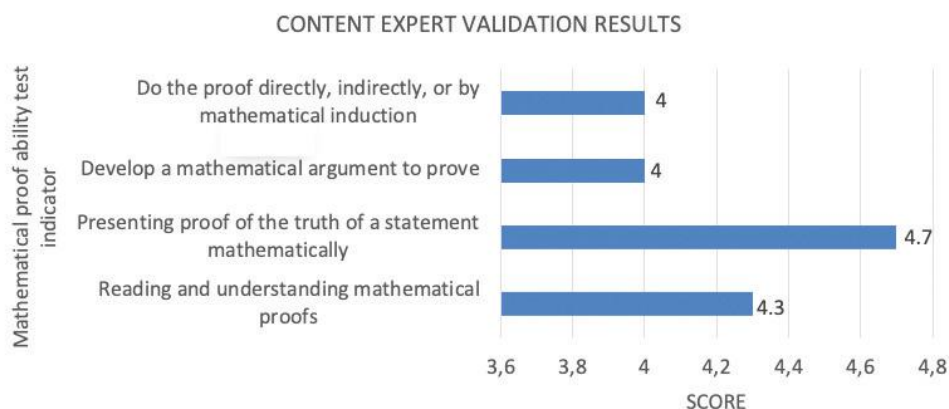


Figure 5. The Results of The Content Expert's Assessment of The Evidentiary Ability Test

The assessment results show that the content experts agree or strongly agree with the grid and questions on the proving ability test that are mutually compatible. The grids and questions follow the subject competencies and characteristics of UT students. Suggestions from experts: 1) The number of questions for each indicator is more than 2, and 2) presented from easy to difficult.

4. Conclusion and Recommendations

This study aims to produce valid e-learning videos to improve mathematical proof abilities. The validity of the video and test instrument was based on the assessment of content experts, instructional design experts, media and language experts, and students. All elements of the video reviewer gave an average rating of above 4 for each indicator on a scale of 5. Likewise, the content expert gave an average score of above 4 for each mathematical proof ability test instrument indicator. Thus, videos and mathematical proof test kits are valid for online tutorials for Abstract Algebra courses to improve mathematical proof abilities.

To produce an even better video, the next development or existing video is revised by considering: 1) The video is made more attractive, with enlarged fonts, colorful fonts, interspersed with music, and made as if it were 2 directions; 2) Videos are made for all materials; and 3) more examples are presented. The next research is to test the effectiveness of the video.

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195-The Effects of Covid-19 Period on Open and Distance Learning in Vietnam

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Abstract

The Covid-19 pandemic had a profound impact on education systems around the world, particularly in developing countries. It was one year and half of school closures inconsecutively, because of social distancing across the entire country. But education cannot be interrupted. In Vietnam, facing a learning crisis, the Ministry of Education and Training (MOET) had to change policies about “distance learning” to minimize the negative impact of the pandemic on educational activities across the country and to adapt to the new situation. The school-year’s plan was interrupted, the educational program and content had to change towards the core, millions of children, pupils and students had to temporarily confine them self at home, to switch to online learning, and to study online. The inequality in reaching out for a proper education was becoming more and more obvious between students in the cities and remote areas. The abilities to access the educational services were very limited, due to the lack of infrastructure, information technology equipment and Internet access, which made “distance learning” a challenge. This pandemic also exposed many problems in Vietnamese education system from the resources of digitalized online or CCTV broadcasted courses, to the quality of the education’s management systems. Another issue is sports and practice subjects, that cannot be acquired sufficiently from online sources nor through the television; the closure of laboratories and travel restrictions prohibited researchers to continue their experiments or investigations, except for experimental and collaborative work that can be done remotely. As a matter of fact, health’s service and psycho-social wellbeing cannot be assured from distance. The pandemic of Covid-19 had seriously impacted the life and works of not only the students but also the teachers. They had to adapt to unexpected working conditions with colleagues and students, teaching in unprecedented ways, using new tools. And they also had their own health and psycho-social wellbeing to deal with. There are many lessons to be learned from this pandemic in the world in general and in Vietnam in particular.

Key words: Covid-19 pandemic, policies, distance learning, lessons, Vietnam

1. Introduction

For many countries in the world, including Vietnam, open and distance learning (ODL) is not only a global solution and the most promising education method of the 21st century, but also a supporting mode for the building of a learning society and a tool for lifelong learning.

The Covid pandemic happening at the end of 2019 was a push for the change and development of ODL in Vietnam. At that time, schools all over the country were closed regionally, in response to the spread of the virus. This led to disruption of teaching and learning processes at all educational levels. To ensure overcoming difficulties in the new situation, right in the first quarter of 2020, the Vietnam Ministry of Education and Training issued a document directing educational institutions on the implementation of ODL methods to ensure uninterrupted learning. This is a huge and unprecedented turning point, because from the traditional point of view, offline or face-to-face education has always been considered the only teaching and learning method to ensure training quality. It is this long and dangerous global pandemic that has once again confirmed that open and distance learning (ODL), with its legal basis and special technical conditions, is an effective solution that not only helps maintain the teaching-learning process while still ensuring its quality.

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2. Literature Review

Over the years, the university-level ODL system in Vietnam has actively contributed to improving people's knowledge and training local human resources for mountainous, remote, and island areas. This type has contributed to the realization of equality in education, creating lifelong learning opportunities for people, overcoming the difficulties of geographical distance between learners and cultural centers, educational institutions, etc., and implementing policies on ethnicity and social justice on education as well. As a result, on the one hand, learners can take advantage of many information channels to access the store of human knowledge, on the other hand, educational institutions also reduce the cost of building schools.

Hanoi Open University is one of the first two universities in the higher education system licensed by the Ministry of Education and Training of Vietnam to launch ODL, which has made a positive change in training and fostering quality human resources for the country, meeting the learning needs, improving the qualifications of learners, contributing to creating good opportunities both in space and time for learners' access to knowledge.

In the process of implementing ODL, higher education institutions have made great efforts in the organization of training management, course exams, and graduation exams according to the regulations of the Ministry of Education and Training. The preparation of learning materials was initially implemented in a scientific, complete and timely manner. Academic mentoring is done to help students quickly integrate with the new training method. With the superiority of ODL, the learning of people who still have difficulties and have no conditions to go to school in remote, isolated and extremely difficult areas has been partly solved. In big cities and provinces, people who already have jobs and those who want to learn to improve their professional qualifications and skills for work have also had access to ODL, helping them to solve their difficulties on learning conditions.

2.1. Some Advantages in Implementing ODL System

The strong development of science and technology is the premise to promote the increasingly strong development of ODL. High-speed computer networks have developed, along with that, telecommunications services with broadband have spread and covered most localities in the country, from mountainous areas to islands. Network access devices such as smartphones, laptops, and personal computers have become commonplace. Therefore, just one more legal corridor is needed for the quality and results of remote teaching and testing, via a recognized internet and high-speed network. On March 29, 2022, MOET issued the Education Sector Master Plan, adapting to the Covid 19 pandemic, ensuring safe and quality teaching and learning organization (353/KH-BGDĐT), in which, the MOET empowers universities to take the initiative in providing teaching and learning methods and forms. At the same time, the MOET allows flexible application of measures to test and evaluate students, in both graduation and transfer exams, as well as recognition of those results. This is a big step forward in Open Education in Vietnam, when the concept of open university and distance learning has become inseparable in the world. Currently, on that basis, a number of universities in Vietnam have started enrolling 100% online learning programs and are aiming to build large-scale online courses (massive open online course MOOC) and catch up with the world.

In terms of facilities, MOET has actively invested in the development of technology infrastructure, especially in educational institutions in remote and isolated areas. Accompanying that is the strengthening of training of staff and lecturers with science and technology qualifications to be ready to adapt to modern teaching tools. At the same time, the development of e-libraries with rich content of learning materials also creates better conditions for ODL more equally for all in all different geographical regions of Vietnam.

Another point worth noting is the attention to the mental health of pupils and students. Teachers are also strengthened, fostered and professionally trained in school psychology. Counseling and psychological support activities in the school are focused through cooperation activities with experienced experts.

2.2. Some Other Difficulties

Although the MOET has issued guidance documents since 2016 (Circular No. 12/2016/TT-BGDĐT), and 2017 (Circular No. 10/2017/TT-BGDĐT) on ODL, but the real transformation of teaching and learning from face-to-face to online still exists many difficulties as follows:

Information infrastructure and facilities for ODL are still limited, making this type of training not developed as set out goals. In some places, students have to study in training institutions with cramped classrooms and the too-large number of students in a class, so the quality of training cannot be guaranteed. The use of audio-visual equipment and modern information technology in the implementation of ODL here has not been focused on. The conditions of infrastructure, information technology and specialized software in these facilities are still poor, outdated and inconsistent.

About documents and training courses

In some training institutions, the curriculum specifically for distance training has not been compiled in time, so the curriculum for formal training is temporarily applied for distance training. This makes students difficult in learning and somewhat passive in accessing knowledge. There are still no clear and uniform regulations on the standards of learning materials used for ODL, and there is a lack of appropriate regulations on testing and quality assurance for ODL in Vietnam, so it is difficult to control the quality of teaching and learning of this training method.

ODL is a training form in which the teacher and the learner are in indirect contact in space and time during most of the training process. Therefore, the transmission of information between teachers and learners is mainly done through a system of learning materials that are updated, compiled and standardized periodically.

Enrollment work has not been really focused scientifically and has not been strictly controlled. Enrollment in many places is still mainly based on quantity to increase income for schools but forget about its mission. In addition, the testing and evaluating management of ODL quality has not been paid due attention. The organization of exams, tests and assessment of learners' learning outcomes is mainly held at local training institutions by the method of self-study, so the quality and objectivity are not guaranteed here and there.

3. Method

In order to collect information for the article, the research team carried out the research using the qualitative method and the document analysis method from the articles, research works and guidelines of the State to assess the impact of the Covid-19 pandemic on ODL and online learning in Vietnam.

4. Findings

4.1. The Influence on Teachers

Two very important and indispensable components in the teaching-learning process are the teachers and the learners. However, the role of teachers and learners in this process under ODL form has changed quite a lot compared to the traditional form of teaching.

For teachers, their role has changed from lecturer to commentator (or in other words, from lecturer, presenter to commentator, debater).

Indeed, in traditional teaching, the teacher mainly transmits and provides knowledge, while in online teaching, the lecturer is now responsible for imparting the knowledge content according to the program and the plan to the students, to ensure the goal of forming their knowledge and capacity. Therefore, their teaching workload is huge, even though they have to try their best to accumulate knowledge and then pass it on to students.

In online teaching, the lecturer now plays the role of commentator, on the one hand they are both lecturers, but they also play the role of commentator. In which, the proportion of the commentator section is much higher than that of the lecturer section. This is completely true according to the nature of online training that developed countries around the world are applying as well as currently being applied by universities in Vietnam in the fight against the Covid-19 pandemic.

Practice shows that there are many issues that need to be accepted by learners besides the official content provided by the textbook. Lecturers are responsible for expanding the issues related to the lesson content from near to far (even life's issues) that students need to be consulted.

At this point, the teacher's role is no longer just imparting. Students are also not only receivers anymore, but actually both have turned into commentators to transfer ideas and thoughts to each other. In the discussions on that forum, many comments of lecturers were recorded by students and turned into their knowledge and experiences.

The teacher has also "grown up" a lot from the "comments" of the learners. There are many ideas that come from students' comments, which the teachers did not have or have never been thinking of before. At this point, the lecturer has turned into a real commentator.

In addition, with the advantage of online learning, the teacher-student communication relationship is not so principled and rigid as in traditional teaching and learning.

The interaction here is mainly based on forums and "keyboards", so students' guilt, timidity and apprehension are greatly reduced. The students were more open in commenting on cases (situations), the distance between teachers and students was shortened, but not because of that, the respect for teachers and students was reduced. Students confidently become commentators and so do the lecturers.

The process of "backward interaction" in a timely manner with the lecturer about the content of the exercise and practice makes the lecturer's commentator role more confirmed. This is also a feature of higher education. Academic freedom and freedom are formed and developed in both teachers and students, promoting the creative ideas of both learners and teachers.

To achieve high efficiency in online teaching, teachers need to be able to share and empathize. Because the communication interaction here is indirect, mainly through the "keyboard", it is difficult for students to understand the ideas and feelings of the lecturer when communicating with them. Persistence and the ability to read other people's thoughts and feelings are highly valued in online instructors.

The rich and abundant knowledge and practical experience transmitted to students will help them find answers to the questions posed by the lecturer (including questions outside the curriculum content). This requires the lecturer, besides the specialized knowledge of the subject in charge, must have a broad, deep and erudite knowledge. Thus, they can direct, guide and free students' thoughts and ways of thinking.

To do this, the lecturers need to understand the format of online training, design lessons and course materials. In particular, they need to adhere to a number of principles in online teaching such as: Create an environment that encourages interaction between lecturers and students; Diversify classroom activities; Provide positive and timely feedback to each student; Regularly notify the deadline of activities to students, help students actively complete assignments....

4.2. Impact on Students

In the context of the epidemic and the general situation of the country, students have almost no initial preparation for online learning. The synchronous implementation of online teaching and learning in the context of the epidemic has made teachers tend to create many exercises to strengthen students' learning. However, this has also led to pressure on learners due to having to spend a lot of time completing assigned exercises. Besides, the acquisition of knowledge through online teaching is also a difficult task for most students because interacting with teachers through online teaching faces many limitations compared to the traditional face-to-face teaching and learning.

In the process of online learning, difficulties related to technology and technology can also lead to tension between teachers and learners. Encountering technical problems also greatly affects online learning. In particular, if students only use one learning tool, the phone, it will be very difficult to use other simultaneous features to participate in the discussion in online learning. Meanwhile, computers are a valuable asset that not all learners can afford.

Besides, students may face some other difficulties such as power outage, internet connection and technical problems in logging in to online learning content on moodle, Zoom meeting, Google classroom, Microsoft Teams...

The Internet is increasingly showing its importance in the fields of society in general and education in particular. More specifically, the research here shows that, in addition to equipment directly used by students for online learning such as fixed computers, laptops, wireless electronic devices such as smartphones, Internet facilities also play a very important role in determining the success of students' online learning.

Difficulties in the process of online learning not only affect the psychology of learners but also determine the learning outcomes of students. Learners often feel tired, stressed and distracted when they have to spend a lot of time on the computer and have limited face-to-face interaction. In addition, some families have difficult conditions resulting in students not having a quiet study space that is often disturbed by background noise.

5. Discussion

After the impact of the Covid-19 epidemic, currently, all students and students across the country have returned to teaching and learning directly at schools. However, after a long time of online learning in difficult conditions, the issue of education quality assurance is the top concern of the education industry.

To draw lessons and experiences in distance teaching, online teaching, towards improving the quality of university distance learning, meeting the demand for training and providing high quality human resources for society, step by step integrating with the region and the world on ODL, Vietnam's ODL needs a vision and a right direction.

Firstly, it is necessary to seriously organize a review of ODL work, to synthesize the opinions of experts, researchers and especially the opinions of higher education institutions with ODL to clearly see the current state of this work in the past, thereby, drawing lessons for the implementation of ODL in the next time.

Secondly, it is necessary to attach importance to the issue of learning and selectively absorbing ODL experiences from countries that have made many achievements in this work. It is necessary to take as a starting point the culture, economy, politics, and educational context of the home country as the basis for the acquisition and application of the educational model. It is necessary to correctly and fully calculate the factors that make up success in the cause of educational innovation, then we can have a successful and valuable model application that promotes the development of education in the country.

Thirdly, the widespread propaganda should be strengthened to raise awareness of the whole society about superiority as well as the great values that ODL brings to society, contributing to creating an important basis for the implementation of this type of training effectively.

Last but not least, stemming from the fact that there are still many shortcomings in distance training, it is necessary to have good preparation in terms of infrastructure, learning materials, teachers and administrators... before expanding this type of training. It is necessary to make the most of and promote the positive aspects of modern technology (information technology, computers, Internet...) in ODL.

Finally, there must be an appropriate regulation for ODL. The objective and serious inspection, supervision and evaluation of the quality of the training program should be enhanced so that the learning quality of the learners, the teaching quality of the teachers and the management quality of the teaching staff and education administrators are improved and adjusted in a timely manner.

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196-Modeling Motivation and Perceived Learning as Predictors For Academic Performance: An Empirical Study In An Open And Distance Learning Institution

Yosi Mardoni¹, Rahmat Purnama², Meirani Harsasi³

Abstract

In distance education, student motivation is a major factor in student success considering that students are required to be able to learn independently. The online learning environment often creates a sense of alienation for students because it is difficult to interact with other participants and with the teacher. Therefore, it is important to understand students' motivation in studying online to achieve success in learning. The achievement of student success is always associated with academic performance, which at the same time shows the implementation of quality education. This study seeks to explore the effect of motivation on academic performance by developing a research model that uses perceived learning as a mediating variable. Accumulated good learning experience is the main support for student success through achieving good academic performance. Therefore, we developed a research model by putting in mediating variables, to have a better insight of this matter. This research was designed as a quantitative study that aims to examine the effect of three variables: motivation, perceived learning, and academic performance based on the research model developed by considering previous studies and theories. The data was collected from respondents by employing a survey to find out students' perceptions of these variables. The questionnaire was developed as closed questions using a Likert Scale ranging from 1–5. By using a simple random sampling method, 153 valid data were collected and could be analyzed further. To prove the research hypothesis, the Structural Equation Modeling (SEM) is used to be able to analyze the effect between variables simultaneously, including testing the function of the mediating variable. The results of the analysis show that all research hypotheses are supported and show a positive influence between variables. High motivation will form positive perceived learning which further triggers student learning efforts so that it is shown by good academic performance. In this case, institutional intervention is needed to support good experiences that will accumulate as perceived learning so that student success in learning can be achieved. In the discussion section, various managerial implications are discussed that will be useful for the development of best practices in distance education.

Keywords: *Motivation, perceived learning, academic performance, distance learning, online learning.*

1. Introduction

Distance learning is a popular learning pattern that has been applied globally. This is inseparable from the advantages of distance learning compared to face-to-face learning, such as opening access to wider learning opportunities (Campbell & Sarac, 2018), utilization of learning technology (Sedeghi, 2019), as well as ease of use of interactive media (Velasenko & Bozhok, 2014). However, distance learning also has challenges such as questions about the effectiveness of distance learning that impact teachers and students in an online environment (Esra & Sevilen, 2021). In this case, student motivation is the main focus of some scholars when students have to be exposed to online platforms, not meeting teachers and other students physically. Hartnett et al. (2011) describe motivation in the online environment as a complex phenomenon that is strongly influenced by individual character. Motivation becomes important to study when many cases show a decrease in student participation to a high drop-out rate associated with many problems with motivation (Kyewski & Krämer, 2018).

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Online learning requires students to have the motivation to achieve student satisfaction in online learning, one of which is shown by academic performance. The research results by Adams, Randall, and Traustadóttir (2015) show that online learners have a lower success rate than face-to-face learners determined by student motivation, satisfaction, and presence. Behind all the advantages and disadvantages of online learning, one main goal of learning is student success. Several researchers have investigated how online learning can provide as good results as face-to-face learning regarding academic achievement. The results show that the dominant factors are student satisfaction and motivation (Baber, 2020). Student satisfaction shows how positive students' perceptions of their learning experiences can support academic success (Lo, 2010). Academic performance is the main measure of success in the learning process that can be attributed to perceived learning and motivation. Given the importance of academic performance in relation to perceived learning and motivation, it is reasonable to explore how to strengthen academic performance associated with perceived learning and motivation. Therefore, this study analyzes the influence between motivational variables, perceived learning, and academic performance.

Academic performance is a measure widely used to assess the success of the learning process in face-to-face and online learning. Students' positive experience in learning (perceived learning) shows the quality of the learning process and the achievement of students' academic performance. Perceived learning is a unity of trust and confidence about the learning that has been experienced (Caspi and Blau, 2008). One measure of student satisfaction is academic performance, which shows learning success (Gray and DiLoreto, 2016). Baber (2020) emphasizes that the result of a successful learning experience is a satisfied student, and found that perceived learning is a good predictor of student satisfaction in online learning. Ikhsan, Saraswati, Muchardie, and Susilo (2019) found that perceived learning outcomes contributed to student satisfaction and positively influenced it in the online environment. Perceived learning has been verified as predictor of learning and is a core element for evaluation (Wright, et al., 2006). Perceived learning shows a student's assessment of how their knowledge and understanding are built during the learning process or students' opinions and views about the learning (Alqurashi, 2019). The positive assessment of students in their learning experience does not appear immediately. Still, it is a process formed due to the encouragement of other factors such as interaction (Kang and Im, 2013) and motivation (Baber, 2020). In some previous studies, motivation was an important factor for student success in learning. Research focuses on how motivation can improve academic performance to measure learning success. In an online learning environment, motivation is an important input that contributes positively during the learning process, which will accumulate to form perceived learning and produce output in the form of academic performance (Eom and Ashill, 2016). Corroborating this opinion, Hafizoglu and Yerdelen (2019) also found that motivation will encourage the formation of student's perceptions of their abilities so that students will focus on completing their studies. The learning environment in online learning becomes a challenge when students are faced with being unable to meet directly with other students or teachers but bridged by technology. So, in this case, a strong motivation will increase perceived learning, leading to academic performance achievement. Therefore, this study proposes two hypotheses, namely: H1: there is a positive influence of motivation on perceived learning H2: there is a positive influence of perceived learning on academic performance To test the hypothesis that has been compiled, this study was conducted based on the research framework as shown in Figure 1.

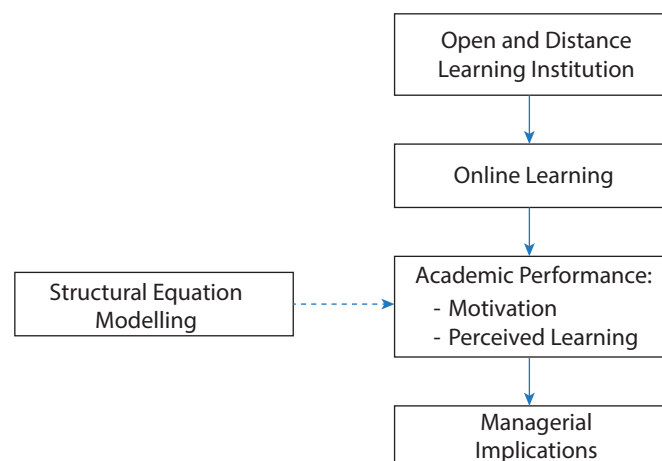


Figure 1. Research Framework

The research framework, as shown in Figure 1, is used as the basis for this study. The operationalization of variables as in Table 1.

Table 1. Capitalize First Letter of Words in the Table Caption

| Variable | Definition | References |
|----------------------|--|--------------------------|
| Motivation | process that describes intensity, direction, and persistence of an individual to achieve academic performance | Eom and Ashill (2016) |
| Perceived Learning | student assessment of how their knowledge and understanding are built during the learning process or students' opinions and views about the learning that has occurred | Gray and DiLoreto (2016) |
| Academic Performance | achievement of academic success perceived by students | Waheed, et al. (2016) |

A research model and hypothesis were developed by considering the theoretical basis and previous research to determine the correlations among variables as shown in Fig. 2.

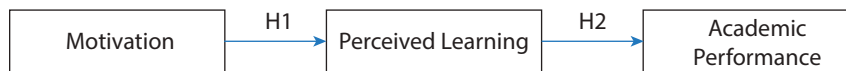


Figure 2. Research Model

2. Method

This study is designed as quantitative research to verify the influence between variables as compiled in the research hypothesis. The sample used was Indonesia Open University (UT) students who were selected using simple random sampling and they were willing to participate in the research. The data collected is primarily from students' perceptions of the variables studied. Research questions are arranged in questionnaires distributed online based on previous research with modifications needed to adjust to the research subjects. To answer the research hypothesis, questionnaires were developed research indicators using the Likert scale. The Likert scale generally uses values between 1 and 5, i.e., for attitudes consisting of strongly disagree, disagree, neutral, agree, and strongly agree. A scale of 1 to 5 (odd) is still carried out to give rights to respondents in opinion. The Likert scale criteria used are 1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree. Based on the incoming responses, data analysis was carried out using SEM LISREL 8.72 to verify the influence between variables as arranged in the research model.

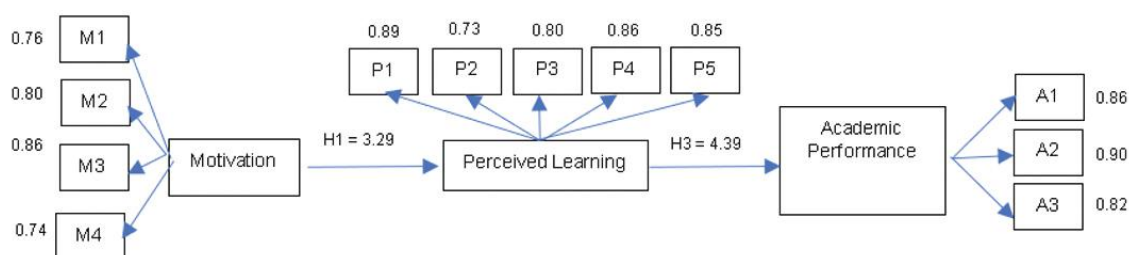
3. Findings

The distribution of online questionnaires resulted in as many as 153 valid data for further use and processing. The results of the SEM test showed that the goodness of fit of the research framework showed that in general, all the criteria could be categorized in the "acceptable" classification (Table 2).

Table 2. Goodness of Fit

| Goodness of Fit | Cut-off Value | Results | Notes |
|---|-----------------|---------|----------|
| RMR (Root Mean Square Residual) | < 0.05 or < 0.1 | 0.051 | Good fit |
| RMSEA (Root Mean Square Error of Approximation) | < 0.08 | 0.036 | Good fit |
| GFI (Goodness of Fit Index) | > 0.90 | 0.92 | Good fit |
| AGFI (Adjusted Goodness of Fit Index) | > 0.90 | 0.80 | Good fit |
| CFI (Comparative Fit Index) | > 0.90 | 0.95 | Good fit |
| NFI (Normed Fit Index) | > 0.90 | 0.91 | Good fit |
| IFI (Incremental Fit Index) | > 0.90 | 0.89 | Good fit |
| RFI (Relative Fit Index) | > 0.90 | 0.94 | Good fit |

Furthermore, to test the hypothesis, it was found that all the proven hypotheses were supported by the results as shown in Fig. 3.

**Figure 3.** Hypotheses and Loading Factor Results

The results of the SEM test show that all hypotheses are supported. Figure 3 shows that $H1=3.29$ (motivation to perceived learning) and $H2=4.39$ (perceived learning to academic performance) as the t -values > 1.96 (for $\alpha = 0.05$). In addition, the results of the indicator validity test showed that all research indicators proved valid with a loading factor value above 0.5. Motivation has four valid indicators, perceived learning has five valid indicators, and academic performance has three valid indicators.

4. Discussion and Conclusion

The results of this study show that motivation has a positive effect on perceived learning, as well as perceived learning has a positive effect on academic performance. Motivation is proven to be an important predictor for the formation of positive perceived learning that will result in good academic performance. Motivated students will always follow and complete online learning and are motivated to overcome all obstacles during the learning process. Motivated students will perform well academically due to effort during the learning process. Motivation describes how a person does something to achieve a certain result that is considered valuable. Other results show that perceived learning has a positive effect on academic performance. Student experience in learning will accumulate into positive experiences that form knowledge of a particular subject to deepen the understanding illustrated in academic performance. Academic performance is a measure of learning success, not only from the student but also from the manager/institution. Therefore, the results of this study contribute in practice to improve online learning management, which has many challenges compared to face-to-face learning. Therefore, strengthening student motivation needs always to be done by higher education institutions in the form of learning designs that encourage students to learn independently and not feel alienated in an online learning environment. Online learning design should be developed to create active communication with students and encourage the development of cognitive aspects of students such as collaborative projects, challenge-based learning, and game-based learning. Online learning design by utilizing various media can also reduce student communication gaps with other students or teachers by providing more interactive material.

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200-Measuring the success of ArcGIS StoryMaps in Delivering Online Education to Distance Learners: A Mixed Methods Study

Kamran Mir¹

Abstract

Since the demand for online education has grown in the post-Covid era, creative solutions are needed to improve the experience for distance learners. This study aims to develop interactive learning content based on story maps and measure the effectiveness of utilizing story maps, specifically ESRI StoryMaps. A mixed methods research design will be employed, integrating qualitative and quantitative data collection and analysis techniques. The study will involve the development of a Massive Open Online Course (MOOC) centered around a history-related subject of post graduate level. The course will incorporate ESRI ArcGIS StoryMaps, a digital tool that combines narrative storytelling with interactive maps, images, and multimedia. The ArcGIS StoryMaps will be designed to engage learners in an immersive and interactive learning experience, enabling them to explore historical events, locations, and related content in a visually compelling manner. Open and Distance learning (ODL) students and teachers will be invited to enroll in the MOOC course, and their participation will be voluntary. The research will collect both qualitative and quantitative data to evaluate the success of story maps in distance education using DeLone and McLean's Information System Success model. Qualitative data will be obtained through interviews, focus groups, and open-ended surveys to gain insights into learners' perceptions, experiences, and preferences regarding the use of story maps. Quantitative data will be gathered through structured questionnaires and assessments to measure learners' satisfaction, engagement, and knowledge acquisition based on the six interrelated dimensions of IS success: system quality, information quality, service quality, (intention to) use, user satisfaction, and net benefits. Findings of this study will provide valuable insights into the effectiveness of ArcGIS StoryMaps as an interactive tool for distance education. The qualitative data will shed light on the learners' experiences, highlighting the strengths and limitations of ArcGIS StoryMaps in facilitating meaningful engagement and knowledge retention. The quantitative data will provide statistical evidence regarding the impact of ArcGIS StoryMaps on learners' satisfaction, motivation, and learning outcomes. By examining novel ways, the findings of this study will advance the field of online and distance learning. The research findings will provide information to educators, students, and managers of distance learning institutions about the potential of story maps as a pedagogical tool for delivering interactive and interesting content in historical or pertinent themes that incorporate physical location.

Keywords: *Story Maps, Innovative learning content, visual engagement, GIS for Education*

1. Introduction

One of the sustainable development goals established by the United Nations is focused on Quality Education. This objective aims to guarantee inclusive and equal access to high-quality education, while also fostering opportunities for lifelong learning for all individuals (UN, 2015). To attain the objective of providing high-quality education, formal educational institutions are encountering difficulties. However, it is important to note that the formal education system alone is inadequate and lacks the capacity to effectively address the imperative of inclusivity and equity in education. Open and Distance Learning (ODL) universities play a crucial role in expanding educational opportunities and fostering lifelong learning to address this challenge. Open and Distance Learning (ODL) refers to an educational system wherein students are not required to physically attend regular classes at a university or institute. The learning process typically occurs in the absence of direct physical interaction between the learner and the teacher (Moore, Dickson-Deane, & Galyen, 2011). After the outbreak of the Covid-19 pandemic, the field of education has experienced a substantial

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shift, highlighted by the rise of online learning as a dominant medium for the transfer of knowledge. The increasing demand for remote education has prompted the exploration of creative methods to improve the online learning experience. This study aims to meet this demand by leading the way in developing interactive learning content specifically designed for the specific needs of distance learners. At the core of this research lies the examination of story maps as a powerful instructional instrument, particularly emphasizing ESRI ArcGIS StoryMaps. This dynamic platform effectively merges narrative storytelling with interactive maps, photographs, and multimedia components.

This study uses a mixed methods research design, which combines qualitative and quantitative methodologies, to enhance the effectiveness of online education. This study aims to assess the impact and effectiveness of story maps, specifically within the framework of ESRI StoryMaps, by employing rigorous data gathering and analytic methods. The primary objective of this research is to develop a highly interactive and engaging Massive Open Online Course (MOOC) that caters specifically to postgraduate-level learners, with a focus on historical topics. The course's innovative aspect is its incorporation of ESRI ArcGIS StoryMaps, which provides learners with a compelling opportunity to explore historical events, locations, and associated material through visually fascinating elements and interactive encounters.

The innovation of this research rests in its comprehensive methodology for comprehending the potential of narrative maps in the realm of distance education. The invitation to participate in this new MOOC will be extended to students and educators engaged in Open and Distance Learning (ODL), with voluntary participation being encouraged. The research seeks to assess the effectiveness of story maps in the field of online learning by utilizing a combination of qualitative insights and quantitative measures. This evaluation will be conducted using the well-known DeLone and McLean's Information System Success model. This study examines different aspects of information system success, such as system quality, information quality, service quality, user satisfaction, intention to use, and net benefits, using the framework provided by this model.

The outcomes of this study are poised to serve as a veritable treasure trove of knowledge, enriching the discourse surrounding online and distance learning. The qualitative arm of the investigation is poised to illuminate the intricate nuances of learners' experiences, accentuating the strengths and limitations of ArcGIS StoryMaps in fostering meaningful engagement and knowledge retention. On the quantitative front, the study aspires to offer statistical proof of the profound impact of ArcGIS StoryMaps on learners' satisfaction, motivation, and educational outcomes.

Through the exploration of uncharted territory within the domain of education, this study holds the potential to achieve significant advancements in the sphere of online and distance learning. The results have significant implications for educators, students, and administrators of distance learning institutions. They provide insights into the untapped potential of story maps as a powerful tool for delivering interactive and engaging content, especially in subjects that involve historical or relevant themes with geographical aspects.

Wu and Wang (2006) assert that DeLone and McLean's IS success model is widely employed as a multi-dimensional model across various disciplines. Nevertheless, the evaluation of information systems' success remains relatively underdeveloped in terms of conceptualization and measurement. The present model is founded upon six distinct dimensions. This study predominantly utilized the DeLone and Mclean Information Systems Success Model, which examines many factors such as system quality, information quality, service quality, user satisfaction, intention to use, and net benefits. The validity and reliability of the model have been previously established by Sirsat and Sirsat (2016). A concise overview of each dimension of this model has been provided below:

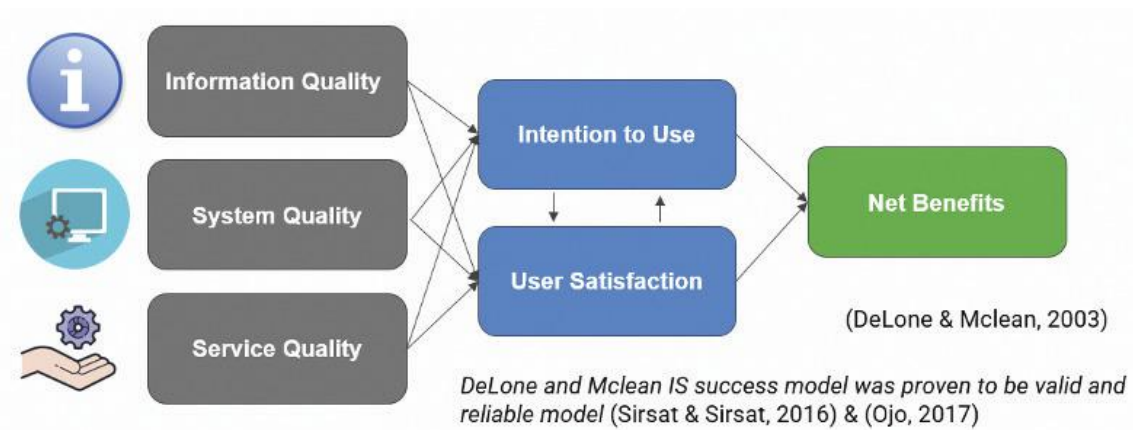


Figure 1. DeLone and McLean Information System Success Model

1.1. Information Quality

The measure of success in question is primarily associated with output. The desired output specified by the user and the output produced by StoryMaps. The closer the proximity between these two variables, the greater the likelihood of success and user happiness.

1.2. Service Quality

This measure of success factor encompasses the provision of technical support or assistance by the tutor in using StoryMaps. This may encompass factors such as assurance, empathy, flexibility, interpersonal skills, and responsiveness of the support team.

1.3. User Satisfaction

This pertains to the degree of contentment experienced throughout the utilization of StoryMaps. The measure of success holds significant importance. The measure of user happiness is not a standalone metric, but rather intricately connected to other metrics such as service quality.

1.5. Intention to Use

This metric denotes the frequency with which users employ or intend to employ StoryMaps. This encompasses factors such as practical application, regular utilization, manner of implementation, frequency of transactions, and other related aspects.

1.6. Net Benefits

This measure serves as a comprehensive synthesis of all the measures. This is strongly associated with the advantages of StoryMaps experienced by all parties engaged.

2. Related Work

Storytelling is a creative practice that engages individuals' emotions and stimulates their imagination via the act of narrating tales. The utilization of map-based storytelling has shown to be a valuable tool for knowledge dissemination across various subjects, with a particular emphasis on the geographical context in which the narratives unfold. The study investigates the potential educational benefits of utilizing storytelling in conjunction with maps as a didactic tool. Specifically, authors are referring to the assortment of diverse applications provided by ESRI for the purpose of constructing Story Maps using various methodologies and strategies. In addition, they present a project that was initiated by Esri Italia in partnership with the Italian Association of Geography Teachers, which engaged several schools in Italy. The objective of this initiative was to disseminate the notion of Story Maps and their significance in the pedagogical process of imparting knowledge across many subjects (Marta & Osso, 2015).

The study by Berendsen et. al. (2018) highlights the importance of utilizing story maps as a means of effectively conveying knowledge derived from extensive databases. This text explores the evolution of geo-visual tales,

also known as story maps, within the domains of journalism and geo-visual analytics. The methodologies have exerted a significant impact on the advancement of student-centered multi-thematic atlases and digital storytelling within the realm of education. The study additionally delineates the evolution of the Wyoming Student Atlas, transitioning from a traditional paper edition to a dynamic online iteration by narrative mapping technology. The assessment of the atlas narrative maps entailed students utilizing them during instructional sessions and offering their input via survey instruments. The survey findings indicated that participants expressed positive sentiments, specifically highlighting the simplicity of use and their preference for digital atlases over traditional paper-based ones. Nevertheless, certain engagements with the maps resulted in unfavorable or ambiguous student attitudes.

Another research project on the utilization of ESRI Story Maps for science education, which are web applications that incorporate multimedia elements and are primarily focused on maps, with the aim of increasing soil science teaching. The aim of the study was to develop an educational tool known as a “Story Map” titled “Soil Forming Factors: Topography” for the purpose of instructing students in beginning soil science courses. Additionally, the usefulness of this tool was assessed by applying ESRI’s five principles of effective storytelling and analyzing user feedback obtained from a knowledge quiz. The Story Map pages were designed with distinct learning objectives, allowing participants to effectively manage their learning experience by use the navigation tabs. The participants achieved an average score of 8.2 out of 9 points on the quiz, suggesting a high level of understanding of the subject matter. The ESRI Story Map demonstrated strong performance in accordance with ESRI’s storytelling standards, as indicated by more than 70% of respondents ranking it as outstanding. The participants conveyed favorable perspectives regarding the efficacy of the Story Map as an independent instructional instrument or when utilized in conjunction with PowerPoint slides. The study posits that ESRI Story Maps exhibit promise as efficacious pedagogical instruments in the realm of science education. This study further advocates for the integration of interactive activities to augment their educational influence (Cope et. al., 2018).

3. Methods

3.1. Development of MOOC and StoryMaps

A Massive Open Online Course (MOOC) is an online educational program specifically designed to facilitate the participation of a substantial number of individuals from diverse geographical regions worldwide. Massive Open Online Courses (MOOCs) provide a diverse array of educational offerings across several disciplines, typically delivered by universities, institutes, or organizations. These courses are readily available to those who possess an internet connection. Massive Open Online Courses (MOOCs) commonly include a range of educational tools such as video lectures, interactive quizzes, discussion forums, and various multimedia materials to enhance the learning experience. As a first objective of this study was to develop a MOOC course in which we can use ESRI ArcGIS StoryMaps as learning content. Moodle cloud was used as a base platform to develop a MOOC course. A course named “Visual or Spatial Learning Analytics” was developed. This introductory MOOC course on Geographical Information System (GIS) included the basic introduction to GIS from distance education context.

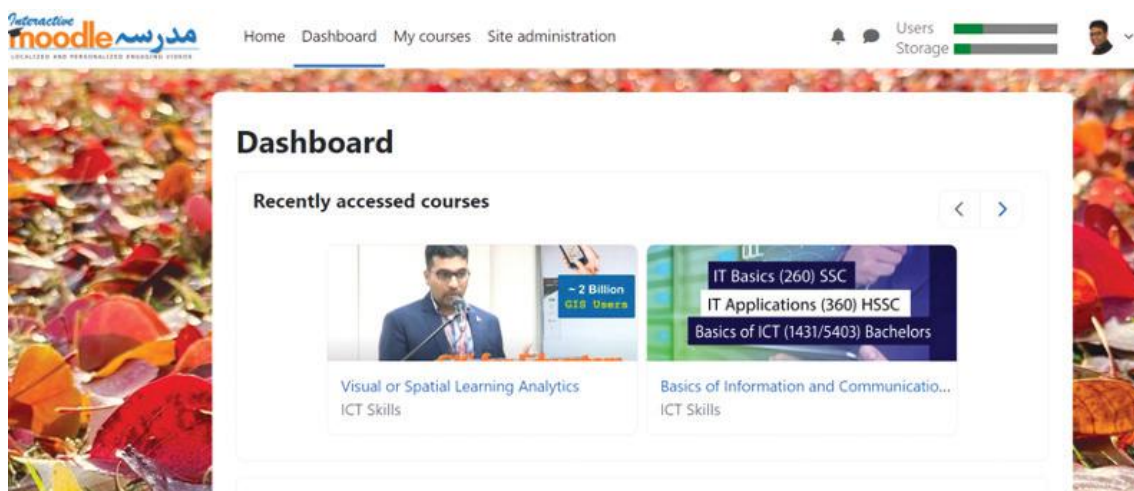


Figure 2. Screenshot of Moodle Cloud based MOOC course on Visual or Spatial Learning Analytics

Prezi[®] presentation tool was used to develop an interactive presentation which can be embedded within the MOOC course as shown below in figure 3. The presentation included some basic introduction to GIS, its application in distance education administration and content development using story maps.

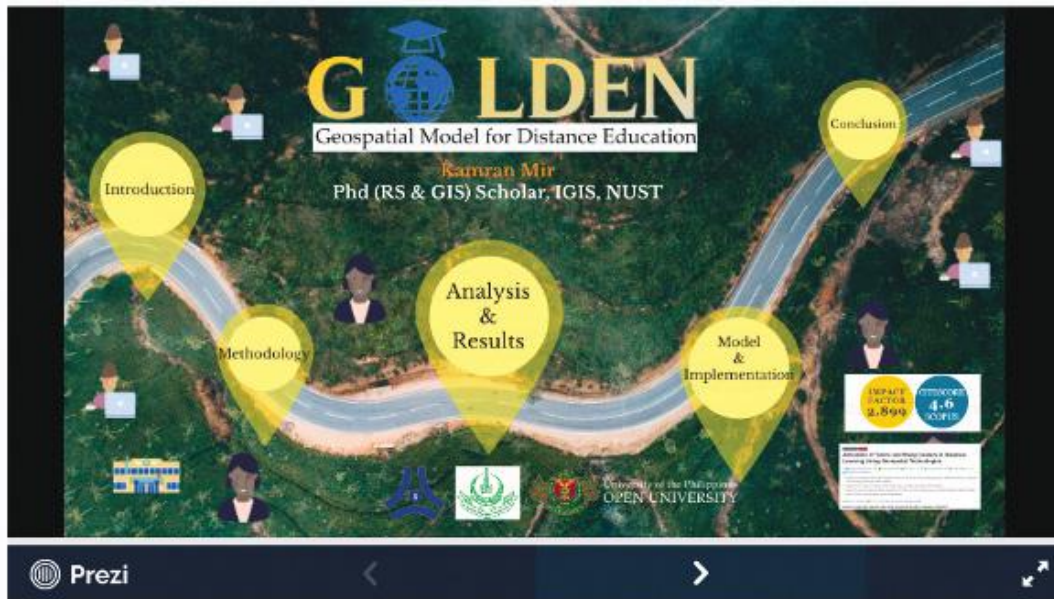


Figure 3. Screenshot of Prezi presentation embedded in MOOC course

Different pre-developed StoryMaps based videos were embedded in the presentation including video developed by Khan Academy on “Mughal rule in India” and “World Religions” developed by Business Insider. A custom developed ArcGIS StoryMaps based on the research travelling to different countries was included to give basic understanding about how to develop a custom story map using ArcGIS tool.

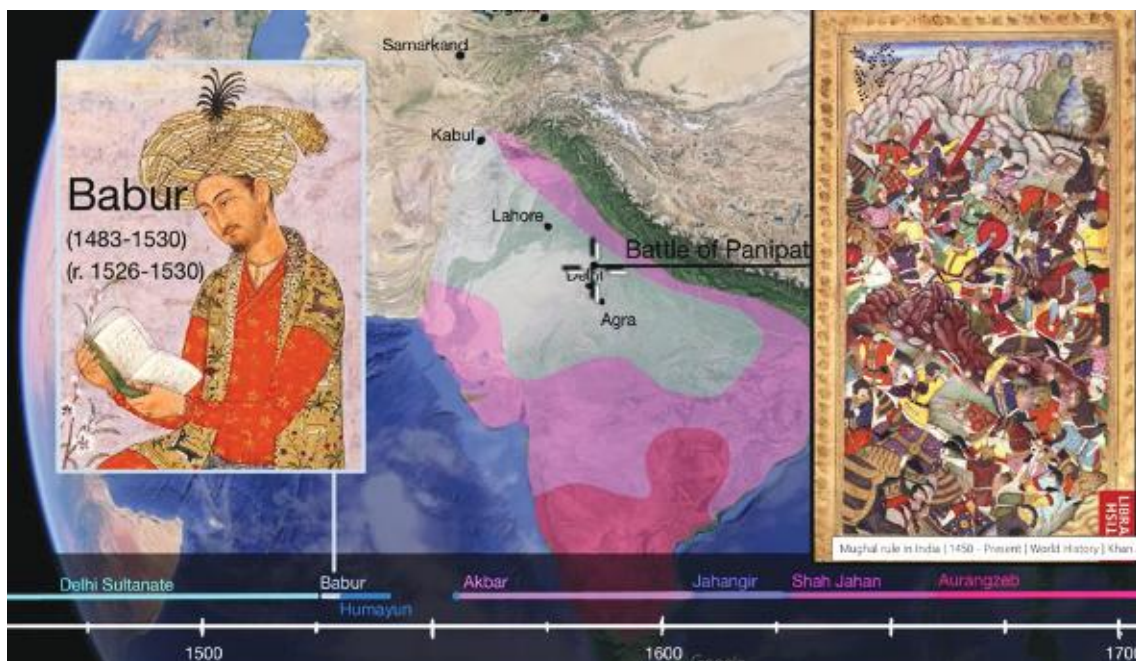


Figure 4. Application of Story Maps in Teaching History about “Mughal rule in India” developed by Khan Academy

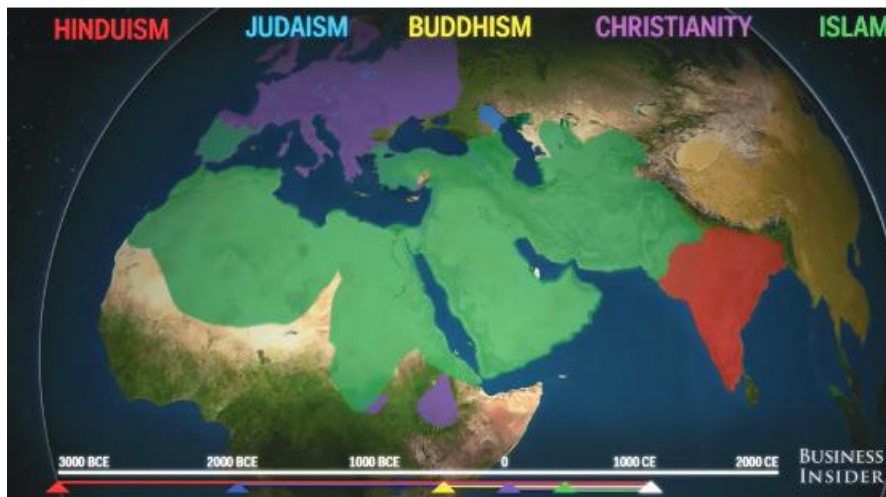


Figure 5. Application of Story Maps in Teaching History about spread of different religions developed by Business Insider

3.2. Research Design

The chosen design for this study was a mixed-method exploratory sequential design, which involved conducting qualitative data collecting and analysis as the initial step, followed by quantitative data collection and analysis. Initially it investigates inquiries and creates hypotheses. Subsequently, the data can be utilized to assess the qualitative findings (Creswell, 2012).

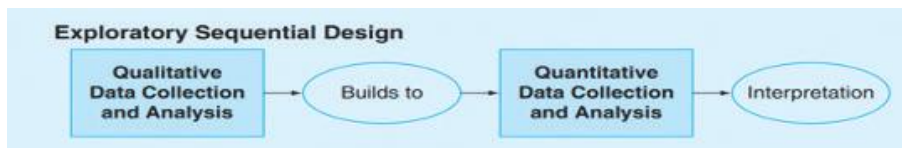


Figure 6. Exploratory sequential design, qualitative feedback by ODL/TEL experts followed by quantitative feedback

In the first phase of this study, the PhD summer school participants of EATEL (European Association of Technology Enhanced Learning) were enrolled in this MOOC course. The participants were PhD scholars from different European universities conducting research in the field of Technology Enhanced Learning (TEL). A group discussion was held after the presentation of this MOOC course wherein qualitative open-ended feedback was taken using HyperChalk collaborative activity.



Figure 7. Group Discussion with PhD Scholars of Technology Enhanced Learning

In the second phase of this study, the survey instrument to measure the success of ArcGIS StoryMaps was developed using the DeLone and McLean's information system success model. The tool had several questions

for each measure on likert scale. All these questions were multiple-type, closed-ended and five-point likert scale type questions except two open-ended questions for the general remarks. Likert scales (1-5) with anchors ranging from “Strongly Disagree” to “Strongly Agree” were used for all non-demographic based questions (Emerson, 2017).

| Measure | Question |
|---------------------|---|
| Information Quality | Q1: Story Maps or GIS provide very precise information that I need.
Q2: Story Maps or GIS provide very sufficient information.
Q3: Story Maps or GIS provide very up-to-date information. |
| System Quality | Q4: Story Maps or GIS interface is very user-friendly.
Q5: Story Maps or GIS is very easy to use. |
| Service Quality | Q6: Whenever I have a query Story Maps or GIS is very helpful in it.
Q7: I feel safe in using Story Maps or GIS.
Q8: Story Maps or GIS gives me individual/personalized attention. |
| Intention to Use | Q9: My learning OR teaching is dependent on my Story Maps or GIS.
Q10: My frequency of using Story Maps or GIS is very high. |
| User Satisfaction | Q11: I am satisfied with Story Maps of GIS.
Q12: Story Maps or GIS meets my expectations. |
| Net Benefits | Q13: Story Maps or GIS has made my learning or teaching easier.
Q14: Story Maps or GIS increases my speed of learning. |

4. Results and Discussions

The qualitative data provided by PhD scholars was summarized using ChatGPT Large Language Model (LLM) developed by OpenAI. The feedback was divided into following four themes.

A. Administration

The feedback provided highlights the versatile applications of Geographic Information Systems (GIS) in various educational contexts. In the first statement, GIS is noted for its utility in managing resource planning and allocation for distance and online learning. The second statement emphasizes GIS’s role in measuring student satisfaction regarding physical infrastructure in Higher Education Institutions (HEIs) and in tracking issues related to buildings and spaces. Both statements underscore GIS’s potential for enhancing administrative and infrastructure-related aspects of education.

B. Teaching

The feedback underscores the educational versatility of Geographic Information Systems (GIS). It can be applied to create engaging learning content using Map Stories, boost student motivation in Geography classes, and facilitate the teaching of global technological innovations in Engineering.

C. Learning

The feedback highlights multiple aspects of using Geographic Information Systems (GIS) in education e.g. Few scholars emphasized the use of virtual tours incorporating Augmented Reality (A/R) and Virtual Reality (VR) to enhance learning with location context. Others suggested the development of virtual representations of students for educational purposes. Few scholars underscore the potential for informal learning as users navigate various geo-platforms, such as street views, contributing to a comprehensive educational experience. Some scholars said that learning GIS concepts can inadvertently aid in grasping geometry and computer graphics fundamentals.

D. Research

The feedback underscores the multifaceted applications of Geographic Information Systems (GIS) in education and research. It highlights the potential of mapping research papers and topics to reveal trends, as well as examining diversity in research across countries and genders. Additionally, GIS is seen as a valuable tool in Geography classes for evaluating student motivation. The integration of location-based analytics into research projects is also noted. Overall, these insights collectively emphasize GIS’s capacity to enhance learning, promote inclusivity, and provide analytical depth in academic pursuits.

5. Conclusion and Future Work

In conclusion, the varied response regarding the implementation of ArcGIS StoryMaps in online and distance education highlights its significant capacity to transform educational experiences. The insights shed light on a range of potential applications, encompassing the development of captivating educational content via virtual tours and the analysis of research trends through mapping techniques. Additionally, these insights address the imperative of addressing diversity concerns within the realm of research, as well as the potential to enrich Geography lessons. Furthermore, they underscore the value of integrating location-based analytics into academic studies. Future research in this field should prioritise the enhancement of the incorporation of StoryMaps into educational curriculum, the development of full virtual learning experiences, and the utilisation of the platform's capabilities to facilitate interdisciplinary collaboration and novel pedagogical methods. Furthermore, it is imperative to allocate resources towards tackling issues related to accessibility and technological obstacles, to guarantee that the advantages offered by ArcGIS StoryMaps are accessible to a wide range of learners and researchers. The ongoing development of online and distance education has led to the emergence of ArcGIS StoryMaps as a powerful tool with the potential to significantly transform the educational sector and facilitate meaningful progress.

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214-Diversification of Education Services for Student Diversity in Open and Distance Learning

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Abstract

Universitas Terbuka (UT) implements open and distance learning (ODL). UT accommodates a multitude of students with different ages, geographical areas, and economic and educational backgrounds and strives to provide various modes of educational services, and other various supporting services by optimizing the use of the latest technology. After the Covid-19 pandemic, UT is even more focused on providing a variety of services. The research objective is to analyze the diversification of UT's educational services to facilitate student diversity. The study used quantitative methods and the study population was active UT students in the even semester of 2022. The student samples were taken from UT's Regional Office (UT's RO) in Banjarmasin, Jakarta, Medan, Sorong, Surabaya, Yogya, and Makassar. The total number of respondents was 486 students. The number of respondents who graduated from high school was 75.31%, while 10.91% had undergraduate degrees and 9.26% had vocational college degrees, master's degrees, and others. Data were analyzed using descriptive analysis. The results of the study showed that most of the students had internet access. Course registration was done online by 71.4% of respondents with payment services through BRI Bank, BTN Bank, Mandiri Bank, BNI Bank, Tokopedia, Indomaret, Alfagrup, and scholarships. The academic guidance service desired by students is online (68.72%), face-to-face (25.1%), and WhatsApp Group (6.17%). Online student guidance is considered more effective and flexible for students. 66.56% of the students preferred teaching materials in printed form and 61.32% of the students preferred online tutorials to face-to-face tutorials. During the Covid-19 pandemic, UT used the Take Home Exam (THE) test service. The implementation of THE was from the odd semester of 2020 period to the odd semester of 2022. The conclusion is that UT is preparing a diversification of educational services, and UT students are ready to choose online services.

Keywords: *diversification, educational services, student performance*

1. Background

The Open University (UT) implements an open and distance learning system (ODL). As learners, students are encouraged to study independently using the learning resources provided. The main learning resources for ODL students are digital teaching materials and those printed in hard copy. Other learning resources include multimedia teaching materials, libraries, journals in the UT Library, and other reading sources accessible to the students.

UT students come from various walks of life and have high diversity in terms of age, income, residence, ability to use information technology, and educational background. UT students live in rural and urban areas, from Sabang to Merauke.

This diversity is likely to affect students' ability to absorb learning materials. At present, UT provides several modes of learning services. In large groups, the service modes are classified into face-to-face, online, and hybrid (face-to-face and online). Students can participate in learning by choosing a mode that suits their conditions. Therefore, UT is constantly developing new programs to provide students with a selection of modes, so that UT has a wider reach.

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According to Marzuki (2012), there are six educational services.

1. Information Services.
Information services are provided in oral or written form. Oral information can be obtained through direct face-to-face contact, while written information can be provided through various manuals such as brochures, banners, pamphlets, bulletin boards, websites, *et cetera*.
2. Infrastructure services.
Infrastructure services are the provision of services in the form of providing infrastructure or physical facilities such as school buildings, libraries, laboratories, and others.
3. Administrative services.
Administrative services include tuition payments and document/certificate services, *et cetera*.
4. Guidance services.
Guidance services begin with a school orientation program, guidance in problem-solving, especially in overcoming learning difficulties and personal problems, educational and teaching guidance (teaching and learning activities), and academic practice guidance.
5. Talent, interests, and skills development services.
Talent, interests, and skills development services are provided through extracurricular activities for students.
6. Welfare services.
Among the forms of welfare services for students is the provision of scholarships for outstanding students, especially among the less fortunate, and the provision of tuition relief.

As an educational service, UT provides services to students consisting of the following.

1. Information services which include call centers, Hello UT, the UT website, and social media (Facebook, Twitter, Instagram, LinkedIn)
 2. Infrastructure services which include BAC (*bahan ajar cetak*/printed teaching materials), BAD (*bahan ajar digital*/digital teaching materials), RBV (*ruang baca virtual*/virtual reading room), SUAKA UT, UT Radio, UT-TV, TBO (*Toko Buku Online*/Online Bookstore), wifi ID, the digital library, GPO (*guru pintar online*/online smart teacher), and web supplements
 3. Administrative services which include credit transfer, online registration, www.aksi.ut.ac.id, online tuition fee payments
 4. Guidance services which include
Preparation: LPKBJJ (*layanan pendukung kesuksesan belajar jarak jauh*/distance learning success support service) which includes OSMB (*orientasi studi mahasiswa baru*/new student study orientation), PKBJJ (*pendidikan ketrampilan belajar jarak jauh*/distance learning skills education), WT (*workshop tugas*/assignment workshop) and KU (*klinik ujian*/examination clinic).
 5. Learning services include online tutorials (*tutorial online*/Tuton), TTM (*tutorial tatap muka*/face-to-face tutorials), TMK (*tugas mata kuliah*/course assignments), MOOCS, and practice/practicum.
 6. Assessment of learning outcomes includes THE (take-home exam), UAS (*ujian akhir semester*/end of semester exam), UO (*ujian online*/online exam), semi-online proctoring exam (*ujian semi-online proctoring*/USOP)
 5. Talent, interests, and skills development services include UT dispor seni (*diskusi ilmiah, pekan olahraga dan seni*/scientific discussions, sports and arts week) activities
 6. Welfare services include bidikmisi (*Bantuan Biaya Pendidikan bagi Mahasiswa Miskin Berprestasi*/Tuition Fee assistance for Underprivileged, High-Achievement Students) and corporate social responsibility scholarships, academic achievement improvement scholarships, Indonesian smart card college scholarships (KIP-K/Kartu Indonesia Pintar-Kuliah), tuition fee assistance
- This study aimed to analyze the diversification of educational services for UT students based on the various conditions of UT students, from registration, learning, and assessment of learning outcome services.

2. Research Method

The research uses a quantitative approach with the ultimate goal of analyzing the effect of learning service diversification on the performance of UT students. The research population was active UT students in the 2021/2022 even semester. The UT Regional Office (UT RO) locations selected for data collection were Banjarmasin, Jakarta, Medan, Sorong, Surabaya, Yogyakarta, and Makassar. The total number of respondents was 486 students.

Data were collected using a survey method by distributing online questionnaires to research respondents. Descriptive analysis was used to analyze the data and a geographic information system (GIS) was used for the mapping.

3. Results and Discussion

3.1. Respondent Profile

Respondent profiles (Table 1) were identified and analyzed to discover the diversity level of UT students. The diversity of these profiles included age, gender, credit transfer status, marital status, educational background, occupation, income level, and internet access.

Table 1. Respondent Profile

| Respondent Characteristics | Frequency | Percentage |
|-----------------------------------|-----------|------------|
| Age | | |
| < 30 years | 349 | 71.81 |
| 31 - 50 years | 132 | 27.16 |
| 51 - 70 years | 5 | 1.03 |
| > 70 years | 0 | 0 |
| Total | 486 | 100 |
| Gender | | |
| Male | 201 | 41.36 |
| Female | 285 | 58.64 |
| Total | 486 | 100 |
| Credit Transfer Status | | |
| Did not apply for credit transfer | 411 | 84.57 |
| Applied for credit transfer | 75 | 15.43 |
| Total | 486 | 100 |
| Marital Status | | |
| Unmarried | 317 | 65.23 |
| Married | 169 | 34.77 |
| Total | 486 | 100 |
| Education | | |
| Senior/Vocational High School | 366 | 75.31 |
| 1 to 2-year vocational diploma | 17 | 3.5 |
| 3-year vocational diploma | 45 | 9.26 |
| Bachelor's degree | 53 | 10.91 |
| Master's degree | 3 | 0.62 |
| Others | 2 | 0.41 |
| Total | 486 | 100 |
| Employment | | |
| Unemployed | 102 | 20.99 |
| Employed part-time | 121 | 24.9 |
| Employed full-time | 263 | 54.12 |
| Total | 486 | 100 |

| Income Level | | |
|------------------------|-----|-------|
| Have no income | 102 | 20.99 |
| Below 2 million rupiah | 157 | 32.3 |
| 2 – <3 million rupiah | 63 | 12.96 |
| 3 – 5 million rupiah | 82 | 16.87 |
| Above 5 million rupiah | 82 | 16.87 |
| Total | 486 | 100 |
| Internet Access | | |
| None | 27 | 5.56 |
| Available | 459 | 94.44 |
| Total | 486 | 100 |

The classification of the respondents' age can be seen in Table 1 which shows that most of the respondents (71.81%) were less than 30 years old while 27.16% were aged 31-50 years. This shows that UT students are currently dominated by young people. This is following Mazduki's statement (2017) that young people who have high mobility tend to be more interested in more flexible learning systems.

Table 1 also shows that the number of female respondents was higher (58.77%) than that of the males. This represents the proportion of UT students as a whole from the registration data for May 2022. Of the 246,582 registered students, 64.25% were female (<https://www.ut.ac.id/ut-dalam-angka>).

Data in the respondent characteristics table shows that 84.57% of respondents did not apply for credit transfer, meaning that the students were high school graduates. This is in accordance with the educational background of most of the respondents before entering UT which was senior/vocational high school. Credit transfer is the equalization of courses from the university or study program of origin with the courses of the destination study program. At UT, credit transfer is one of the RPL (recognition of past learning) programs, recognition of learning outcomes obtained from formal, non-formal, informal education, and/or work experience as a basis for equalization with certain qualifications according to the Regulation of the Minister of Education, Culture, Research, and Technology number 41 of 2021 (UT Catalog).

The percentage of respondents who graduated from senior/vocational high schools was 75.31%. This data is consistent across all UT RO. A minority of 10.91% held Bachelor's Degrees and 9.26% were from 3-year vocational colleges while the rest were graduates of 1 and 2-year vocational colleges, master's degrees, and others. The characteristics of respondents based on work show that most respondents (56.04%) worked full-time, 25.06% worked part-time, and 18% were unemployed. This was in accordance with May 2022 data that 12.67% of UT students were unemployed and 18.77% were employed without information, while the rest worked full time as teachers, civil servants, police officers/military, working in the private sector, or are self-employed (<https://www.ut.ac.id/ut-dalam-angka>).

The percentage of unmarried respondents was 65.23% and was the majority in UT RO Banjarmasin, Jakarta, Medan, Surabaya, Yogyakarta, and Makassar except in UT RO Sorong. Married students play multiple roles as parents, spouses, employees, and students. Married college students have greater responsibilities than unmarried students. If these roles are unfulfilled, work-family conflict will occur, which could lead to stress and dissatisfaction (Asri, 2011 & Triaryati, 2003).

The income of the respondents in this study varied, 32.3% of the respondents had an income of below 2 million rupiah, 20.99% of the respondents had no income, and 16.87% of the respondents had an income of 3-5 million rupiah and above 5 million rupiah. The remaining 12.96% of the respondents had an income of 2-3 million rupiah. This shows the diversity of students at UT, ranging from those who have no income, have an income below the regional minimum wage (*upah minimum regional/UMR*), the average UMR, and above the UMR.

Also in Table 1, 94.44% of the respondents in 7 UT RO had internet access in the area where they live. However, 5% of the respondents had difficulty accessing the internet at their location. Since the Covid pandemic hit the world, internet access has become a primary need. The Indonesian government issued a policy through

3.2.3. Distance Learning Success Support Services

Distance Learning Success Support Service (LPKBJJ) is a program to prepare students to have the ability, readiness, and capability to participate in all distance learning processes. LPKBJJ services include New Student Study Orientation (*Orientasi Studi Mahasiswa Baru/OSMB*), Distance Learning Skills Workshop (*Pelatihan Keterampilan Belajar Jarak Jauh/PKBJJ*), Assignment Workshop, and Examination Clinic. These services are mandatory services for all new students at all levels of education at UT and are organized by the local UPBJJ. This service is divided into two modes, online and face-to-face. The survey results show that more respondents chose face-to-face (54.1%) than online (45.9%) support services (Figure 3).

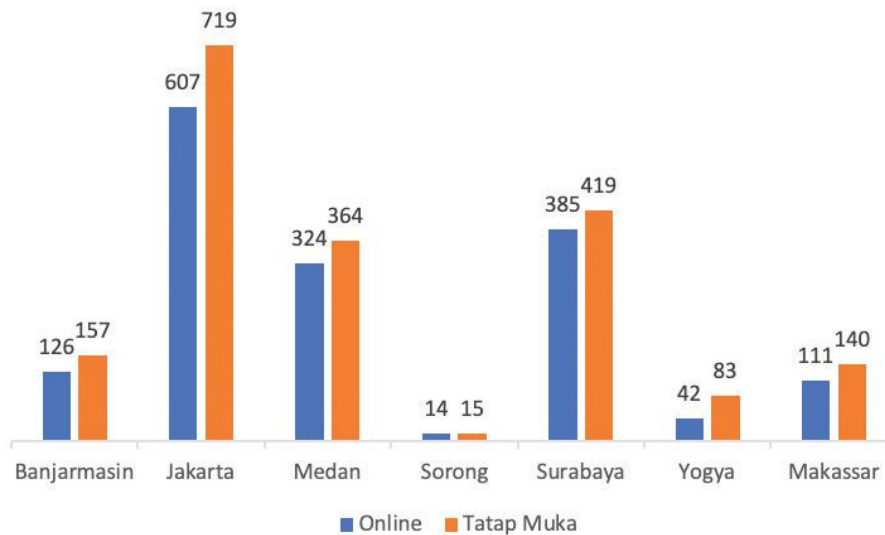


Figure 3. Supporting services

3.2.4. Academic Advisory Services

Academic mentoring services at UT are conducted in various modes including face-to-face, WhatsApp group, and online. Based on the survey results (Figure 4), 74.28% of the respondents said they received academic guidance services while 25.72% claimed they had never received academic guidance services. Of the students who answered that they had, 68.79% received online services; 18.09% face-to-face; and 13.12% through the WhatsApp group. The academic guidance service desired by students is online (68.72%), face-to-face (25.1%), and WhatsApp group (6.17%) (Figure 4). Online student guidance is considered more effective and flexible for students.

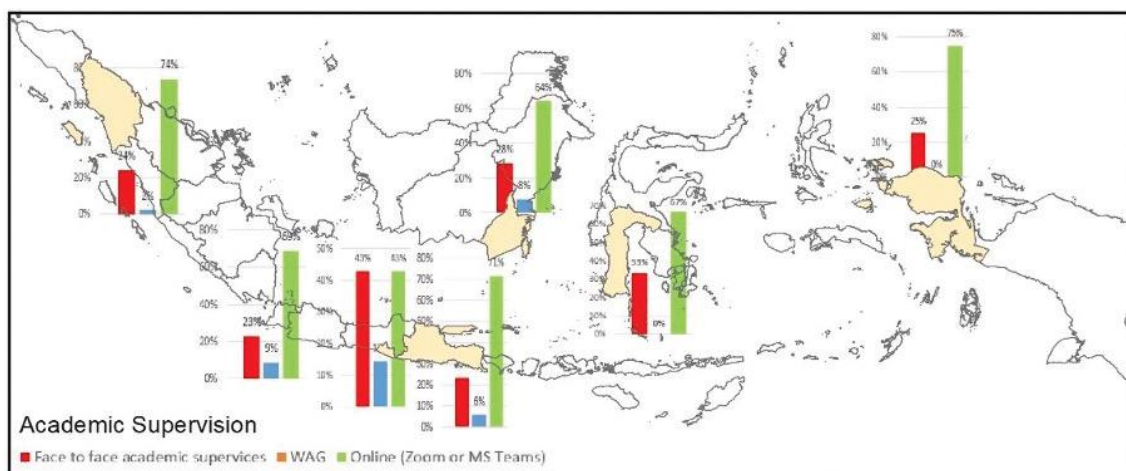


Figure 4. Academic mentoring services

3.2.5. Teaching Material Services

Teaching materials are the main learning resource for students in the distance learning system. Figure 5 shows that 66.56% of the students in all the UT RO preferred printed teaching materials. This is consistent with the students' choices regarding the teaching materials suitable for them at the moment which was printed teaching materials (65.02%) and the teaching materials most preferred was also printed teaching materials (68.11%).

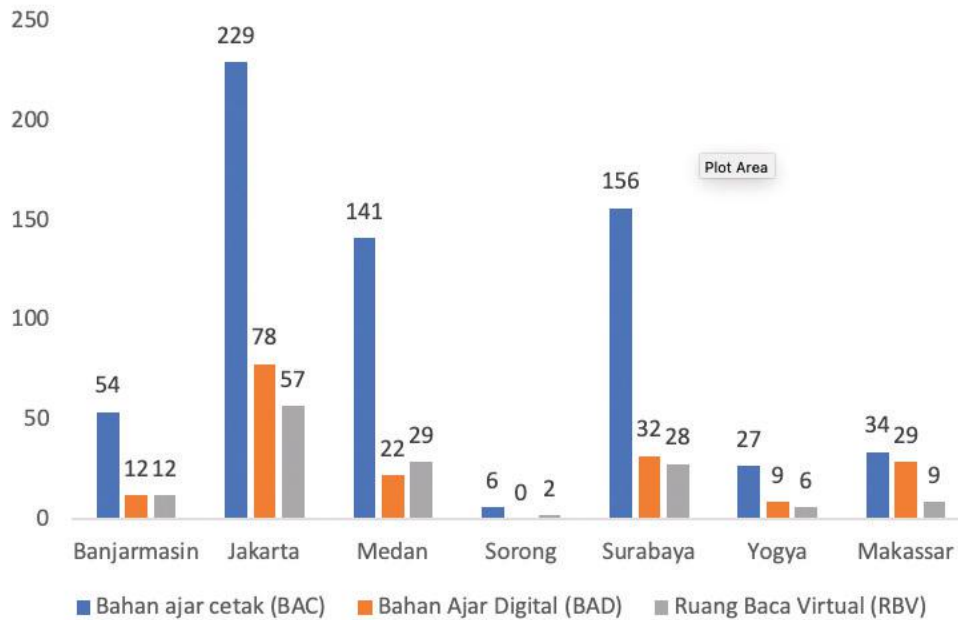


Figure 5. Teaching Material Services

3.2.6. Learning Support Services

In the learning process, UT provides Learning Support Services in the form of online tutorials (*tutorial online/ tuton*), face-to-face tutorials (*tutorial tatap muka/TTM*), webinar tutorials (*tutorial webinar/tuweb*), and course assignments (*tugas mata kuliah/TMK*). In the registration process, students have the right to choose the service they prefer. Nearly 90% of the students have received online tutorial services but only 61.32% liked the online tutorials (Figure 6). Although almost all the students have attended face-to-face tutorials, only 17% choose face-to-face tutorials as their preferred learning aid.

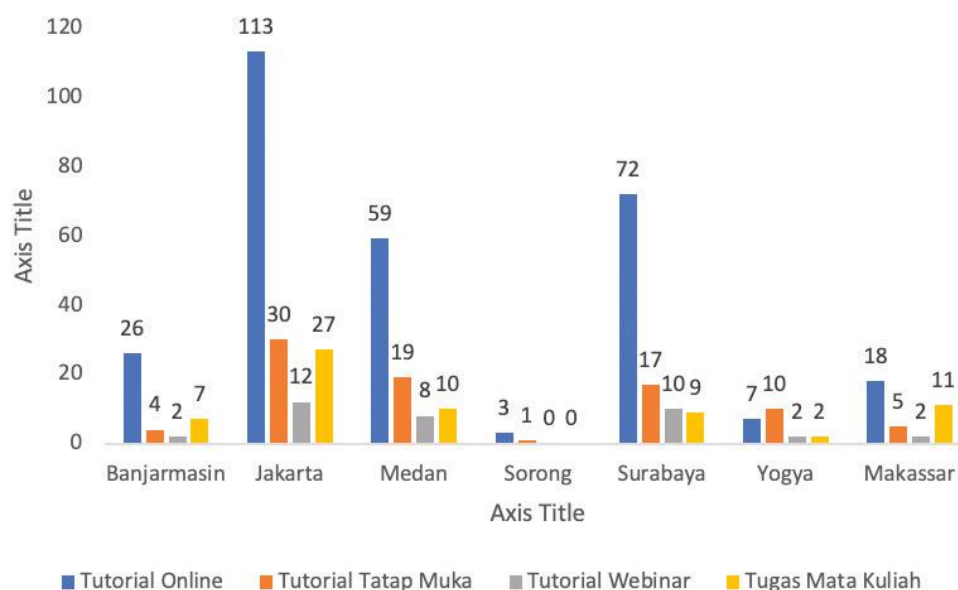


Figure 6. Learning Support Services

3.2.7. Practical/Practicum Guidance Services

Practical/practicum guidance services are conducted in three ways: face-to-face, online, and through webinars. Of the 486 respondents, 73.87% of the respondents said they had used online tutoring services but only 63.99% felt comfortable and 60.49 liked the service (Figure 7). UT RO representatives preferred the online service mode compared to tuweb and face-to-face. Tuweb services are rarely liked by students due to network constraints.

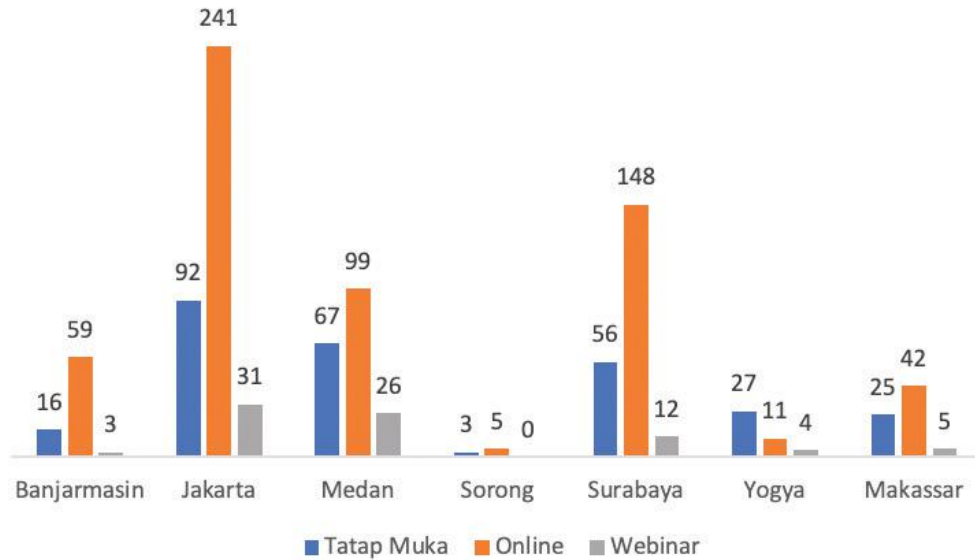
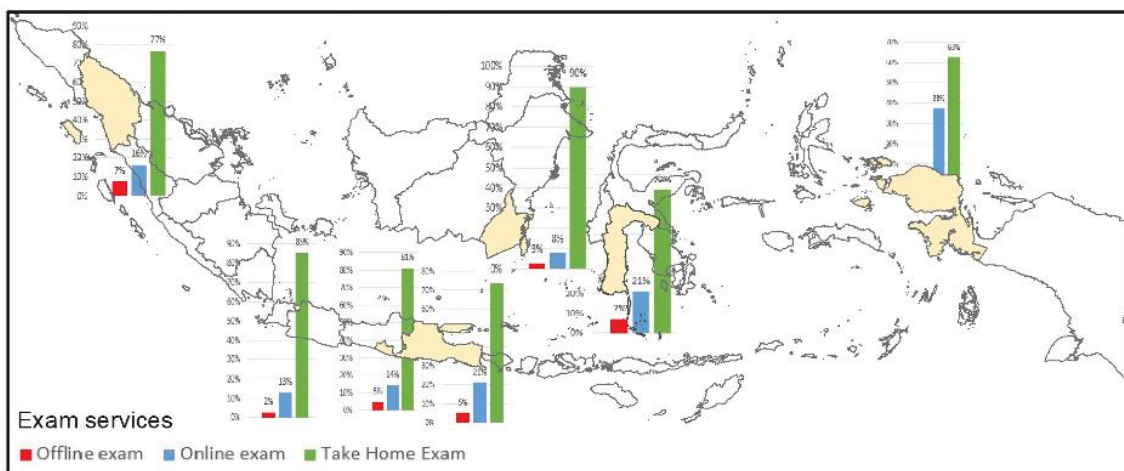


Figure 7. Practical/Practicum Guidance Services

3.2.8. Exam Services

The survey results (Figure 8) showed that most students (79.84%) chose the Take Home Exam (THE) because the THE was the mode of examination best suited to the students' conditions. The research survey was conducted during the Covid-19 pandemic in 2021. During the Covid-19 pandemic, UT offered tests using the THE mode to implement social distancing. Students worked on the THE problems from home, making the implementation more flexible, it can be done anywhere and at any time, as long as it is within the allotted time. Implementation of face-to-face exams every Saturday and Sunday for 2 weeks and online exams in certain locations determined by the UT RO is deemed unsuitable for the students' current conditions.



3.2.9. Information Services

The information service aspect is related to providing information about UT to the public, including students. The information is provided one through offline and online media. Information about UT can be accessed in various media such as the UT website, the UPBJJ website, social media (Facebook, Instagram, and Twitter), newsletters, the Hello UT contact center, bulletin boards in each UT Regional Office, student circulars, and leaflets or brochures about UT. The three most informative media according to the students were social media (34.28%), the UT Central website (21.22%), and the UT Regional Office website (21.11%) but the information service that students preferred the most was social media (58.85%) (Figure 9).

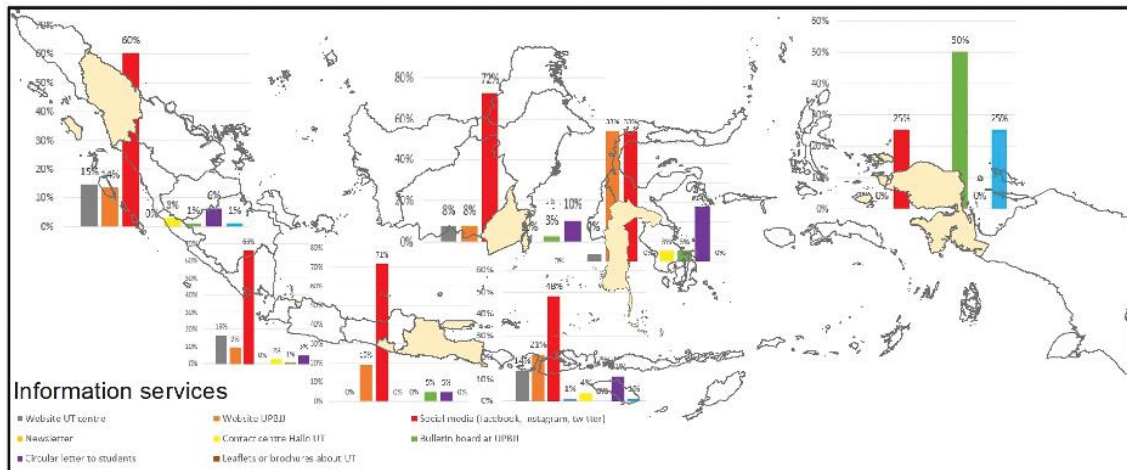


Figure 9. Information Services

3.2.10. Complaint Services

Complaint services in learning and academic administration at UT are provided through the local UPBJJ, the Hello UT contact center, chat box, SMS, and email. In general, students prefer to submit complaints to the local UPBJJ office (52.47%), while 29.22% chose the Hello UT contact center, 9.47% email, 6.38% chatbot, and 2.47% SMS. UT Jakarta students preferred complaint services through the contact center (42%) and the UT Regional Office (41%) (Figure 10).

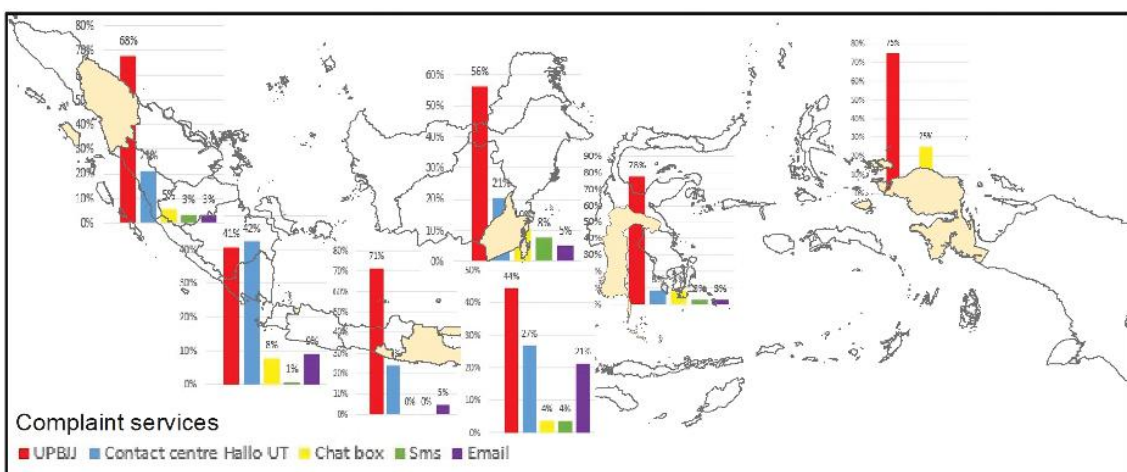


Figure 10. Complaint Services

UT also has additional services such as web supplements, UT TV, UT radio, an online bookstore, and an online library. The additional service that many respondents use is the online libraries, consisting of virtual reading rooms (RBV), open educational resources (SUAKA-UT), and e-resources. RBV is a service that provides digital subject matter books (*buku materi pokok/BMP*), usually used by students before they receive printed BMPs.

Open educational resources (SUAKA-UT), Online-Based Enrichment Materials, UT Television, UT Radio, Smart Teacher Online, UT Journal, MOOCS, ASEAN Studies Program, Digital Libraries and e-resources, e-journals, e-books, and reference works online.

4. Conclusion

The total number of respondents in this study was 486. From the respondents' characteristics based on age, most of the UT students were less than 30 years old (71.81%), the number of female respondents was higher than that of men (58.77%), and 84.57% of the respondents did not apply for a credit transfer. The number of respondents who graduated from senior/vocational high schools was 75.31%, 56.04% of the respondents worked full time, the number of unmarried respondents is 65.23%, and in 7 UPBJJs 94.44% of the respondents had internet access in the area where they live. Most respondents (83.13%) had an income of less than 2 million rupiah to more than 5 million rupiah.

The registration service chosen by students at the six UPBJJ representatives was mostly (73.25%) online registration services. The most popular payment service, in general, is Bank BRI (32.72%). Respondents prefer the use of face-to-face support services, namely 54.1%. The academic guidance service desired by students is online (68.72%). Printed teaching materials are preferred by students, namely 66.56% in all of the UPBJJs. Nearly 90% of students have received online tutorial services, but only 61.32% like tutorials. Of almost all students who have attended face-to-face tutorials, 17% choose face-to-face tutorials as their preferred learning aid. 73.87% of respondents said they had used online tutoring services but only 63.99% felt it was suitable and 60.49 liked the service. Students felt that the exam service most suitable for their current conditions is THE (79.84%). The three most informative media were social media (34.28%), the central UT website (21.22%), and the UPBJJ website (21.11%) but the information service that students liked the most was social media (58.85%). In general, students prefer to submit complaints at the local UPBJJ office 52.47%. additional services that many respondents utilized were online libraries. The online library consists of a virtual reading room (RBV), open educational resources (SUAKA-UT), and e-resources.

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225-Students' Perceptions on the Materials of the Distance Learning Success Support Services

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Abstract

Distance learning success support services is a compulsory program provided by Universitas Terbuka (UT) to new students of UT. The purpose of this program is to prepare them to apply learning strategies from the beginning of their study at UT. One of the crucial components of the implementation of this program is the availability of quality materials that are presented in meetings with students delivered both onsite and online. This article aims to give information related to the perceptions of UT's students on the quality of the materials of distance learning success support services. The data were obtained from some new students of UT who attended the program for the registration period of 2022. The participants were chosen from the Regional Offices (ROs) of Bandung, Palangkaraya, and Kupang. The selection of the locations was based on the representation of the UT regions in the West, Central, and East. Primary data were collected through the distribution of questionnaires through email with 322 responses, consisting of 241 people from Bandung Regional Office, 47 people from Palangkaraya Regional Office and 34 people from Kupang Regional Office. The data were analyzed descriptively using Excel. In general, students perceive that the quality of the materials of the distance learning success support services is very easy to obtain, especially in accessing materials about information sources of UT which include catalogues, academic calendars and UT pages; easy to understand, especially in how to access online on materials about distance learning skills; and based on prospective students' needs, especially about Introduction of the Universitas Terbuka. In other words, the presentation of the materials was quite clear, structured, and attractive. Meanwhile, students perceive that the obstacles in participating in the distance learning success support services activities are time constraints including their other activities and the difficulty of managing study time; economic constraints include high internet subscription fees and transportation costs, as well as technical constraints, including weak internet networks.

Keywords: *distance learning success support services, materials, new students.*

1. Introduction

Universitas Terbuka (UT) is a state higher education institution that applies an open and distance learning (ODL) system. In its practice, the ODL system differs from face-to-face educational institutions where students are able to interact directly with instructors and their fellow learners, and generally receive learning materials in class at the initiative of the teacher. Most UT new students generally come from face-to-face educational institutions. When they become UT students, they have to adapt themselves to a distance learning system that requires independent learning as a prerequisite for successful study at UT. UT students are required to have learning initiatives and be able to prepare themselves in facing various study assignments and exams that will be taken each semester.

Regarding the presence of new students, UT is challenged on how to ensure that students are retained as UT students after undergoing the learning process in the first semester. Saepudin & Ratnaningsih (2008) states that generally, distance learners tend to have a high dropout rate, one of which is due to the relatively low-grade point average in the first semester. Meanwhile, Andriani and Pangaribuan (2006) found that UT new students often experience difficulties in understanding the subjects they are enrolled in, particularly because students

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are not used to learning independently and using the technology used in the learning process at UT. This condition certainly needs to be concerned by UT so that students can continue their studies at UT until they are graduated. New UT students need to get comprehensive information about the characteristics of the institution, including how the learning system is used.

Regarding the importance of new students understanding their institutions well, the Ministry of Education, Culture, Research, and Technology (MoECRT) has established guidelines for the Introduction to Campus Life for New Students known as PKKMB (Kemdikbud Dikti, 2021). Through PKKMB, higher education leaders can introduce and prepare their new students in the transition process to become mature and independent students, as well as accelerate the process of adapting students to a new environment. This program is also conducted by UT through a program called the New Student Study Orientation known as OSMB. OSMB itself is a service for UT students in supporting their learning success. Other services provided by UT to new students are the provision of distance learning skills training usually called PKBJJ, Assignment Workshops, and Examination Clinics. These four services are packed in one of UT's main programs known as Distance Learning Success Support Services which is then known as LKPBJJ.

There are some objectives of LKPBJJ, i.e., students are able to (1) understand the concept of distance education and the learning system at UT, (2) have effective learning skills and strategies in studying at UT, (3) take advantage of various learning services provided by UT, and (4) attend the learning activities at UT appropriately, including solving the various learning problems they experience (UT, 2021). The implementation of LKPBJJ refers to the concept that independent learning does not mean students study alone without guidance. Furthermore, it is not enough for UT to only provide various learning facilities, but must also provide interactive assistance, and utilize a two-way designed communication process, so that learning assistance can be provided optimally. This is in accordance with the thoughts of Daniel in Keagan (1996) that the interaction of learning participants with fellow friends and mentors is an important factor in supporting the success of distance learning. This interaction can take place synchronously or asynchronously by using the media.

The implementation of LKPBJJ in UT is carried out by UT regional offices throughout Indonesia and the Center for Overseas Student Management for UT students domiciled abroad. The material for LKPBJJ was developed by the content developers according to their expertise, and divided into OSMB, PKBJJ, WT, and KU materials. These materials are packed in various media formats, including text, video, and PowerPoint presentation materials. There are quite a lot of materials to be shared and understood by UT's new students. Therefore, the quality of the substance and delivery of the material must be well prepared so that it has a positive impact on students' active engagement during their learning process at UT.

In 2021, the materials of LKPBJJ have undergone many revisions and adjustments, both with the current learning system at UT and with the updated substances as recommended by the Directorate of Higher Education at the MoECRT. It is necessary for UT to evaluate how effective LKPBJJ is to assist UT's new students in running their independent learning activities. Furthermore, UT needs to investigate those students regarding the quality of LKPBJJ, especially in substances as well as its delivery. From the participants' perceptions, UT can take some good points to improve the quality of LKPBJJ. This paper aims to analyze the perceptions of UT's students on the quality of LKPBJJ materials, both in terms of substance and delivery.

2. Method

This research used a quantitative approach by applying explanatory research. It is aimed at describing the quality of the materials of LKPBJJ based on respondents' feedback and recommendations. This study also applied an online survey and an in-depth interview based on the data gained from the questionnaire.

The research determined three regional offices which are holding LKPBJJ in the period of 2022.1 (January to June 2022). These regional offices are UT Bandung to represent the West region, UT Palangkaraya which represents UT for the central region, and UT Kupang which represents UT for the East region.

In general, the population and sample of this study were all students participating in LKPBJJ from UT Bandung, Palangkaraya, and Kupang during the 2022.1 registration period. The population of the UT Bandung area is 2,712 people, UT Palangkaraya is 438 people, and Kupang is 654 people. Of all the respondents invited to participate in the survey, the responses reached 322 people, consisting of 241 responses from UT Bandung, 47 responses from UT Palangkaraya, and 34 responses from UT Kupang.

Data collection was carried out by distributing questionnaires through the SurveyMonkey application. The time span for distributing the questionnaire was one month. The collected data were tabulated and analyzed descriptively using the Excel-assisted program.

3. Findings

This study focuses on the perceptions of UT students about the quality of the LPKBJJ materials they received as new students. The quality of LPKBJJ materials referred to the level of ease of accessing LPKBJJ materials, the level of ease of understanding LPKBJJ materials, the degree of suitability of LPKBJJ materials with learning needs, and the quality of the media used in providing LPKBJJ materials. This research involved a number of UT's new students who took benefits from LPKBJJ's activity services.

The results showed that almost 50% of the respondents were between 20-25 years (Figure 1). This condition is in line with the number of UT students in 2023, where they are dominated by those under 25 years with the largest proportion reaching 51% (UT, 2023). This condition is very different from the conditions in the early 2000s. Zuhairi & Budiman (2009) stated that in 2009 the number of UT students reached 600,000 and 42% of them were between 30-44 years. This shift in age group shows that UT is starting to be recognized by young people. The young age group is the millennial group who are internet users. UT's current students, therefore, tend not to experience difficulties in conducting distance learning at UT.

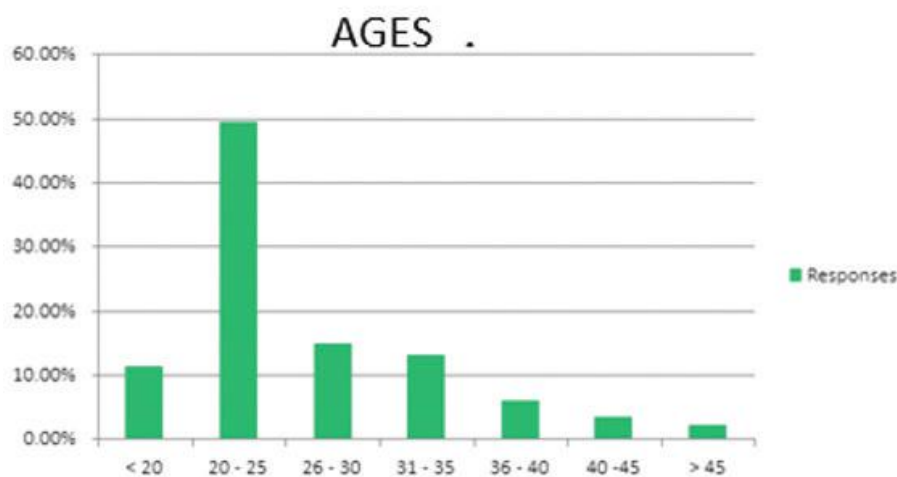


Figure 1. The distribution of respondents based on ages.

3.1. The Ease of Accessing LPKBJJ Materials

The level of ease of accessing LPKBJJ material is shown by students' perceptions that the LPKBJJ material they need is easy to obtain. The results showed that 67% of respondents stated that LPKBJJ materials were easy to access (Figure 2). The accessibility of LPKBJJ materials, i.e., OSMB, PKBJJ, Assignment Workshop, and Exam Clinic materials, is almost evenly distributed in each material element.

The topics discussed in OSMB material include the formation of the character of Indonesian students, an explanation of the learning system in higher education institutions in general, as well as the learning system at UT in particular. PKBJJ materials contain effective learning methods along with training materials. The Assignment Workshop materials contain about how to carry out tasks in the learning process at UT, while the Exam Clinic materials contain about the exam system at UT and students' strategies to do the exam at UT. These materials are packed in various formats of media, including text, video, and PowerPoint presentation materials.

There is no difference regarding the ease of accessing one activity material and another because all material is available in the LPKBJJ Learning Management System (LMS) for those who are able to access the internet properly. In addition, UT regional offices prepare files that have been downloaded from the website of the Student Learning Support Center of UT to enable students to easily obtain material if students have difficulty accessing it via the internet.

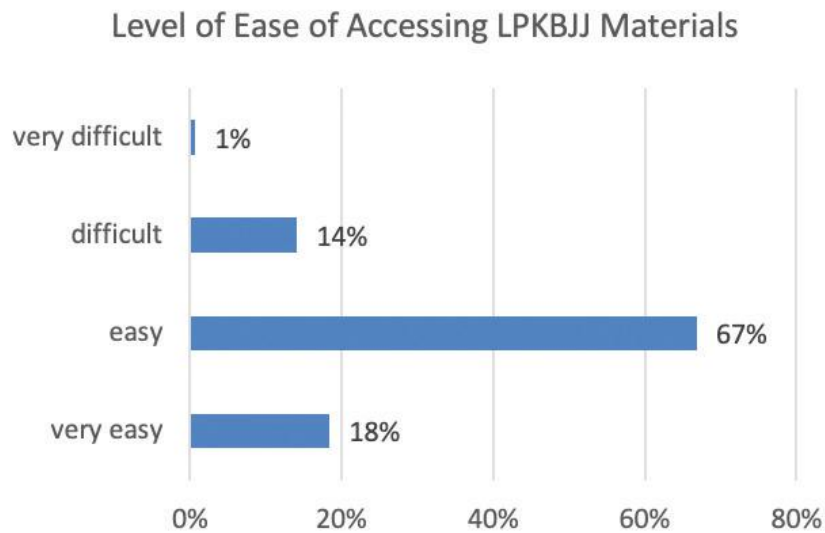


Figure 2. The distribution of respondents based on the ease of accessing LPKBJJ materials.

3.2. Level of Ease in Understanding LPKBJJ Materials

The level of ease of understanding LPKBJJ materials is shown by students' perceptions of the ease to learn and understanding. The results showed that 68% of respondents stated that LPKBJJ materials were easy to access (Figure 3).

OSMB material that was considered the easiest to understand by respondents was about environmental awareness and healthy universities, while the material considered the most difficult to understand was material about Higher Education in the Industrial Revolution 4.0 era. The PKBJJ material that was considered easy to understand was material on tips for success in participating in online tutorials, while what was considered difficult to understand was material on how to read properly and record reading results. The assignment workshop materials considered the easiest to understand were about how to discuss and do online tutorial assignments, while those considered the most difficult to understand were how to make scientific work. The exam clinic material considered the easiest to understand was about exam regulations at UT, while the most difficult to understand was about self-anxiety patterns.

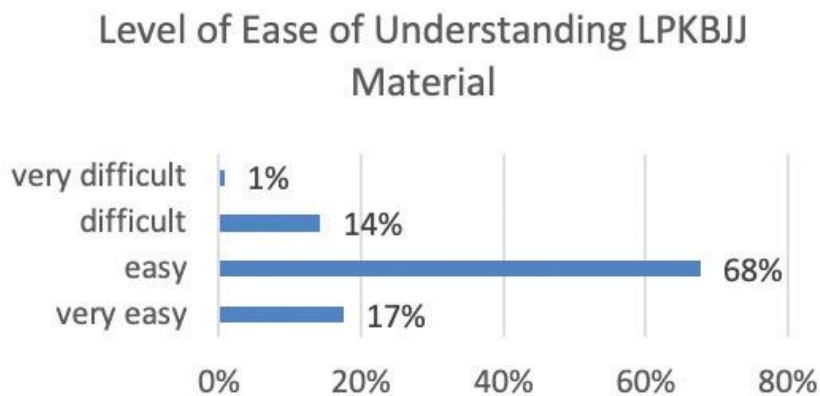


Figure 3. The distribution of the respondents based on the ease of understanding LPKBJJ materials

3.3. Level of Relevance of LPKBJJ Materials With Students' Learning Needs

The level of relevance of LPKBJJ materials with students' learning needs can be seen from students' perceptions of the materials provided in LPKBJJ activities which are relevant to students' needs in studying at UT. The results showed that 75% of the respondents stated that the LPKBJJ materials were in accordance with learning needs (Figure 4).

OSMB materials considered most relevant to learning needs were materials about campus life in the pandemic era, while PKBJJ materials considered most relevant were those about how to make study plans. The assignment workshop materials considered most relevant to learning needs are materials about how to make scientific work, while exam clinic materials considered most relevant are about patterns of self-anxiety and how to deal with them.

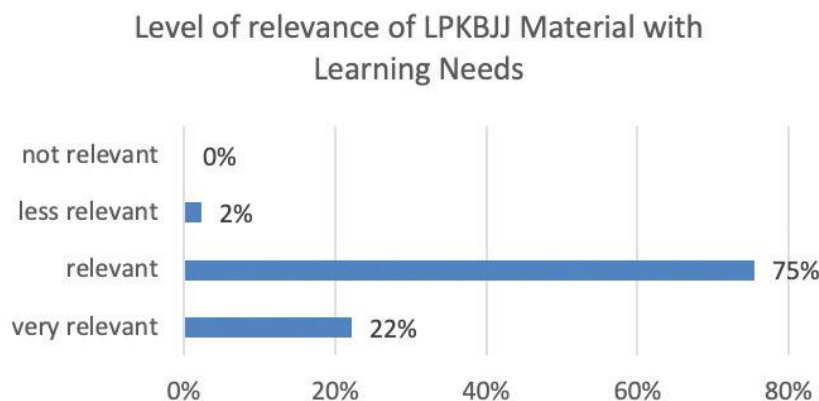


Figure 4. The distribution of respondents based on appropriateness of LPKBJJ materials with students' learning needs.

3.4. The quality of media available in LPKBJJ materials

Media quality was seen from respondents' perceptions of the clarity of writing/text, the clarity of images, the clarity of audio, and the clarity of visual movement. Figure 5 shows that 70% of the respondents said that the media was of good quality.

The media used to deliver LPKBJJ materials include text, PowerPoint, and video. Of the four components of the respondent's assessment, the component perceived to be of the best quality was visual clarity of movement, while audio clarity was of poor quality.

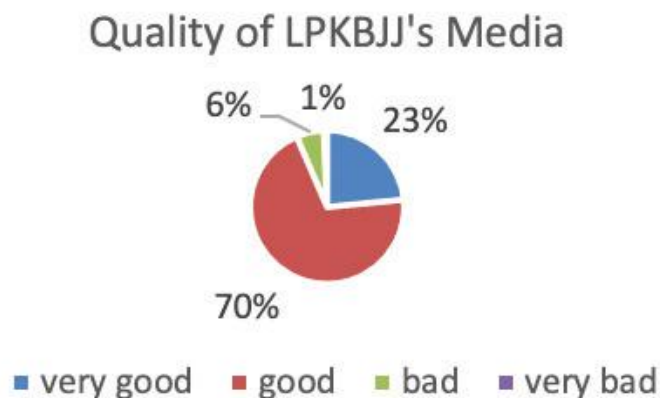


Figure 5. The distribution of respondents based on LPKBJJ media quality

4. Discussion and Conclusion

4.1. Level of Ease of Accessing LPKBJJ Materials

The results showed that most students (67%) perceive the material as easily accessible. This condition indicates that the LPKBJJ materials provided can be easily obtained by LPKBJJ participants. OSMB material is the easiest to access because it is available on the UT website on the student page specifically for the OSMB menu. OSMB material is the easiest material, containing all explanations about the Open University, plus material that is required by the government to be known by students throughout Indonesia.

The materials of PKBJJ, assignment workshop, and exam clinic are not provided on UT's website but available on the LMS which can be accessed after students registered as LPKBJJ participants. Accessibility requires the internet, which will be open when LPKBJJ's asynchronous activities are held. For students who have fairly

good internet access, there will certainly not be a problem accessing these materials. The ease of accessing the internet in obtaining the information needed can arouse students' enthusiasm in learning the material they need. This is in line with the opinion of Rahardjo et al (2016) that internet accessibility can increase student learning independence.

On the other hand, for students whose internet coverage is not yet stable, other efforts are needed in preparing this material. UT regional offices as the executors of the LPKBJJ activities must prepare materials by downloading them first, then distributing them to students. This method is considered the most effective for overcoming the difficulties in accessing the LPKBJJ materials.

4.2. Level of ease of Understanding LPKBJJ Materials

The results showed that 68% of respondents understood the material provided during LPKBJJ activities well. OSMB material that is considered the easiest to understand is about environmental awareness and a healthy university. Meanwhile, the material that is not well understood is about universities in the era of the industrial revolution 4.0. These two materials include material that new students must know in general. In comparison, content that is easy to understand is easy to digest, and relevant to everyday life.

This happened in the materials for PKBJJ, assignment workshop, and exam clinic. The materials considered easy are the material that is easily digested by students' minds or material that was previously known before becoming a new student. Materials that require heavier thinking, such as how to compose scientific papers, will of course take longer to understand in sharing general knowledge. This condition needs to be examined again, it is possible that material that is considered difficult must be packaged in media that is easier to understand, or given repeatedly accompanied by practice.

Ease of understanding the material is expected to be able to motivate new students to apply the information they receive in everyday life. That is, if the material can be understood properly, the learning objectives will be successful. This thought is in line with the results of research by Stiawan & Harlin (2018) which states that there is a positive correlation between understanding theory and students' ability to carry out practice.

4.3. Level of Relevance Between LPKBJJ Materials and Students' Learning Needs

The results showed that 75% of the respondents acknowledged that the material provided was relevant to their learning needs as UT students. OSMB material that is most relevant to their learning needs is related to campus life in the pandemic era. This is very possible because the research was carried out at a time when the Covid-19 pandemic was still ongoing in Indonesia, so students really needed this material. PKBJJ material on how to make a study plan is considered the most relevant to current needs. UT's new students will immediately carry out the learning process, so they really need a strategy on how to plan learning properly. Likewise, assignment workshops and exam clinic materials are considered the most relevant to students' learning needs.

Actually, someone who needs information will seek information from various sources and in various ways. However, if a learning institution prepares the information needed by its students, then that is a very good and important thing. In this way, students can learn easily and learning objectives will be more easily achieved.

4.4. Quality of LPKBJJ Media

Media for learning plays an important role in providing information to audiences. Through learning media, a teacher provides an explanation of learning material that will be conveyed to his students. In addition, learning media also functions to assist communication for both communicators and recipients.

Media remote reactions can help get the message across, depending on the quality of the media used. The results showed that the quality of the media was considered the best in the visual and motion components, but rather poor in the audio component. It is appropriate that these two parts support each other so that the meaning to be conveyed to students can be understood optimally. Student perceptions of LPKBJJ's media for providing information are mostly aimed at audio-visual media. This is quite reasonable because the highest audience retention is usually achieved when the audience makes use of the senses of sight and hearing (Muhson, 2010).

Currently, LPKBJJ material is still mostly conveyed through written media without sound, namely using PowerPoint. Into it, it is necessary to increase the material delivered through audio-visual media, both video and other multimedia, especially those that are more interactive.

4.5. Obstacles and Solutions

Each implementation of activities is inseparable from obstacles, as well as in LPKBJJ activities. Students perceive that the obstacles to participating in LPKBJJ activities include technical constraints, economic constraints, and time constraints. Figure 6 presents the proportion of students' obstacles in joining LPKBJJ.

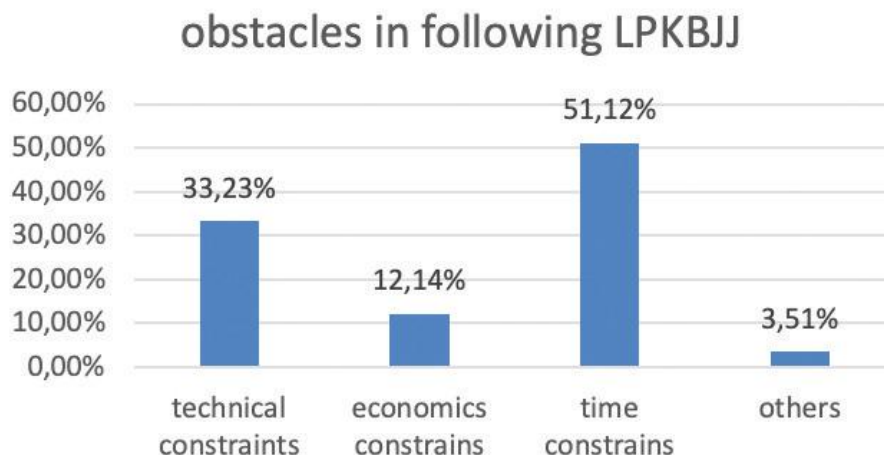


Figure 6. Obstacles and solutions

Technical constraints related to network readiness and devices owned by students when participating in LPKBJJ activities. Network readiness is especially a problem for students who take part in LPKBJJ boldly, while they are in an area far from the reach of a strong network. Problems with devices created by students who have mobile phones that do not fully support online UT access. Given to overcome this obstacle are students who are gathered in classes in certain locations with good internet networks, as well as providing wifi access in locations that students can easily reach. This method can make it easier to provide material directly, and direct students to access LPKBJJ material available in the Learning Management System (LMS) room.

Economical or financial constraints related to internet subscription fees, quota owned, and transportation. LPKBJJ activities are carried out in a full day, and if you take part online, of course, you will need a large quota. Some materials must be accessed online, thus requiring an internet network to access them. Transportation costs are an obstacle if students have to take LPKBJJ offline in remote areas. It is included to overcome the problem of quota availability, namely providing free wifi access for students. Obstacles to accessing materials that are online can be overcome by implementers at regional UTs by first downloading LPKBJJ materials to be forwarded to students. Regarding expensive transportation, an online mode can be an option with a record that the network is in a location that is guaranteed to be better.

Time constraints include hectic activities other than studying, as well as the difficulty of managing study time. The input for this obstacle is giving students time options in participating in LPKBJJ. Furthermore, UT regional offices organizes this activity in stages according to the choice of time given to students.

4.6. Conclusion

The conclusion of this paper is:

1. students perceive that the quality of the materials of the distance learning success support services is very easy to obtain, especially in accessing materials about information sources of UT which include catalogues, academic calendars and UT pages; easy to understand, especially in how to access online on materials about distance learning skills; and based on prospective students' needs, especially about Introduction of the Universitas Terbuka. In other words, the presentation of the materials was quite clear, structured, and attractive.
2. The obstacles in participating in the distance learning success support services activities are time constraints including their other activities and the difficulty of managing study time; economic constraints include high internet subscription fees and transportation costs, as well as technical constraints, including weak internet networks.

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228-Building Soft Skills For Employability: Challenges in ESP Courses of an E-Learning Program

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Abstract

The development of soft skills for employability has become increasingly important in today's competitive job market. Apart from the hard skills required for a specific job, soft skills for employability will determine whether a job applicant can win the heart of the recruiters or not. Therefore, teaching and assessing these soft skills in tertiary education needs to be carefully planned and done so that graduates will be better prepared for their future jobs. This study aimed at finding out the challenges of building these soft skills in English for Specific Purposes (ESP) courses of an e-learning bachelor's program at a university in Ho Chi Minh City, Vietnam. The two selected ESP courses are English for Tourism and English for Business, which are additional courses considered as enrichment units in the program. The context of the study is the distance e-learning program for English linguistic majors. Unlike traditional learning methods, e-learning has the absence of face-to-face interaction, which may result in limited opportunities for practical application of these soft skills. This is the reason why the researcher decided to have an investigation into the specific difficulties for the course designers as well as the course instructors when developing the soft skills of the students in preparation for their future job capabilities. The research data was qualitatively collected from one course designer and four course instructors, who were in charge of teaching the two courses. The researcher is also the course designer and instructor, which gives her an advantage in approaching the teaching/ learning materials in the courses. After having studied the course syllabi, the learning and teaching resources by using a checklist of the target skills, the researcher conducted a semi-structured in-depth interview with each of the participants. The findings revealed some limitations of the current courses in terms of teaching and assessing the soft skills. From the perspectives of the teachers, various challenges were named, including learner types, learning/ teaching activities, teaching/ testing methods, and teachers' feedback in a virtual learning context. The researcher also gave some recommendations for the course improvement regarding the specific soft skills, and course design.

Keywords: *Soft skills, Employability skills, English for specific purposes, E-learning program*

1. Introduction

1.1. Background Information

In the highly competitive job market today, job applicants who are equipped with only academic qualifications related to their hard skills may fail to win the heart of the prospective employers if they do not possess a set of soft skills specifically needed for their job position. Recruiters particularly look for some soft skills in the candidates, which are likely to match their company's culture. However, many job seekers, especially new graduates, seem to pay insufficient attention to their preparation of the relevant soft skills. The soft skills, which are normally listed at the end of job adverts or résumés, weigh much more than the job seekers thought. According to a survey of 650 employers in the United States, conducted by Morning Consult for Cengage Group (2019), over 70 percent of them had difficulty searching for qualified job applicants who have expected soft skills; moreover, over 30 percent stated that students were not fully prepared in colleges for employability skills.

Therefore, this research is aimed at investigating how soft skills for graduate employability are taught and assessed in an online bachelor's degree program. The research is limited to two courses in English for Specific Purposes since the course objectives cover not only English language skills but also work skills, in which soft skills for employability are embedded in the syllabi.

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The contribution of this research is expected to provide some implications for developing the soft skills in a full-time e-learning program, particularly in specialized courses in the program, to facilitate the work readiness of the undergraduates.

1.2. Research Questions

While many previous studies about soft skills, specifically soft skills for employability, have been done in traditional face-to-face contexts, there has been an emerging tendency to focus more on a partially or completely virtual learning context. Several researchers have mainly worked on short online learning courses or situation-driven online learning modes. Nevertheless, limited research is conducted on effectively developing and evaluating soft skills for employability in an entirely online learning program in higher education institutions (HEIs). Therefore, the researcher decided to do an investigation into the implementation of soft skills in a full-time e-learning program for bachelor's degree in English major. To begin with, the researcher started studying the two courses (English for Specific Purposes) of the program in order to analyze the challenges faced by the course instructors in building the soft skills for graduate employability. Below are the key questions of this research.

- How do the course instructors perceive the efficacy of soft skills for employability in two ESP courses of an online bachelor's degree program in English linguistics?
- What are the challenges in developing the soft skills in the two selected courses?
- What could be done to tackle these challenges?

2. Literature Review

2.1. Overview of Soft Skills

2.1.1. Defining Soft Skills

As can be seen in Table 1, definitions and terms associated with soft skills may vary from country to country. However, the nature of soft skills in different contexts is similar in the way that these skills refer to social/interpersonal skills and personal attributes (Robles, 2012; Litecky, Arnett, & Prabhakar, 2004). Soft skills, defined by online Cambridge Dictionary (2023), are “people’s abilities to communicate with each other and work well together”. The definitions of soft skills, which are introduced in Table 1, share some key words in common, such as society, personal abilities. In general, soft skills, regardless of different so-called names, are the key to personal development in both work and life.

Table 1. Terms and Definitions Associated with Soft Skills in Different Countries
(Huynh et al., 2012; Cinque, 2016, Bowman, 2020; Tran, 2020)

| Country | Some common terms referring to soft skills | Some definitions |
|-------------|--|--|
| Australia | Generic skills, employability skills, key competencies | <p>Definition 1:
Core skills refer to the transferable skills to develop the individual's abilities of being active and responsible in society (Bowman, 2020).</p> <p>Definition 2:
Essential skills are fundamental in maximizing people's potential and their social engagement (Bowman, 2020).</p> <p>Definition 3:
Soft skills are the mental abilities of an individual to adapt to others and work, developing positive relationships and effective work performance (Huynh et al., 2012).</p> |
| Scotland | Core skills, transferable skills, | |
| USA | Necessary skills, workplace know-how skills | |
| New Zealand | Essential skills | |
| Vietnam | Life skills, soft skills | |

2.1.2. Identifying Key Soft Skills for Employability

There are many sets of soft skills, which are suggested and discussed by worldwide professionals. Depending on one regional context, some specific soft skills can be prioritized and embedded into the curriculum development to educate the undergraduate students. In a research done by Tran (2020), he studied different soft skills frameworks for the 21st century (i.e., World Health Organization, European Union), and then proposed six main groups of soft skills.

- **Basic skills:** Literacy, using numbers, using technology
- **Personal skills and attributes:** Being responsible, resourceful, flexible, having self-esteem, management skills
- **Conceptual/ Thinking skills:** collecting and organizing information, problem-solving, planning and organizing, learning-to-learn skills, critical thinking, creativity
- **People-related skills:** Communication, interpersonal, teamwork, customer-service skills
- **Business world-related skills:** Innovation skills, enterprise skills
- **Community-related skills:** Civic or citizenship knowledge and skills

Soft skills can be broadly categorized into the six above-mentioned areas, representing different aspects of a person's interpersonal and professional skills. Further sub-soft skills can be added; for example, the skills related to business involve the skills of networking, leadership, and conflict management. These essential soft skills, therefore, can be implemented in the curriculum for Business majored undergraduates.

Furthermore, Cortez (2014) conducted a study with an Explanatory Sequential Mixed Methods Design to examine ten soft skills: Communication, Courtesy, Flexibility, Integrity, Interpersonal skills, Positive attitude, Professionalism, Responsibility, Teamwork, and Work Ethic. The researcher gave an online survey to 113 human resource professionals (over 30% of the population), followed by a focus group interview with 7 respondents. The finding shows the significant roles of these skills; however, little was done for training these skills. These ten soft skills also belong to the six classified groups of soft skills, proposed by Tran (2020).

2.2. Repositioning Soft Skills for Employability in the Twenty-First Century

2.2.1. Hard Skills vs Soft Skills

Initially, soft skills are ranked after hard skills, which are directly job-related skills. Therefore, students of HEIs tend to target to master the hard skills for their future job, whereas their soft skills might be considered as supplementary or optional skills.

Strang (2023) employed a structural equation model (SEM) to survey 900 Business students. All the soft skills and most hard skills in the study influence the effectiveness of the learning. The finding shows that the students effectively learned the hard skills and soft skills. Besides, these skills matched their current job. There has been a correlation between hard skills and soft skills, which supports efficient working performance.

2.2.2. The Increased Importance of Soft Skills

According to Williams (2023), the Covid-19 pandemic elevated the importance of soft skills, and in the post-pandemic period soft skills are more important than ever. These skills are no longer considered as soft or supplementary skills. They help businesses in general, and workers in particular, to create good rapport and sustainable relationships to overcome the worldwide crisis.

Agarwal (2019) states soft skills are the secret to conquer the risks of Artificial Intelligence (AI). The reason is AI cannot perform uniquely-human skills, such as creativity, social abilities. Similarly, in the educational field, AI tools, such as ChatGPT, will no longer be threatening. Some teachers are concerned that their students can use ChatGPT to generate and regenerate a lot of ready-made ideas to complete their assigned tasks, which is an example of plagiarism. However, if teachers or course designers know how to implement soft skills appropriately in the learning courses or the curriculum, the learners will be unable to use ChatGPT for copying the ideas in their assignments. Above all, they can actually make use of AI tools in their learning process if they know how to apply their soft skills (i.e., creativity, flexibility, resourcefulness). A lot of workshops have been done on AI applications. In general, implementing the soft skills in the learning and teaching process is very important. The course designers and curriculum developers in HEIs should not underrate these skills.

Mabe and Bwalya (2022) conducted a study based on the Delphi-study principles to generate as many essential soft skills as possible from the practitioners in information and knowledge management. The key finding reveals 17 soft skills out of 57 that received consensus among the experts. Some specific soft skills can even be considered as hard skills because their roles are extremely important. For instance, bargaining skills are regarded as hard skills in the field of sales and marketing while they are considered as soft skills in human resources management (Ginting, 2020). In other words, soft skills in a particular field of work can significantly determine its success.

2.3. Recognizing the Similar Soft Skills That Are Prioritized in Different Contexts

Table 2 below briefly summarizes the important soft skills for employability in different countries. Firstly, 17 soft skills were finalized in a research report in South Africa as previously mentioned (Mabe & Bwalya, 2022). Secondly, ten top soft skills were collected from publicly available documents of Australian universities (Pitman & Broomhall, 2009). Thirdly, four main soft skills, according to the official website of the American Department of Labor (n.d.), essentially contribute to work readiness. Fourthly, a cross-country survey in Europe reveals the strategic roles of 12 leading soft skills to maximize job opportunities for immigrants (Dall' Amico & Verona, 2015). Finally, the Vietnam Ministry of Education and Training issued the regulations (2010) on the major soft skill implementation in higher education programs. Based on that regulation, HEIs in many different regions in Vietnam set specific learning outcomes accordingly in their specialized training programs. The soft skills can be purposefully embedded in the academic programs or additionally trained in extra-curricular activities. For example, in Decision 3079/ QĐ-ĐHQGHN issued by Vietnam National University, Ha Noi (2020), HEIs of Ha Noi National University wrote the expected program learning outcomes that covered the soft skills as follows: (1) communication skills, (2) IT skills, (3) foreign language skills, (4) teamwork skills, (5) presentation skills, (6) interpersonal skills, etc. It seems that the list of soft skills confirmed in the Vietnamese context is slightly shorter than the other three contexts shown in Table 2. Possibly, soft skills in Vietnamese contexts of HEIs are mainly rated as sub-skills for graduate employability. This is why the author chose this research topic since the review of literature has shown the significant roles of soft skills for the graduates to secure their employability in the future labor market.

Table 2. A Summary of Critical Soft Skills for Employability in Different Contexts

| Source | Mabe & Bwalya (2022) | Pitman & Broomhall (2009) | U.S. Department of Labor (n.d.) | Dall' Amico & Verona (2015) | Vietnam MOET (2010) |
|-------------|---|---|---|---|---|
| Context | South Africa | Australia | The United States | European countries | Vietnam |
| Soft Skills | <ol style="list-style-type: none"> 1. Leadership 2. Adaptability 3. Flexibility 4. Emotional intelligence 5. honesty 6. Integrity 7. Collaboration skills 8. Active learning 9. Willingness to learn 10. Critical thinking 11. Ethical awareness for using data 12. Innovation 13. Planning skills 14. Data collection & analysis 15. Ability to find, access, evaluate and transform data to information 16. Ability to use new information tools 17. Being familiar with industry trends in big data systems | <ol style="list-style-type: none"> 1. Communication skills 2. Interpersonal skills 3. Problem-solving skills 4. Master of specific knowledge 5. Awareness and respect for others 6. Critical/ analytical thinking 7. Behaving ethically 8. Lifelong learning 9. Creative thinking 10. Professional skills | <ol style="list-style-type: none"> 1. Professionalism or work ethic 2. Communication skills 3. Teamwork and collaboration skills 4. Critical thinking or problem solving skills | <ol style="list-style-type: none"> 1. Time management 2. Motivation 3. Adaptability & flexibility 4. Managing responsibility 5. Team working 6. Service skills 7. Conflict management 8. Communication skills 9. Problem-solving 10. Creativity & Innovation 11. Critical & structured thinking 12. Decision making | <ol style="list-style-type: none"> 1. Communication skills 2. Teamwork skills 3. Foreign language skills 4. Information technology skills |

Apparently, the lists of soft skills in the above-mentioned contexts share several things in common. Therefore, the repeated soft skills in Table 2 will be selected for further investigation in this study. This study is based on the two main categories of soft skills. They are people-related skills (i.e., 1, 2, 3) and conceptual skills (i.e., 4,5,6), shown in Table 3.

Table 3. Target Soft Skills in This Study

| People-related Skills | Conceptual/ thinking skills |
|---|--|
| <ol style="list-style-type: none"> (1) Communication Skills (2) Interpersonal Skills (3) Teamwork Skills | <ol style="list-style-type: none"> (4) Critical Thinking (5) Problem Solving (6) Creativity |

2.4. Stakeholders' Involvement in the Implementation of Soft Skills for Employability in HEIs

The way soft skills are taught and assessed in HEIs will be decided or influenced by several factors. In other words, the success of an educational program can be assured by direct and indirect involvement of different stakeholders, who help to assure the high quality of education and training. In this case, education can bring the best learning outcomes and equip learners with the work-related skills that the labor market in modern society needs or demands. Therefore, the efficacy of these skills in a training program needs to be approved or empowered by the relevant stakeholders.

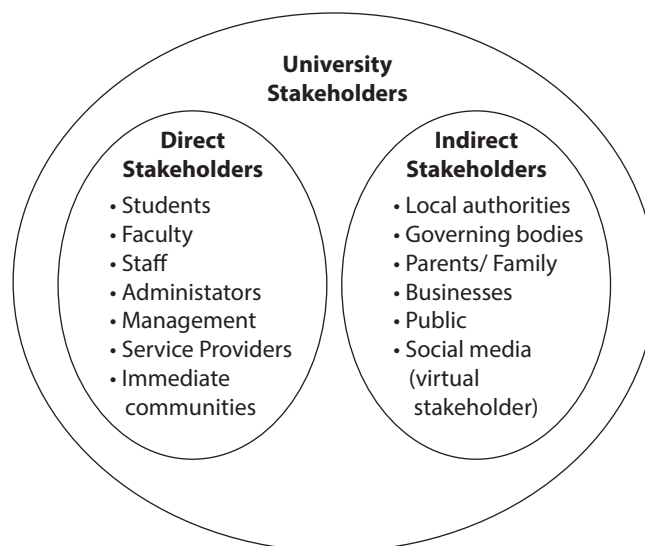


Diagram 1. *Typical Stakeholders in HEIs*

As can be seen in Diagram 1, direct stakeholders in HEIs include students, teachers, administrative staff, managers, etc. while indirect stakeholders, such as businesses, are those who may not be visible but influence the program's sustainability (Venkatasubramanian, 2022). In this research, teachers or course instructors were the main selected participants since they directly influenced the implementation of the soft skills in the courses. Besides, they are the ones who witnessed the visible difficulties of the learners in acquiring the soft skills integrated in the learning process via e-learning mode. This research findings, hence, was basically based on the perspectives or reflections of the in-charge teachers, who are internal or direct stakeholders.

3. Method

3.1. Research Design & Procedure

Qualitative research method was used in order to get descriptive data related to the research topic and questions. This research is a case study of an online bachelor's degree program in English linguistics, which is designed by a public university in Vietnam. This is also an open university, which focuses on open distance education. In this research limitation, two English-major elective courses of the e-learning program were selected for a deeper investigation in terms of the course objectives and syllabus.

First, the researcher analyzed the syllabi of the two courses: English for Business, and English for Tourism. The researcher is also the course designer as well as course instructor in this e-learning program, which gave her great benefits of approaching the documents regarding the syllabi and e-documents via Learning Management System (LMS). Next, most importantly, 5 teachers were invited to join in-depth semi-structured interviews, which were conducted online in 30 minutes per interview. The interview type gave the researcher flexibility in asking for further information or demonstration according to the viewpoints shared by the interviewees. The interviews were carried out online via Google Meet platform for the convenience of the participants.

3.2. Participants

Table 4 is a summary of the participants. Three out of the five participants have experience in both designing the courses via e-learning and teaching these courses. The other two have experience teaching the courses. The names of the participants were coded T1-T5 for the reason of the research ethics.

Table 4. Description of 5 Participants

| No | Participant | Experience | Role(s) |
|----|----------------|--------------------|------------------------------------|
| 1 | Teacher 1 (T1) | more than 10 years | Course Designer/ Course Instructor |
| 2 | Teacher 2 (T2) | more than 10 years | Course Designer/ Course Instructor |
| 3 | Teacher 3 (T3) | less than 10 years | Course Instructor |
| 4 | Teacher 4 (T4) | more than 15 years | Course Designer/ Course Instructor |
| 5 | Teacher 5 (T5) | more than 25 years | Course Instructor |

3.3. Setting

The online bachelor's degree program in the study is a distance program via an entirely e-learning mode. The program is mainly for working people of different ages. Many of them are in the management level of their organization (Online learning center portal, 2017). The university is one of the first two universities in Vietnam that started the online bachelor's degree program via e-learning, and it is a member of the Asian Association of Open Universities (AAOU). The e-learning program in English linguistics started in 2018 (Press Conference, 2018). The two elective courses were designed to help the distant students in preparation for their work readiness in the contexts of Business and Tourism. The course syllabi share several things in common, including objectives, course structure, activities, assessment, and so on.

3.4. Data Analysis

MS Excel and NVivo are the two tools used for managing and analyzing the collected data. An inductive approach to thematic analysis will be applied to get the best of the data in this research.

4. Findings and Discussion

4.1. Information Collected From the Course Syllabi

Table 5 summarizes the key information related to the selected ESP courses in the study. The course syllabi are being used in the current program. Both courses share the same objectives related to the soft skills and their role in the learning program is similar in the way learners are taught to develop their English language skills and make use of the specialized knowledge in real-life working situations. Furthermore, the students are expected to practice high-level soft skills. There are some differences between the two courses in terms of task types and on-going assessment. It seems that the course 'English for Tourism; requires learners to perform soft skills more than the course 'English for Business' does. It is because learners are asked to work in pairs/ groups, and submit different kinds of learning products (i.e., audio, video clip) in the former course. However, in the latter course, individual work is generally dominant although there are opportunities for mutual interactions through Discussion Boards and video conferences in which students will learn synchronously with the course instructor via Google Meet platform.

Table 5. Summary of the Two Course Syllabi (Aug 2023)

| English for Tourism | English for Business |
|---|--|
| Elective ESP course: A supplementary course to the main major | Elective ESP course: A supplementary course to the main major |
| Type: 2 credits in 7 weeks | Type: 2 credits in 7 weeks |
| Learners: third-year students | Learners: third-year students |
| Skill-related Objectives: After the course completion, students are able to:
- speak and present confidently a topic regarding travel and tourism development.
- read an article/ listen to a speech in tourism contexts.
- write a letter to describe a tourist attraction
- write an email to deal with a customer's complaints
- improve the soft skills: critical thinking, independent working, teamwork. | Skill-related Objectives: After the course completion, students are able to:
- speak and present confidently in business contexts.
- read an article/ listen to a speech in business.
- write a business proposal
- write an email regarding a business matter
- improve the soft skills: critical thinking, independent working, teamwork. |

| | |
|---|---|
| Exercise types: Reading & Listening comprehension with multiple choice questions | Exercise types: Reading & Listening comprehension with multiple choice questions |
| Tasks for On-going Assessment: 3 Topics for Discussion, 3 Video conferences (including group presentation), Email Writing, Individual Audio & Pair-work Video clip Submission | Tasks for On-going Assessment: Assessment: 2 Topics for Discussion, 2 Video conferences, Email writing, Business proposal writing |
| Final Assessment:
A paper test consists of 40 multiple choice questions (Vocabulary & Reading items) and 1 writing task. | Final Assessment:
A paper test consists of 40 multiple choice questions (Vocabulary & Reading items) and 1 writing task. |

4.2. Interview Findings

4.2.1. *Efficacy of the Soft Skills for Employability*

All the five participants in the interviews agreed that soft skills play a crucial role in preparation for the graduates' employability skills. Therefore, soft skills must be implemented in the ESP courses. One teacher, who is the head of Business English and has experience in teaching as well as designing these courses, said:

Soft skills are very important in distance learning via e-learning, especially for specialized courses (i.e., English for Business, English for Tourism, English for Secretaries, Management Studies, Marketing, Public Relations, Business Projects. (T1)

Teacher T5 added:

The process of e-learning and e-teaching in the fourth industrial revolution, commonly known as Industry 4.0, requires the capacity of mastering the soft skills ranging from basic level to high level. For example, students must have basic Information Technology (IT) skills to study on e-learning platforms and use their skills of networking and interacting with others during their learning process.

None of the participants mentioned business world-related skills and community-related skills were the main focus in the two ESP courses. Teacher T4 emphasized the customer-service skills in English language that the students need to learn. Besides, two teachers, T2 and T3, shared similar viewpoints that these skills are not of the utmost importance, but these skills can be embedded at the basic level of understanding through reading comprehension activities.

Communication skills, especially customer-service skills, are important to English-majored students. Even if the students of the e-learning program have had experience working with their customers or clients, they might be unable to use English language appropriately in their communication. We can design a task in which the students have to use English in their working contexts and submit a video clip or report as their final product. (T4)

The other soft skills, which are personal skills, thinking skills, people-related skills, have not been taught via e-learning mode as effectively as it has been in a traditional method in our university. Therefore, we should firstly work harder to build these skills. (T2)

Because of the special needs of the students who are working and experiencing real-life work situations, communication skills in English are what they mostly need. Moreover, people-related skills help to create an interactive and engaging virtual learning environment, which seems to lack face-to-face interactions. (T3)

To sum up, the top three groups of soft skills that were mentioned in the interviews are basic skills, conceptual skills, and people-related skills. Teacher T5 stated basic skills and personal skills were the basic requirements for those who wanted to pursue a bachelor's degree program via e-learning and the e-learning center should provide them several introductory tutorials before they started their independent learning journey via e-learning.

4.2.2. *Challenges in Developing the Soft Skills for Employability*

The soft skills of the course instructors play a certain role in the way soft skills are taught to the students. Teacher T5 confessed that he had difficulty using IT skills for his online teaching; then, he had to learn from other teachers and admin staff.

Some teachers have to improve their soft skills if they teach an online program. I, myself, had to make an effort to learn more about IT skills to work well with my students on LMS and other online platforms. Before planning to build the soft skills for our students, we should prove that we are competent at using these skills. . . . (T5)

Teacher T4 said it was not easy to build mutual rapport with the students; hence, interpersonal skills in a virtual learning and teaching environment are needed. According to Teacher T3, many students complained they received little or slow feedback from their instructors; in other words, the management skills of these instructors are in need of much improvement. Teacher T5 said it was hard to give timely and appropriate feedback or support online. This can be considered as one challenge.

Regarding the soft skills embedded in the ESP courses, teamwork is a big obstacle for the students. Teacher T4 said that her students asked if they could work alone since they were unable to find partners in their pair/ group work. Teacher T3 said she still gave her students marks based on the individual performance even though the task requirement was pair/ group work. She gave only some minus points for the task incompleteness.

Some students realize that they will only lose some points because of not working in a team; therefore, they keep working alone in many other group assignments. Basically, they only need to pass a course with acceptable minimum scores. (T3)

For the students of the e-learning program, teamwork is too demanding and time-consuming as they are currently working in different job positions. Some students decided not to join any synchronous class via video conference; instead, they tried to complete all the individual tasks to gain sufficient scores for passing. (T4)

To tackle this matter, the teachers and students need more support from the admin staff or teaching assistants. Together they help the students to create a virtual learning community, where they can easily find their classmates to work with. Teacher T3 suggested:

I once read a confession from a student of the e-learning program. The student felt lonely when studying online. So, I think it will be better if we can organize an offline meeting for the course instructor and students to get to know more about each other. This can strengthen the connection and communication between the teachers and learners. Further people-related skills can be built up based on that foundation, I believe so.

One more major challenge is developing the thinking skills of the learners. All the teachers said they could not check plagiarism properly in their students' submitted assignments. They are concerned that the learners might not use their thinking skills but tend to copy other sources (i.e., previous student's assignment, online sources, Artificial Intelligence - ChatGPT).

Once I found a similar writing submission, I spent a lot of time tracking the previous submissions. Finally, the two students in different academic years had the same writing. (T1)

Some of the tasks in our courses do not require high-level thinking skills like critical thinking skills. As a result, the students can easily copy an answer from somewhere else. I think a good task on LMS should give choices of flexibility and personalization so that each student will have a unique performance or learning product.

In brief, tasks for practice and evaluation should be designed in a thought-provoking way when learners are expected to show more of their thinking skills, such as problem-solving, critical thinking, creativity, etc.

4.2.3. Recommendations on Improving the Implementation of the Soft Skills

It is recommended that a variety of learning activities and task types should be used to maximize the chances of enhancing the soft skills, especially people-related skills, and conceptual/ thinking skills. In order to do this, the courses should be carefully and detailedly designed. Task description and requirements should be written in detail. Teachers' timely and appropriate support is essential. In this study, the soft skills of some course instructors are also in need of improvement. They are expected to have good IT skills, time-management skills, communication skills, etc. If the teachers do not possess the relevant soft skills required for e-teaching, the learners will be unable to successfully develop the target soft skills as described in the course's learning objectives. One suggestion is that there should be more training sessions for teachers in the soft skill implementation in an e-learning program.

The participants in the study gave some suggestions on redesigning some particular tasks on LMS so that the learners will have to perform the soft skills in their learning process. Firstly, one teacher (T3) said that some tasks in English for Tourism should be rewritten. The tasks like the speaking assignment shown in Image 1 are still at the basic level since the students are asked to summarize what they read about the tourism history and development. Instead, the students can be asked to write a critical reflection on what they have learned when they relate it to the current development of tourism in their living area. They must justify whether they think

the development has a positive or negative impact on their community. In the new task design, the learners must collect more authentic information based on the given topic. Also, they must show their critical thinking skill, which refers to reflective thinking toward an analysis and evaluation of existing information by using logic and reason (as cited in Heard et al., 2020).

Image 1. A Speaking Assignment in the Course English for Tourism on LMS

Another teacher (T2) said teamwork in an e-learning program was not easy. To make students effectively work together, Teacher T1 suggested that instructions should be clear and detailed. Groups are expected to give an interactive and well-organized presentation. After the presentation, the team must submit a report of group work and responsibilities. For example, students are expected to give a group presentation on a tourist attraction in the first video conference (a synchronous online class). The current instructions for this class, shown in Image 2, are insufficient in terms of the task description (i.e., main parts of a presentation, examples of interaction). Most importantly, the course instructor must check how their students can contact the others to work in groups. Another discussion section can be created on LMS for this purpose. If possible, group presentations can be done in the second video conference, not very first meeting so that the students will have better rapport. Teamwork skills as well as interpersonal skills are better built in this way. As a result, communication skills, especially oral presentation skills on a virtual platform can be achieved.

Image 2. A Video Conference in the Course English for Tourism on LMS

Next, formal email writing or business correspondence is a common task in the two ESP courses. Teacher T2 said further information should be clearly stated in the task requirement. For instance, Image 3 below shows an example of an email-writing task, in which learners are required to give investment advice to a client. Teacher T2 hoped that Turnitin, a tool for checking plagiarism, could be embedded on LMS so that it would be a reminder for learners to work independently on their writing. Once again, the course instructor should emphasize the reasons why they learn this program. This is improving their knowledge and target skills, which can be applied in their work-related communication. Active and independent work is only possible when the students maintain a serious interest in achieving knowledge (Nematjonov, 2019).

Sungreen Power Stock Price Takes a Fall

Sungreen's stock price has fallen by about half since it hit a high of \$15.50 earlier in the year. This comes as a result of industry concerns that a shortage of silicon – the material needed to make solar cells – will hurt manufacturers. However, many analysts describe this as a short-term problem since Sungreen specialises in a technology which aims to reduce the amount of silicon needed.

Imagine you are an investment advisor. One of your clients is interested in investing in environmentally-friendly businesses and has heard about Sungreen Power. He thinks the company might be a good investment and has asked for your advice. Write a letter (120-140 words) to explain:

- The current pros and cons of the investment
- If you think it is a good investment

Image 3. A Writing Assignment in the Course English for Business on LMS

Besides, Teacher T4 suggested an alternative task in which students must personalize their responses. Image 4 shows a topic and some questions for discussion on a Discussion board. This task is generally good because they must share information about their past/ current/ dream workplace. The course instructor and class members have a chance to get to know more about each other. Alternatively, Teacher T4 said students could be asked to make a video clip to introduce their workplace and they could interview one colleague for some information related to work motivation. After asking for permission, the student can show a part of the workplace in the video. This can avoid the situation of making up an unreal story. They must report authentic information and they practice the English skills beyond the LMS platform; after that, the teacher can evaluate the final learning products. However, this task type requires time, effort, and detailed instructions.

Tim kiếm khoá học

Vietnamese (vi)

Below is the photo of the Faculty of Foreign Languages, Ho Chi Minh City Open University. We are proud of the special culture of our working environment.
 FFL Fight for Love
 We are OPEN to Opportunities and Challenges.

Let's share briefly something about your work motivation and the organization where you are working.

1. What motivates you to work? Why?
2. What are some outstanding characteristics of your company cultures?
3. What factors do you think determine the success of the company where you are working?

Please share one photo to let us know more about your workplace if possible.

Image 4. A Discussion Board in the Course English for Business on LMS

5. Conclusion

5.1. Conclusion

The findings of the research reveal some major points, which are potential for further research. In general, the key soft skills for employability in the two ESP courses of the e-learning program consist of the people-related skills and thinking skills. These skills should be carefully studied to implement into the learning program since the students of this program have diverse characteristics. However, the majority share one common thing since they have already worked part time or full time in different fields. They need a qualification in English linguistics to prove they have competent English communication skills, which facilitates their communication in their current job. The major challenges, concluded in this study, are teachers' soft skills, students' teamwork, and students' thinking skills.

5.2. Limitations and Further Research

This study was conducted on two ESP courses of an e-learning program in building the soft skills for graduate employability, which presented several challenges in developing the high-level soft skills. However, these

challenges might not be the same in the other main courses of the program. Further quantitative research on the other courses related to the main major of English linguistics could further show how the work-related soft skills should be effectively and accordingly implemented. Besides, different perspectives of the stakeholders, such as students, alumni, educational leaders, businesses, could be taken into consideration for specific strategies of building the soft skills via an e-learning mode.

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7. Appendix

Semi-interview Questions

1. From your perspective, how do soft skills for employability play a role in teaching English for specific purposes (i.e., English for Business, English for Tourism), especially in an online bachelor's degree program in English linguistics?
2. What soft skills do you think are the most important to be taught in the program? Why?
Suggested soft skills (Tran, 2020):
 - **Basic skills:** Literacy, using numbers, using technology
 - **Personal skills and attributes:** Being responsible, resourceful, flexible, having self-esteem, management skills
 - **Conceptual/ Thinking skills:** collecting and organizing information, problem-solving, planning and organizing, learning-to-learn skills, critical thinking, creativity
 - **People-related skills:** Communication, interpersonal, teamwork, customer-service skills
 - **Business world-related skills:** Innovation skills, enterprise skills
 - **Community-related skills:** Civic or citizenship knowledge and skills
3. What do you think about the roles of thinking skills and people-related skills? What about the other skills?
4. Are there any differences between an e-learning program and a traditional on-campus program in the way these soft skills are taught and assessed?
5. Are there any obstacles in learning and teaching these soft skills via an e-learning mode? Why (not)?
6. What should be done to tackle these obstacles? Do you have any suggestions for developing the soft skills for employability in an online bachelor's degree program in English linguistics?

232-Exploring the Potential of Micro-Credentials in Facilitating Competency Development for Human Capital via ODL Universities

Santhi Raghavan¹, Nantha Kumar Subramaniam², Ahmad Izanee Awang³

Abstract

In recent years, there is growing interest from the government agencies, higher education institutions (HEIs), statutory bodies and the corporate sector in micro-credential courses to not only provide but also enhance employment opportunities to confront the new world. The rising prominence of micro-credentials initially started during the COVID-19 pandemic, where online resources offered competency and capability-building opportunities for the work-from-home (WFH) human capital. Conventional higher education institutions (HEIs) which halted operations during the pandemic, changed roles from offering full-time programmes and began implementing online, short-term micro-credentials courses. This paper not only explores the role of micro-credential courses in facilitating competency development for the workforce, but also investigates the current trends and challenges in developing and implementing micro-credentials courses via ODL universities. Traditional universities basically offer full-time or part-time conventional programmes to students fresh from school, but the COVID-19 pandemic combined with total halt to face-to-face lectures, paved ways for ODL universities to showcase their prowess to close the gaps in increasing inequities in accessibility to higher education by continuing to offer programmes digitally. This study employed triangulation approach, combining quantitative and qualitative data collection methods from the workforce, universities, employers and statutory bodies. The findings indicated that the workforce desired more options to upgrade and upskill themselves, opting for shorter durations and lower fees. Employers, on the other hand, prefer employees with high-value skills and competencies. The findings indicate that conventional colleges and universities have started to actively engage in granting short-term programmes for adult learners via ODL that supports employability and marketability. The implication of these findings indicates that ODL institutions implementing micro-credentials must consider the acceptance and stackability of credentials from different HEIs, with clear validation metrics, and allow maximum transferability among ODL institutions in different countries, through AAOU as an international consortium.

Keywords: *Micro-credentials, Competency development, Human capital, ODL*

1. Introduction

Increasing cost of higher education for both learners and education providers, accelerated labour market changes, rapid skills obsolescence, growing pressure for more flexible learning opportunities and ultimatum for global experiences, has generated the expansion of alternative credentials for the workforce. One form of alternative credentials that is gaining increasing recognition is the micro-credential.

Malaysian Qualifications Agency (MQA) (2020) defines micro-credential as “digital certification of assessed knowledge, skills and competencies in a specific area or field which can be a component of an accredited programme or stand-alone courses supporting the professional, technical, academic and personal development of the learners”. One of the most common definition being cited in recent times would be that of Prof. Beverley Oliver who says “a micro-credential is a certification of assessed learning that is additional, alternate, complementary to or a formal component of a formal qualification” (Oliver, 2019, p.19). These definitions,

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though broad, highlights that micro-credentials are additional forms of (short-term) certification, that can complement existing educational provisions provided by formal programmes, or may be taken as alternatives to facilitate the competency development of the learner. This can be further attested by the definition given by the European Commission (2022, p. 10) that “a micro-credential is a proof of the learning outcomes that a learner has acquired following a short learning experience”.

1.1. Literature Review

Through a collaboration between the Malaysian Ministry of Human Resources and Ministry of Higher Education, the Human Resource Development Corporation Micro-credential Initiative was launched in Malaysia in April 2022. These first ever comprehensive industry-based micro-credential courses are to assist Malaysians across all backgrounds to obtain stackable certifications through short-term learning to facilitate their competency development. These certifications or credentials will enable learners to acquire officially recognised qualifications through personalised learning pathways. Currently, the Human Resource Development Corporation (HRDC) is aimed at encouraging employers to provide learning and development opportunities for their employees and shoulders the responsibility to drive Malaysia’s talent development. HRDC has initiated the HRDC Micro-credential Initiative which holds the largest repository of courses in Malaysia, with 10,000 courses across 24 skill areas. It aimed to create 50,000 micro-credential training places for Malaysians by the end of 2022 and over 3 million micro-credential training places are to be added within the next five years. To support this initiative, MQA launched the “Guidelines on Micro-credentials” in March 2019 to provide Higher Education Institutions (HEIs) and other stakeholders in Malaysia with information on the principles and guidelines to good practices (GGP) in the implementation of micro-credentials. This has led many HEIs, including Open University Malaysia (OUM), to offer micro-credentials.

TalentCorp, is another key agency in complementing the capacity-building ecosystem in Malaysia. Established under the Prime Minister’s Department in 2011, it is a national agency driving Malaysia’s talents toward becoming a dynamic talent hub. TalentCorp collaborates with public and private sectors, industry leaders, and professionals to bridge the talent supply-demand gaps across various sectors.

In a world that is demanding a greater level of flexibility, micro-credential courses are more accessible to a broader range of people in a short time. Micro-credentials fulfil the urgent need for upskilling and retraining, by not replacing the current methods of conventional education, but rather offer an option to those interested in earning a formal qualification through a flexible education system. It is noticeable that national and international initiatives on policy documentations to stimulate global higher education policies on micro-credentials have continued to be produced. Amongst these, UNESCO’s Global Convention on Recognition which came into play in March 2023, has the potential to be an important milestone for the recognition of micro-credentials across the globe. Meanwhile from the European context, the European Commission published the Council Recommendation on Micro-Credentials for Lifelong Learning and Employability in 2022 that attempted to address issues linked to micro-credentials. The Organisation for Economic Co-operation and Development (OECD) too, in 2023, has published a perspective paper drawing on evidence to form some views on the impact of micro-credential initiatives and policies. In a nutshell, micro-credentials are found to have macro values to assist in upskilling for employability and therefore will encourage meaningful participation from the workforce as it provides for both life-long and life-wide forms of learning.

Brown, M., Mhichil, M., Beirne, E. and Lochlainn, C. (2021) developed the chart in Figure 1 to map out the emerging credentials landscape differentiating the bundled from unbundled credentials and credit-bearing from non-credit bearing. Brown et al. (2021, p. 235) consider micro-credentials as a way of meeting the projected growth in demand for higher education worldwide.

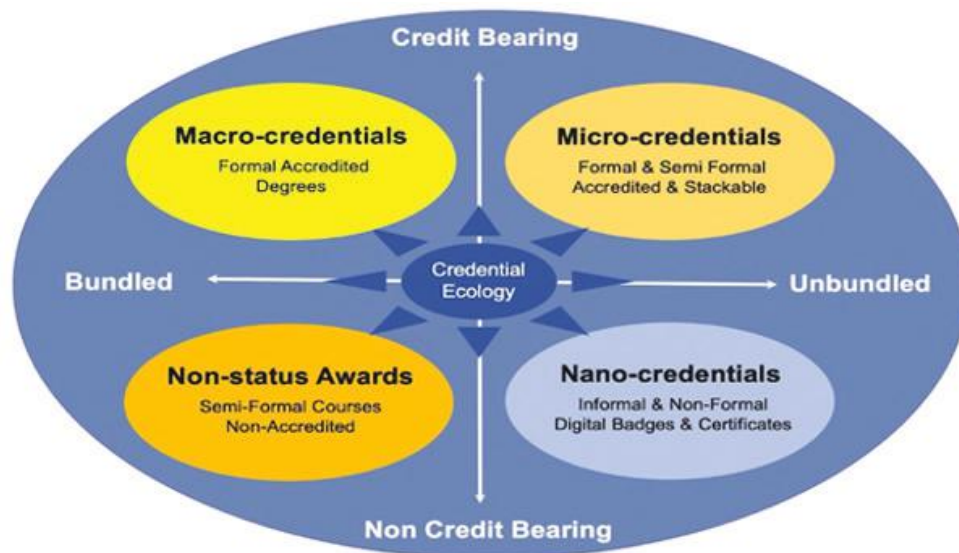


Figure 1. The New Credential Ecology

Source: Brown et al, 2021, licensed under a Creative Commons Attribution 4.0 International License

An updated version of this chart is displayed in Figure 1, depicting four credential quadrants across two axes:

- The x-axis differentiates between bundled and unbundled credentials.
- The y-axis distinguishes between credit-bearing and non-credit-bearing credentials.

On one end of the y-axis, conventional macro-credentials and credit-granting micro-credentials are situated, earned through formal and semi-formal learning. The x-axis illustrates the extent to which credentials and corresponding study units are packaged together by the awarding body or institution, as opposed to scenarios where learners exercise significant discretion in assembling their individual learning packages. According to this classification, micro-credentials are distinguished from traditional macro-credentials, non-status awards like short courses, and nano-credentials such as digital badges or certificates, as they are unbundled, credit-granting, and stackable credentials. However, the boundaries between quadrants in this credential map are not always as distinct in practice. For example, a learner could possess a non-credit-bearing badge in project management, but this badge can be evaluated as ‘recognition of prior learning’ (RPL) or ‘accreditation of prior learning’ (APEL) by a HEI or incorporated into a professional portfolio, which subsequently contributes to a credit-bearing micro-credential course, making the micro-credentials suitable for HEIs entry requirement as well as credit transfers.

2. Method

This study explored the potential of micro-credentials in facilitating competency development among the workforce as well as investigated the current trends and challenges in developing and implementing micro-credentials in ODL universities. The study used triangulation approach to determine the present experiences and future expectations of a sample from the workforce, universities, employers as well as statutory bodies governing talent acquisition among the working population in various industries.

There were two (2) stages using qualitative and quantitative approaches.

Stage 1: Sourcing from the workforce using questionnaire on the role of micro-credential courses offered locally, factors contributing to take-ups and demands in Malaysia and other countries

The first stage, which is quantitative in nature, deals with the identification of the key variables that influence the micro-credential course offerings locally and factors contributing to take-ups and demands in other countries. A questionnaire was developed by using an adapted survey instrument comprising closed-ended and open-ended questions. It was divided into three main sections: a demographic profile in the first section and the factors contributing to take-ups and demands for micro-credential programmes in the second section. The third section consisted of open-ended questions that sought information from the respondents as to what the challenges are and how they believe the micro-credential courses should be deployed. The researchers contacted the selected universities to seek their cooperation to obtain their working adult learners to participate in this study.

Stage 2: Sourcing from the Focus Group Discussion (FGD) sessions with Head of Departments of selected Malaysian universities, MQA, HRDC and TalentCorp on the trends of offerings micro-credential courses and challenges in developing, as well as implementing micro-credentials

This stage is qualitative in nature and begins with Focus Group Discussion sessions. There were seven (7) Focus Group Discussion sessions, each consisting of 3-5 participants. The members of the Focus Group Discussion sessions were deans, deputy deans, academics and senior managers from the focus sector. During the Focus Group Discussion sessions, interviews were recorded with the consent of the participants but the identity of the participants were withheld.

All standard research method processes and practices were observed including obtaining permission, using third-party individuals between the researcher and respondents to collect responses, seeking voluntary participation and ensuring research ethics are not compromised during the distribution and collection of the questionnaires. Quantitative data collected from the survey was analysed using SPSS by using various statistical tests. The focus group discussion was analysed through thematic constructs.

2.1. To Explore the Role of Micro-credentials in Facilitating Competency Development for Human Capital

Google forms containing survey questions were delivered online via emails and links to the workforce. The working community may or may not participate in micro-credentials courses to enhance their skills. Their participation is either encouraged by their employers or are self-motivated to further improve their talents and competencies. Or neither.

2.2. To investigate Current Trends and Challenges in Developing and Implementing Micro-Credentials via ODL Universities

Focus group discussions were held in selected public and private Malaysian universities offering micro-credential courses, as well as with employers and the statutory bodies. Heads of departments were asked about the necessity to offer micro-credential courses and their experiences planning, developing and/or implementing the micro-credential courses and how much their knowledge on micro-credential courses improved after evaluating these courses.

3. Findings

Respondents agreed that micro-credentials offer broader opportunities for upskilling, allowing both employers and employees to engage with learning experiences that can better equip their organisations for the future. This concept, known as a 'learning organisation' in human capital development, encourages individuals to continuously improve themselves for the benefit of the organisations they serve. Micro-credentials are poised to enhance employee engagement and foster a culture of lifelong learning, thereby supporting the organisations they are part of.

3.1. Role of Micro-credential in Facilitating Competency Development for Human Capital

Historically, conventional education has been viewed as a single path, leading to long-term employment in a specific field or industry. However, rapid transformations due to innovation and technological advancement necessitate constant upskilling to tackle new challenges in the workplace. Micro-credentials offer an ideal solution for those aiming to enhance their skills as part of their lifelong learning journey. The advantages of micro-credentials include:

- Quick completion times to facilitate knowledge expansion or enhancement
- Flexibility, allowing a wider population to access them
- Alignment with industry and workforce requirements, ensuring relevance
- Compatibility with other forms of learning
- Ultimate result being a pool of skilled workers ready for new roles

The workforce surveyed highlighted that micro-credentials are very effective as they help in developing professional skills and academic knowledge in a shorter time, and are able to facilitate human capacity development through four (4) areas: upskilling, reskilling, lifelong learning and supporting formal education for school leavers. Micro-credential courses serve as a key asset in human capital development by promoting upskilling

and reskilling among the workforce, thereby enhancing their competencies and skills. Moreover, their flexibility facilitates lifelong and life-wide learning, supporting continuous knowledge acquisition among employees.

This supports the findings by Varadarajan, S., Koh, J., & Daniel, B. (2022) who presented a detailed systematic review of literature on micro-credentials, in which they analysed $n=60$ studies published over the period 2015–2022. Using the stakeholder-focused approach, through examining and analysing from workforce (learners), higher educational institutions, employers, and statutory bodies (governmental) perspectives, their review presents a coherent summary. Among the findings is the identification from higher education institutions (HEIs) perspective of the need for academic support (92%) (p. 10), demonstrating that micro-credentials are highly-dependent on institutional buy-in. From a governmental perspective, the common confusion regarding terminology (47%) (p. 11) has undoubtedly proved a barrier. This emphasises the need to develop “frameworks” or pathways, both for learning, employment, and within qualification agencies for accreditations and recognitions. Van der Hijden and Martin (2023), in their UNESCO policy paper on short courses, micro-credentials and flexible learning pathways, draw similar conclusions and provide insight into global developments of micro-credentials, including in the context of developing and emerging countries which brings us to the next findings in our study.

3.2. Current Trends and Challenges in Developing and Implementing Micro-credential Courses via ODL Universities

The findings from these focus group discussions at selected universities highlight that the micro-credential courses positively influence the participants’ learning experiences and understanding of the subject matter.

The selected universities, MQA, HRDC and TalentCorp view micro-credentials through various lenses, recognising their potential to foster lifelong learning, provide alternative education paths, expand access to education, and offer stackable credentials that enable progression in learning. Micro-credentials are seen as a pivotal tool in the lifelong learning continuum. In the context of widening access to education, micro-credentials remove several barriers typically associated with traditional degree programmes, such as time, cost, and geographical constraints. They thereby, help reach out to marginalized groups, offering them an opportunity to gain recognised qualifications and enhance their career prospects. Additionally, the stackable nature of micro-credentials provides a stepping-stone for learners. Individuals can accumulate these credentials over time to achieve higher qualifications, making the process of higher education more manageable and less overwhelming.

MQA acknowledges the importance of recognising non-formal and informal learning. Many individuals acquire valuable skills outside of formal education settings. Micro-credentials offer a platform to validate and recognise these skills, improving visibility for such learning and subsequently enhancing individuals’ employability and career prospects. In conclusion, the MQA’s perspective on micro-credentials aligns with the global trend towards more flexible, accessible, and learner-centered education systems. By embracing the concept of micro-credentials, MQA is helping shape an education system that caters to the 21st century and beyond. To further accelerate micro-course courses, the Accreditation of Prior Experiential Learning for Micro-credentials (APEL-M) by the Malaysian Qualifications Agency (MQA) is an initiative designed to recognise and validate the knowledge, skills, and competencies obtained through various learning experiences for the award of qualifications under the Malaysian Qualifications Framework (MQF). This innovative approach focuses on “unbundled” or stand-alone micro-credentials, allowing individuals to gain recognition for small, specific skill sets or competencies. APEL-M offers a pathway for learners to acquire qualifications in a flexible, personalized manner that aligns with their unique learning journeys and professional development needs. It acknowledges the importance of both formal and informal learning, providing a robust system for recognizing a wide range of skills and competencies that are essential in the modern workforce. By doing so, APEL-M contributes to creating an inclusive, dynamic, and responsive education system that caters to the diverse needs of learners and the ever-evolving demands of the job market.

The findings also indicated that micro-credential courses can be offered as online courses and further enhanced by open and distance learning (ODL) technology, as an alternative to widen their learning opportunities. Learning at their own pace, time and through their preferred methods, resulting in continuous learning for certification opportunities and make lifelong learning a reality for competency development for Malaysia’s human capital. This supports the findings by Kumar, J., Richard, R., Osman, S., & Lowrence, K. (2022) through their quantitative analysis which indicated that learners valued the micro-credential in particular for

its professional relevance as a facet of digital learning identity (p. 18). According to Kumar et al., their study highlighted the fact that self-motivation and efficacy might be required for learners taking micro-credentials. The authors indicated that the participants were comfortable and competent using technology for autonomous learning. This indicates that micro-credentials via ODL is an option to upgrade and upskill human capital and is a practical choice as working adults can choose to work and study at their own time and pace with maximum flexibility.

Due to its positive take-up factors, ODL universities can also encourage international participants to enrol in the micro-credentials courses and enhance their employability in the global market. ODL universities can offer a wide range of micro-credentials to help local and international learners acquire the necessary skills and knowledge, to keep up with the rapidly evolving industry. Micro-credentials provide these learners with the opportunity to acquire in-demand skills quickly, making them valuable assets in the job market. These courses can be targeted at both beginners and experienced professionals looking to expand their skillset. In summary, these micro-credentials can be an effective way to stay competitive and relevant in their chosen field.

4. Discussion and Conclusion

This study relating to a wide variety of domains linked to micro-credentials, was conducted to act as a counterpoint to the volumes of grey literature and digital sources repeatedly echoing purported benefits and advantages of micro-credentials with little or no evidence base. We speculated and indeed hoped that this study could become a useful resource reflecting an evolving global micro-credential movement in universities.

There is also a need to tie micro-credentials more explicitly to Sustainable Development Goal 4 (SDG) on “relevant skills for decent work”. By 2030, there is a need to substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship and specifically in SDG 4.4: “increase the number of people with relevant skills for financial success”.

The findings also indicated that conventional colleges and universities worldwide have actively started to engage in conducting short-term programmes for adult learners via digital education. The implication of these findings indicates that ODL institutions implementing micro-credentials must consider the acceptance and stackability of credentials from different HEIs, with clear validation metrics. Economic power is shifting from the conventional European countries to the dynamics of Asia. Therefore, it is suggested to position AAOU to promote these initiatives on digital education such as micro-credentials:

1. Memorandum of Agreement (MOA) for mutual understanding and recognition of quality assurance agencies among ODL universities in Asia, by addressing mutual gaps and concerns for programmes and /or courses accreditation and recognition via AAOU roundtable discussion(s).
2. Establish a common AAOU Qualification Agency for all education types, including micro-credentials.
3. Develop a micro-credential credit bank system (undergraduate and postgraduate) in collaboration with AAOU member countries for mutual acceptance.
4. Jointly develop programmes with other AAOU member countries to mutually recognise and approve micro-credential courses.

The above recommendations will allow maximum transferability among ODL institutions in different countries, through AAOU as an international consortium.

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233-Using Chatbots for Student Support in Open and Distance Learning

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Abstract

Open and distance learning has become increasingly widespread in recent years and has become one of the mainstream education models. While this education model is becoming increasingly widespread, many difficulties are encountered. One of these challenges is the lack of effective student support. In this context, the increase in the number of students in open and distance education directs institutions providing education in this way to new searches for support services. Taking this into account, this paper aims to investigate the implementation and effectiveness of chatbot technology as a means of student support in open and distance education environments. Open and distance learning institutions can integrate developing technologies to bring innovation to the support services processes. Chatbots are one of the technologies that have recently been developed in the field of artificial intelligence and are used in different sectors, constantly evolving. This technology is an example of the increasing use of emerging technologies in open and distance learning support services. In addition, chatbots can mark the beginning of a new process in educational environments by personalizing learning support. Based on this, the main purpose of this study is to examine the use of chatbots in open and distance learning environments in addition to traditional support services. In this context, this paper outlines a comprehensive study on the implementation and effectiveness of chatbot technology for student support in open and distance education by investigating the current developments and trends in the use of chatbots in the literature. The outcomes of this paper will contribute to the advancement of student support in open and distance education. Furthermore, the findings of the study will provide faculty members, managers, and policymakers working in the field of open and distance learning support services with a different perspective on the use of chatbots in the open and distance learning processes.

Keywords: *Open and distance learning, Online education, Support systems, Chatbots, Artificial Intelligence*

1. Introduction

Open and distance learning has undergone various phases, each contributing to the growth and development of the field (Ukwoma & Ngulube, 2023). Its primary objective is to afford students educational opportunities by minimizing or eliminating access barriers. Open and distance learning has experienced a significant surge in popularity in recent years due to its capacity to provide students with flexible access to education. Nevertheless, one of the challenges faced by providers of open and distance education is the insufficient provision of effective student support. The rise in student numbers has prompted open and distance learning institutions to undertake new initiatives in support services. It is plausible to assert that as the student population increases, so too will the demand for support services. Tait (2000) contends that student scale is a crucial factor in determining the structure of support services.

Thorpe (2002) defines student support as the actions necessary to overcome personal difficulties that often become too overwhelming for a student to handle alone. It is acknowledged that open and distance education systems utilize technologies developed from the past to the present to furnish support to learners. Examples of these support services include telephone calls, emails, and web pages. The choice of technologies may vary based on the learners' needs, the intensity of student engagement, and the institutional stance towards technology. These technologies empower learners to access support services through various technological devices, ensuring the most efficient use of these resources. Presently, the rapid advancement of software

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processes and artificial intelligence technology demonstrates the potential application of this field in open and distance learning. In this context, it can be posited that chatbots, which have been discussed since the 1950s, can serve a role in student support services. One of the aims of support services is to foster students' sense of belonging to the institution and consequently, have a positive impact on their academic performance (Kumtepe et al., 2019). In this regard, it is conceivable that chatbots offering uninterrupted 24/7 service can be employed in student support services to meet the growing demand for such assistance. This research encompasses various definitions of chatbots and diverse classifications from varying perspectives in open and distance learning environments.

2. Literature Review

2.1. Open and Distance Support Services

The increasing demand for open and distance learning increases the number of learners in the system day by day. It is known that the increase in the number of learners has led open and distance learning institutions to search for new support services. Student support services can be considered a component that serves learners by utilizing different types of technologies in open and distance learning environments. In the open and distance learning system, which has its origins in the 18th century (Simonson et al., 2008), the fact that students are away from the instructors, manage their learning with their own responsibilities, and access resources with different technological tools shows that they will need more support than students in the traditional education system (Kumtepe et al., 2019). At this point, Simpson (2002) divides learner support services into academic and non-academic services. Tait (2003) mentions three different central functions of learner support: cognitive, affective, and systematic. While the cognitive function emphasizes support and enhancing learning, the affective function is related to constructing an environment of willingness and self-esteem. The systematic function is related to the management process. Berge (1995) categorizes the roles that need to be undertaken for the successful implementation of open and distance learning as social, pedagogical (educational), administrative (managerial), and technical support. Social support aims to strengthen learners' relationships with their friends by interacting with each other outside of education and training, while pedagogical support involves the learner interacting with the instructor in order to understand the concepts, principles, and skills more easily during the teaching process. Administrative (managerial) support includes organizational procedures such as registration procedures, academic calendar, course, and grade procedures, while technical support service is provided to solve the technical problems of the learners.

The structure, model, and technologies used in support services may vary from institution to institution. The student density of the institution is one of the main reasons for this variability. Tait (2000) emphasizes that when providing student support, it is important to make a distinction between the technologies available to institutions and the technologies accessible to students. On the other hand, Zawacki-Richter and Oayyum (2019) emphasize that modern distance learners are always connected to the internet and can access information and support services through different tools.

2.2. Artificial Intelligence Applications in Open and Distance Support Services

Technology plays a major role in industry and daily work by serving various purposes, and it is applied in different ways in different parts of the world. Artificial intelligence has been integrated into applications in many fields; it has not only started to be used in different fields from banking to sports, but also in the service sector and education. The worldwide conversational AI market is predicted to develop at a compound yearly growth rate of 22.6% from USD 10.7 billion in 2023 to USD 29.8 billion by 2028 (MarketsandMarkets, 2023). Clark (2017) states that chatbots have become widespread in areas such as retail, health, and finance. The chatbot industry was worth USD 113 million in 2017 and is estimated to reach USD 1.23 billion in 2025 (Kaczorowska and Spsychalska, 2019). In addition, Clark (2017) emphasizes that although the field of education lags behind other fields in adopting new technologies, it will not take long to catch up. Especially in large-scale learning scenarios in universities or massive open online courses (MOOCs), chatbots have the potential to compensate for inadequate support from instructors (Hone and El Said, 2016).

2.3. Chatbots

Technology has a significant influence on business and everyday life. Artificial intelligence is known as a concept in which technology is concentrated in almost every field and has started to develop and popularize

its applications. AI technology has a wide range of applications and is utilized in a variety of ways across the world, such as chatbots. The journey of chatbots to the present day began in 1950 with the famous article “Computing Machinery and Intelligence,” published by the British mathematician, computer scientist, and cryptologist Alan Turing in the philosophy magazine *Mind* (İşeri, Aydın, and Tutuk, 2021). Pratt (2017) describes chatbots as AI tools that engage users through messaging applications, websites, mobile apps, or over the phone. According to Gupta et. al., (2020), chatbots can be used to enhance people’s skills and enable them to be more creative.

Although the first chatbot, ELIZA, was developed in the 1960s, the field of developing chatbots can be considered young and is rapidly gaining popularity in various areas of life. People can engage with chatbots for different purposes, for various reasons, and for different periods of time. Clark (2017) states that chatbots have become widespread in areas such as retail, health, and finance. Furthermore, Singh (2018) discusses seven different ways in which chatbots affect education. In the context of the student support process, Instant Help for Students and Better Student Support stand out as two of these ways. Similarly, Clark (2017) mentions FAQ chatbot and learner support chatbot in his article explaining the use of chatbots in ten different ways.

Chatbots are becoming increasingly used in various industries, including medical, the product and service business, and education. Gupta et. al., (2020) define chatbots as computerized programs that act as intermediaries between humans and bots. Based on their studies, Marinova et al., (2017) and Pantano and Pizzi, (2020) predict that in the near future, humans may be replaced by chatbots providing 24/7 support services. On the other hand, according to Benotti et al. (2018), educational chatbots offer learners a personalized learning experience at a low cost. Although chatbot development slowed at the start of the twenty-first century, it has since become one of the most popular services for both for-profit and non-profit organizations. Mufadhhol et al. (2020) mention that chatbots can stay online without time limits, manage the process by answering multiple people at the same time, and work without human supervision. In comparison to human assistants, this automated technology benefits both customers and businesses since it offers flexibility, accessibility, and low-cost operations (Rajaobelina et al., 2021). Braun and Matthes (2019) state that classification for chatbots can help define requirements and choose the right tools.

2.4. Classification of Chatbots

There are many kinds of chatbots and various ways to categorize them. Ushakova (2019) classifies chatbots into four groups: by purpose, by type of data access, by available services, and by type of response. Winkler and Söllner (2018) classify chatbots in three different dimensions as “building approaches, input mode of chatbots, and inclusion of contextual information” p.6). The first dimension, “building approaches”, differentiates between retrieval-based models and generative models. The input mode of chatbots is the way that chatbots tend to prefer speech over text. In conversations between people in daily life, they may refer to some concepts, for example, places, presentations, or a place traveled to. While this situation is easy to understand among humans, it is not so easy for chatbots. In order for chatbots to respond like humans in such situations, trying to place information such as “linguistic” and “physical” context is expressed as the inclusion of contextual information, which is the third dimension.

İşeri, Aydın, and Tutuk (2021) examined chatbots in two types as rule-based chatbots and artificial intelligence-based chatbots. Similarly, Almansor and Hussain (2020) classified them as Task Oriented and Non-Task Oriented. Task Oriented can be classified into two types: Supervised Approach and Unsupervised Approach. There are two types in Non-Task Oriented; Retrieval based chatbots and Generation based chatbots. On the other hand, Wayesa (2020) analyzed chatbots according to their design approaches by dividing them into three types: Rule-Based, Access-Based, and Production-Based. Sianaki, and Ababneh (2020) classified chatbots in four different ways according to their architectures and expressed them as 1. Interaction Mode, 2. Information Space, 3. Goal Based, 4. Design Approach. Sarandhi et al., (2022) categorize chatbots into two categories: the ones with intelligence (use of AI and NLP), which can evaluate data and enhance their own answers, and those without intelligence, which are pre-defined knowledge (rule-based) base models. In his study, Durak (2022) divided chatbots, which he refers to as dialogue robots, into two. The first one is predefined, and the second one is generative models. The predefined (rule-based) model predicts the question asked by the user by keeping the pre-existing predicted scenarios and predicted answers in a database and transmits one of the pre-prepared answers to the user according to this prediction. On the other hand, generative model chatbots try to answer the user’s text by generating an answer that does not exist in the database. However, today, many developers and software companies are developing chatbots using these two models intertwined. Using these

strategies in the development of chatbots can help to better suit individual or business goals. Trofymenko et al., (2021) emphasized that it makes sense to classify chatbots according to different criteria. It is known as a difficult issue under which conditions and to what chatbots should be compared. Braun and Matthes (2019) presented a framework that can compare chatbots into six different categories: “domain, input/output, timing, flow order, platform, and comprehension”. They stated that this framework allows a meaningful comparison based on important features for users, scientists, and developers. Trofymenko (2021), with a different vision, tried to clearly understand the nature, creation approaches, advantages, and disadvantages of chatbots on one basis or another, and expressed chatbots in seven different types: purpose; location; interface type; number of users; access type; algorithm; functional. Vishwakarma and Pandey (2021) categorized chatbots into five groups under the headings of user, interaction with the user, access, purpose, and principle of operation. Gupta et. al., (2020) categorize chatbots according to algorithms, ease of user interface, and basic technologies used. According to the technologies used, they classified chatbots as menu/button-based chatbots, keyword-based chatbots, and contextual chatbots.

2.5. Chatbots in Open and Distance Support Services

The support services of higher education institutions providing open and distance education can be accessed through their web pages. Based on this, it can be considered that integrating chatbots into support services will enable the use of a different tool in this field. In addition, while opening a different channel in support services offers support diversity, it can be said that students’ access to this service through the institution’s website or application will increase the accessibility of the support service.

In their study, Kuhail et al. (2023) tried to reflect the attempts to use chatbots in education by analyzing and comparing them in seven different dimensions. According to the research, which was examined in seven different dimensions as education area, platform, design principles, function of chatbots, interaction styles, evidence, and limitations, chatbots were mostly created on a web platform to train computer science, language, general education, and a few other subjects such as engineering and mathematics.

Chatbots can offer great value here. Helping students in university admission processes, chatbots can also be used to provide students with all the necessary information and processes related to their education. Besides, chatbots can also act as campus guides and help students when they arrive on campus. They can help students learn more about scholarships, dormitory facilities, library memberships, etc. (Singh, 2018). In this sense, chatbots can be analyzed under the headings of social support and academic support among student support types.

In their study, Winkler and Söllner (2018) link the effectiveness of chatbots in education to the individual differences of students, the quality of the learning process with the chatbot, and the methods of creating chatbots. They emphasized that chatbots will play an important role in the future of open and distance learning and stated that this technology has the potential to support students and instructors in educational environments. The support service of chatbots will be especially useful in large-scale open and distance higher education institutions with a large number of students and in massive open online courses with a high number of students per course. Boeding (2020) emphasized that communication, measurements, leadership strategy, and implementation are important in the adoption of chatbots in higher education institutions. He stated that if chatbots and support services can be well managed by employees, a good experience can be offered to learners.

3. Discussion and Conclusion

In the literature, it is seen that there are studies that classify chatbots into different types, such as area of use, purpose of use, algorithm and platform used, database used, interface type used, and functionality. In these studies, it can be said that chatbots are classified according to the algorithm and platform (working style) used. This situation includes technologies such as background software systems (simple databases, frequently asked questions, word-based working styles) and artificial intelligence technologies (machine learning, deep learning, natural language processing, etc.) in the development of chatbots. Based on this, we can say that chat robots can be divided into Rule-Based Chat Robots, Artificial Intelligence-Based Chat Robots, and Hybrid Chat Robots. On the other hand, it can be said that the classifications made in other fields should be more limited and in-depth, and applied research should be carried out for some classifications (purpose of use, interface type, functionality).

Chatbots do not have features such as sleeping, remembering, getting sick, and retiring like humans (Clark, 2017). Therefore, as they are developed and used practically, it can be thought that they will be used more intensively in the field of education, as in the fields of banking and e-commerce. It can be said that they will contribute to the support services of higher education institutions that provide open and distance learning services with a high student density. In addition, it can be said that by integrating chatbots into student support services in institutions providing open and distance learning services, it can facilitate the work of human resources serving in this field to a certain extent, and these human resources can be used in different fields. On the other hand, although chatbots provide financial benefits to institutions by working 24/7, their usability in this field can be demonstrated by conducting more intensive studies for learners and applications in the context of technical and social support, such as user satisfaction in terms of support service and the ability to answer the questions asked correctly. To summarize, when we visualize the journey of chatbots from the 1960s to the present day, we can understand that while we once thought that having the option to talk to an inanimate virtual machine was a dream, it is now essential for our daily lives (Mouhcine, 2021, p. 11).

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252-Perceptions of Students in the Basic Education Master Program Toward Project-Based Assignments Through Mini Research

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Abstract

Measurement of learning in the Outcome-Based Education (OBE) curriculum is focused on understanding the material, as well as skills that be able to apply at a global level. Basic Education Master Program, Universitas Terbuka has provided Project-Based Tutorial Assignments to students to conduct mini research on topics relevant to the course. Students were provided with explanations through online meetings and sent the mini research guide how to conduct research and write the report. The purpose of study was to analyze the perceptions of semester 1 students towards online tutorial assignments in the Integration of Theory and Practice of Learning course. Mini research activities are carried out by students on the implementation of learning in their classes. The performance of mini research includes planning, implementing, and preparing research reports. The study used a survey method. The survey was conducted to determine the implementation of mini analysis, which includes understanding lecture material, understanding mini research, performance, and preparation of mini research. Questionnaire was sent to 133 students from 16 regions. Interviews were also conducted with the 16 students. Data analysis used descriptive techniques. A total of 104 students have filled out the questionnaire. The results of the analysis show that (1) 98% of students understand the material very well and well, (2) 98% of students understand mini research assignments, (3) 96% of students perceived capable to carry out assignments very well and well, (4) 96% students stated capable to write research reports very well and well. Other findings are that the average level of similarity of the reports reaches 37.4%; the main student's problem is finding relevant references and the lack of ability to paraphrase and write report. Students stated that they needed a more complete assignment guide. The conclusion is that students understand the material and the assignments and be able to conduct mini research and write reports, although the average level report's similarity is quite high. The implication of the research is necessary to develop materials and arrange training regarding how to find relevant references and writing the report, as well as provide more complete research guidance.

Keywords: *Project-based assignments, mini research, Outcome-Based Education, learning theory and practice*

1. Introduction

Curriculum is the most important aspect in an educational program, thus the design and implementation and evaluation in a tertiary curriculum must continue to be pursued thus it is dynamically in accordance with the times, Science, Technology and Arts (IPTEKS) and the competencies needed by the community, as well as users of university graduates (Kemdikbud, 2020, Prihantoro, 2020). The challenge of 21st Century education is the role and strategy in bridging the gap between the educational process in Higher Education and the world of work and the need for innovation. One of the main challenges of 21st century education is the involvement of students in a continuous learning process to acquire skills suitable for the world of work. To face these challenges, the education system needs an appropriate framework such as an Outcome-Based Education (OBE) approach that produces effective learning (Arun Kumar, 2022). OBE is an education system that prioritizes goals, objectives, achievements, and results (Rao, 2020). The effectiveness of implementing OBE is very dependent on educators, so full understanding and awareness of OBE is needed. It takes a lot of will and tremendous effort to adopt new ideas and new skills to change the model from the traditional approach to the OBE approach (Tungpalan and Antalan, 2021). The positive results of the output-oriented learning system (OBE) approach are marked by the fulfillment of learning outcomes determined by the course (Wahyudi & Wibowo, 2018). On

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the other hand Joy and Alata (2019) states that an important component in the implementation and success of OBE lies in: 1) clarity of objectives to be achieved; 2) teacher competence in developing students' abilities; 3) good collaboration between teachers and students will determine achievement of OBE; and 4) the teacher's commitment and dedication in creating a learning environment will result in optimal learning.

One of the effectiveness of the learning process in tertiary institutions is that learning is carried out in a systematic and structured manner through various subjects and with a measurable learning load. Methods that can be used in an effective learning process include methods: group discussions, simulations, case studies, collaborative learning, cooperative learning, project-based learning, problem-based learning, or other learning methods, which can effectively facilitate the fulfillment of graduate learning outcomes (SN-Dikti). One learning model that is able to develop student abilities in fulfilling learning outcomes is through project-based learning (PjBL). PjBL develops students' ability to find meaningful information and create understanding from learning experiences based on what they already known (Roessingh & Chambers, 2011; Joy and Alata 2019). PjBL will be able to involve students in the task of creating new products and be involved in participating in real tasks through collaboration with other students (Chang, Kuo, & Chang 2018; Dana et al. 2021).

The important steps in PjBL are: 1) determining the content and objectives of the skills to be achieved; 2) determine the output achieved through the process and how to present it; 3) determine the project planning and scope, time duration, and evaluation techniques; 4) designing teaching and learning activity plans to support project-based learning, and 5) evaluating project-based learning processes (Havice et al., 2018). The form of making projects that can be carried out by students is through simple research activities (Mini Research) or small-scale research designed by students from the beginning of the lecture and reported at the end of the semester to increase their understanding of a subject topic (Rasyida, 2022; Dasopang et al., 2022).

Relevant research regarding the implementation of project-based learning has shown a positive impact on student learning, motivation, and performance in both the short and long term, increasing student perceptions and developing soft skills and experiences (Ngereja, Hussein, & Andersen, 2020; Syahril, Nabawi, & Safitri, 2021), stimulate interest in learning, build self-confidence, improve student learning performance, develop interest in research, and increase students' understanding of concepts (Wang, 2022; Wahyuni, 2019), improve thinking and expression skills as well as increase student activity and responsibility (Somphol et al., 2022; Abuhmaid, 2020). Relevant research results related to the implementation of Mini Research are that its implementation is able to improve the metacognitive abilities of prospective teacher-students (Rasyida, 2022), and enhance insight/knowledge and experience (Simanihuruk and Simanihuruk, 2019).

Based on the explanation, that it is very important to apply output-based learning (OBE) in lectures by implementing structured assignments through a project-based learning model (PjBL) by conducting mini-research, The Course of MPDR5102-Integration of Learning Theory and Practice for students of the Basic Education Master Program in School Postgraduate Universitas Terbuka (UT) is designed and provided with project-based assignments through Mini Research assignments. The implementation of Mini Research is aligned with the special skills level eight for the master program which refers to the IQF (Presidential Decree No. 8 of 2012), namely being able to develop knowledge, technology, and/or art in their scientific field or professional practice through research, to produce innovative work and tested. Implementation of assignments through Mini Research is carried out to develop students' initial abilities in writing in a systematic and structured manner as a preparation for them in carrying out subsequent assignments. The implementation and results of this learning design need to be studied and analyzed to be used as feedback in the implementation of learning in the following semester. The study was mainly focused on analyzing student perceptions of project-based assignments through Mini Research.

2. Method

This study uses a survey method with a quantitative descriptive approach. The survey was conducted to find out the implementation of mini research which includes understanding lecture material, understanding mini research, implementing and compiling mini research reports. This study describes students' perceptions of carrying out Mini Research activities as one of the project-based assignments in the MPDR5102-Integration of Theory and Practice of Learning Course in The Second Semester of 2022/2023 year. Research data was obtained through a questionnaire to find out student responses in general regarding the implementation of Mini Research. In addition, interviews were conducted with several students to find out the benefits, constraints, and suggestions from students regarding project-based assignments through the implementation of Mini Research.

Questionnaires were sent to 133 students from 16 Regional UTs. A total of 104 students filled out the questionnaire, then interviewed 16 students. Data analysis used descriptive techniques by calculating the percentage of student responses and analyzing the results of the interviews.

2.1. Research procedure

Implementation of project-based assignments through Mini Research is carried out by students in the Integration of Theory and Learning Practice Course courses between September 12 and December 9, 2022. The research procedure begins with creating a project-based learning design by creating a guide for implementing Mini Research for students. The guide contains general provisions, and specific provisions in which there is an explanation regarding planning, implementation and preparation of Mini Research reports accompanied by report templates. Guidelines for preparing Mini Research reports were disseminated to students and lecturers before lectures and during lectures 3 times. The guide is also stored in E-Learning. Students begin preparing for Mini Research in Session 1 of lectures. The research was carried out between Session 2 to Session 7 of lecture activities. In Sessions 8 and 9 students make reports, then in Session 10 students send Mini Research reports via E-Learning.

2.2. Data of Student Perception

The data was obtained from a questionnaire sent via Microsoft form regarding the implementation of the Mini Research. Filling in the questionnaire was carried out in December 2022. In January 2023 interviews were conducted with 16 students to confirm their answers to the questionnaire, as well as convey the benefits, constraints, and suggestions for implementing project-based learning through Mini Research. The questionnaire contains 4 aspects, 12 indicators, and 42 questions/statements. Aspects and indicators on the questionnaire are presented in the following table.

Table 1. Aspects and Indicators on Instruments

| Aspek | Indikator |
|---|--|
| Content understanding | Understanding of the material in the module
Material usefulness associated with daily tasks |
| Understanding of project-based tasks | Understanding of project-based learning
Understanding of research
Understanding of general provisions
Understanding of special provisions |
| Implementation of project-based/mini-research assignments | Topic selection
Title determination
Determination of mini research steps
Theoretical review |
| Writing Report | Understanding and accuracy of preparing reports
Task usefulness |

Furthermore, data from the four aspects are tabulated and analyzed based on the following criteria (Table 2). Data were analyzed as a whole, and also analyzed based on indicators to determine students' perceptions of Mini Research assignments.

Table 2. Instrument Rating Categories and Scores

| No. | Score | Category |
|-----|--------|----------------|
| 1 | 82-100 | Very Good (VG) |
| 2 | 63-81 | Good (G) |
| 3 | 44-62 | Enough (E) |
| 4 | 25-43 | Less (L) |

3. Findings

Implementation of Mini Research is one of the assignments in project-based lectures. Students conduct research in their class in the learning process. The learning process is carried out by first selecting a predetermined topic. These topics are topics contained in the Integration of Theory and Practice of Learning Course Module, which contains several learning theories. After carrying out the learning process, students then compile reports on Mini Research activities. At the end of the course in the Integration of Theory and Learning Practice course, students are given a questionnaire to find out the perceptions and level of implementation of the Mini Research assignment. In addition, interviews were conducted with several people as representatives of students. The results of the questionnaires and interviews are presented as follows.

3.1. Student Perceptions of Project-Based Tasks through Mini Research

3.1.1. Content Understanding

The first aspect in the questionnaire is regarding students' perceptions of material understanding. There are two indicators, namely: 1) understanding of the module, consisting of several statements: (a) the material in the module is presented clearly and easily understood; (b) modules are written systematically and have good continuity; and (c) complete and communicative module content; and 2) the usefulness of the material with daily tasks includes several statements: (a) the material in the module is relevant to daily tasks; (b) the material in the module is the basis for carrying out learning; and (c) the material in the module is useful and in accordance with basic education policy developments. The results of the questionnaire on the aspect of material understanding are as follows.

Table 3. Questionnaire Results on Aspect of Content Understanding

| No | Score | Category | Frequency | Percentage (%) |
|----|--------|----------------|-----------|----------------|
| 1 | 82-100 | Very Good (VG) | 57 | 55% |
| 2 | 63-81 | Good (G) | 45 | 43% |
| 3 | 44-62 | Enough (E) | 1 | 1% |
| 4 | 25-43 | Less (L) | 1 | 1% |
| | Total | | 104 | 100% |

The results of the questionnaire for the aspect of understanding of the material in the Module indicated that students' understanding of the module, and the usefulness of the material with daily tasks are in the very good and good categories.

3.1.2. Understanding of Project-Based Tasks

Furthermore, the second aspect of the questionnaire given is the aspect of student understanding of project-based assignments through Mini Research. This second aspect has four indicators, namely: 1) understanding of project-based learning which includes statements: (a) project-based learning is a learning model that uses projects or activities as media; (b) project-based learning at the tertiary level according to the National Higher Education Standards (SN-PT); (c) project-based learning increases students' understanding of lecture material; (d) project-based learning juxtaposes real classroom learning theory and practice; (e) it is very important to implement course assignments through project-based learning to support students' understanding and skills; and (f) mini research activities/mini-research is a form of project-based learning; 2) understanding of the general provisions with statements: (a) the implementation of mini research/mini-research is carried out in accordance with the general provisions; and (b) general provisions in the guidelines are clear and easy to understand; and 3) understanding of special provisions, which contain: (a) implementation of mini research/mini-research carried out according to special provisions; (b) specific provisions in the guidelines are clear and easy to understand; and (c) general and specific provisions on mini-research assignments facilitate the implementation of mini-research. Questionnaire results are visualized through the following table.

Table 4. Questionnaire Results on Aspect of Understanding of Project-Based Tasks

| No | Score | Category | Frequency | Percentage (%) |
|----|--------|----------------|-----------|----------------|
| 1 | 82-100 | Very Good (VG) | 62 | 60% |
| 2 | 63-81 | Good (G) | 40 | 38% |
| 3 | 44-62 | Enough (E) | 2 | 2% |
| 4 | 25-43 | Less (L) | 0 | 0% |
| | Total | | 104 | 100% |

The aspect of student understanding of project-based assignments in the form of Mini Research has three indicators and 14 statements. In this aspect, in general it is in the very good category. The frequency that answered very well was 62, with a percentage of 60%. Meanwhile, there were no students who answered the less category at all. Thus, in general students' understanding of project-based assignments through Mini Research is very good.

3.1.3. Implementation of Project-Based/Mini-Research Assignments

Regarding the third aspect related to the questionnaire given to students, namely the aspect of carrying out project-based assignments through Mini Research. This third aspect has 4 indicators and 12 statements. The indicators and statements are: 1) topic selection consists of several statements: (a) the topic chosen is in accordance with the topic of the material in the module; and (b) the topics chosen are understood and easy to do research on; 2) determining the title includes: (a) the title is written based on the topic; and (b) determining the title is easy to do and according to the topic; 3) determination of mini research steps which include: (a) mini research begins with making a plan; (b) the implementation of mini research has used appropriate instruments (observations, interviews, documentation); (c) mini-research conducted in the class itself; and (d) mini research is carried out in stages according to the guidelines; and 4) theoretical studies include: (a) Before conducting mini-research, review various theories; (b) the theory studied is in accordance with the mini research topic; (c) the theory studied is easy to get references; and (e) references in the form of books and research articles.

Based on the distribution of questionnaires filled out by students, student perceptions related to the implementation of project-based tasks through Mini Research can be seen in the Table 5. Table 5 shows the largest percentage through the very good category of 59%, the good category is 38%, the category is sufficient 4%, while the category does not exist. this result shows that the implementation of project-based tasks through Mini Research is generally perceived to be in the very good category. Thus students have the view that they have carried out Mini Research assignments in very good categories, in terms of selecting topics, determining titles, determining research steps, and seeking theoretical studies.

Table 5. Questionnaire Results on Aspect of Implementation of Project-Based/Mini-Research Assignments

| No | Score | Category | Frequency | Percentage (%) |
|----|--------|----------------|-----------|----------------|
| 1 | 82-100 | Very Good (VG) | 61 | 59% |
| 2 | 63-81 | Good (G) | 39 | 38% |
| 3 | 44-62 | Enough (E) | 4 | 4% |
| 4 | 25-43 | Less (L) | 0 | 0% |
| | Total | | 104 | 100% |

3.1.4. Writing Report

The last aspect of the questionnaire concerning student perceptions of the implementation of project-based assignments through Mini Research is the aspect of preparing reports. There are two indicators and ten statements in this aspect, namely: 1) understanding and accuracy of report preparation, including statements: (a) report preparation according to guidelines; (b) the guidelines have facilitated the preparation of reports; (c)

the preparation of the report is not experiencing problems; and (d) the report is made according to the time specified; 2) the usefulness of the task, has the following statements: (a) Mini Research activities are useful in improving the quality of learning; (b) Mini Research should still be carried out in the Integration of Theory and Practice of Learning course; (c) Mini Research adds insight into learning practices in class; (d) Mini research as proof of a professional teacher; (e) Mini Research can support students' ability to conduct research; and (f) Mini Research is able to help students determine topics for thesis. The results of the questionnaire are shown in the following table.

Table 6. Questionnaire Results on Aspect of Writing Report

| No | Score | Category | Frequency | Percentage (%) |
|----|--------|----------------|-----------|----------------|
| 1 | 82-100 | Very Good (VG) | 58 | 56% |
| 2 | 63-81 | Good (G) | 42 | 40% |
| 3 | 44-62 | Enough (E) | 2 | 2% |
| 4 | 25-43 | Less (L) | 2 | 2% |
| | Total | | 104 | 100% |

Table 6 shows that the highest frequency, namely 58, is in the very good category with a percentage of 56%, the good category is 40%, while the smallest frequency is in the sufficient and poor categories, respectively 2%. These results indicate that students' perceptions of preparing reports are in the very good category, meaning that students already understand report writing and the usefulness of preparing reports in Mini Research.

3.2. Student Responses through Interview Results

In addition by using a questionnaire, to find out students' perceptions of project-based assignments through Mini Research, interviews were also conducted with 16 students as representatives. This is to obtain complete, relevant and balanced information. The points from the interview results related to Mini Research are as follows.

- a. Student understanding of the material in the module
Based on the results of interviews regarding students' understanding of the material in the module, most students have understood a lot of the material in the module because the presentation is quite communicative, clear, and is complemented by illustrations and exercises. The material in the module is very relevant to students' duties as teachers. The learning theories learned are very useful in creating the learning process. These learning theories are in accordance with the developments and learning demands in the freedom to learn era.
- b. Student responses to project-based assignments through Mini Research
Student understanding of project-based assignments through Mini Research in general shows a fairly complete understanding. Through Mini Research assignments, students are able to juxtapose learning theories through learning practices. The students said that the implementation of Mini Research was important to support students' understanding and skills in creating meaningful learning. Creating meaningful learning is one of the competencies for teachers, namely pedagogical competence. The best contribution made by students is through Mini Research assignments that can inspire students to continue learning, hone social skills, develop leadership, and apply all the knowledge gained to improve the quality of education.
- c. Student responses to the implementation of project-based assignments through Mini Research
The results of interviews regarding the implementation of Mini Research stated that students had chosen topics and titles according to the material in the module. Students first examine the theories and sources relevant to the topic to be studied. In addition, students review previous research findings as the basis for the research to be carried out. Students carry out Mini Research according to the stages in the guide. The guide which contains general provisions and special provisions is very useful for students. The guide is their reference in conducting Mini Research. In addition, the template for making Mini Research reports is very useful as a reference for writing thus you don't deviate too much from what is expected from the report.

d. Student responses to the preparation of the Mini Research report

The results of the interview regarding the preparation of the Mini Research report, in general students have followed the guidelines and templates provided. This will make it easier for them to prepare Mini Research reports. Implementation of Mini Research needs to be done because there are several benefits to be gained, especially in training the ability to do research, integrating learning theory and practice, and applying theories that underlie learning in the Era of Freedom to Learn through the implementation of the Independent Curriculum. Through this Mini Research, students have writing experience, and the topics chosen can be continued for the final master's project if the topic is relevant and in accordance with the research issues that are appropriate for the thesis.

e. The advantages and disadvantages of project-based tasks through Mini Research

Based on the results of interviews with students, the advantages and disadvantages of project-based assignments through Mini Research were obtained as follows. advantages of Mini Research: 1) training the ability to write scientific papers; 2) as an initial stimulus in conducting actual research and preparing research topics for further research; 3) as a forum for students to implement theory obtained in lectures into the real world, namely learning in their respective classes/schools; 4) mentally train students to focus on doing lecture assignments that are more contextual; 5) train students to apply a more varied learning approach model; 6) Mini Research provides broader knowledge for researchers and can open views on various things that were not known before; 7) become a forum for implementing creative ideas into a form of written work thus in the future it will be able to assist students in conducting actual research for their final assignment; 8) train critical, logical, and systematic thinking; 9) train student self-confidence; and 10) students are more creative in adding vocabulary and paraphrasing words that were not widely known before. Some of the shortcomings in carrying out Mini Research include: 1) lack of knowledge about research thus in practice it is still confusing; 2) time is limited due to the tightness of lecture assignments (discussions, tutorial assignments) in each course; 3) students do not have enough time and have difficulty dividing time between teaching assignments and assignments in lectures; 4) students still lack self-confidence because guidance in carrying out Mini Research is limited; and 5) the topics raised in the study were not all suitable because they were too late to choose, while the topics they wanted had been chosen by many other students.

f. Constraints and suggestions

Some of the obstacles presented by students included: 1) limited experience in finding references, especially relevant journal articles; 2) has limitations in avoiding similarity level checks; 3) has limitations in paraphrasing and quoting; and 4) the time available is very limited.

While suggestions submitted by students, including: 1) add a meeting to explain the implementation of the Mini Research; 2) there is special guidance on how to find relevant references; and 3) add an explanation on how to make a good report.

4. Discussion and Conclusion

The Integration of Learning Theory and Practice course is one of the courses in the first semester of the Basic Education Masters Study Program. This course is a course that contains project-based assignments. The chosen project-based task is through the implementation of Mini Research. Mini Research assignments are carried out by students from the start of attending lectures. At the beginning of the lecture students are given an explanation of the steps and procedures for implementing Mini Research. A total of four student meetings were given an explanation of the steps for implementing the Mini Research. In addition, Mini Research report templates and guidelines are integrated into the Introduction section of E-Learning. The Mini Research Report is the output assessed in this course. Reports uploaded by students in the third task in Session 10 of tutorial activities.

4.1. Discussion

Learning/lecturing is a process of interaction between students and lecturers and learning resources in a learning environment. The characteristics of the learning process are interactive, holistic, integrative, scientific, contextual, thematic, effective, collaborative, and student-centered (SN-Dikti Article 11). Student-centered means that graduates' learning outcomes are achieved through a learning process that prioritizes the development of creativity, capacity, personality and student needs, as well as developing independence in seeking and finding knowledge. (SN-Dikti).

In order to meet the learning outcomes according to the SN-Dikti, one way is through the implementation of project-based learning through Mini Research activities whose output is in the form of reports on mini research activities carried out by students. This Mini Research activity is carried out by students in the learning process in class. The steps in carrying out the Mini Research are as follows: (1) students determine the research topic chosen based on the topics that contain learning theories in the module; (2) students plan Mini Research activities; (3) students conduct literature studies to examine various theories; (4) students develop learning tools that will be used in the learning process; (5) students carry out learning in their class based on the learning tools made; (6) students assisted by colleagues conduct research in their class through observation, interviews, reflection, and learning documentation; (7) students analyze the results of the research and then make a report on the results of the research; and (8) students upload reports on E-Learning in Session 10.

After students upload Mini Research reports as course assignments, these assignments are then assessed by each tutor in their class. There are seven classes of Semester 1 students who take the Integration of Theory and Practice of Learning course. The total number of classes is 133 students. Each class is accompanied by two tutors. Each tutor assesses the assignment in the form of a Mini Research report uploaded by the student on E-Learning. Assessment of the Mini Research report is based on the guidelines for assessing the Mini Research report. The task in the form of a report is first checked for its similarity level by the system in E-Learning.

After completing the Mini Research report uploaded by students on E-Learning, then at the end of the tutorial activity students are given a questionnaire and interviewed to obtain information about students' perceptions of the implementation of Mini Research. The results of a survey of student perceptions through a questionnaire are presented as follows: (1) the level of student understanding of the material results in 55% very good, 43% good, 1% sufficient, and 1% less; (2) the level of students' understanding of the task results in 60% very good, 38% good, 2% sufficient, and no category is lacking; (3) the implementation of project-based tasks through Mini Research results in 59% very good, 38% good, 4% sufficient, and no category is lacking; and (4) the preparation of the Mini Research report results in 56% very good, 40% good, 2% sufficient, and 2% less. Overall, the results of the Mini Research implementation survey were based on four aspects, namely: understanding of the material, understanding of assignments, implementation of tasks, and preparation of Mini Research reports. The results showed: 55% of the four aspects were in the very good category; 41.5% good category; 2.25% sufficient category; and 0.75% of the four aspects are in the less category.

Based on the results of a survey on the implementation of project-based learning through Mini Research, students generally understand the material in the module regarding learning theories. These materials are very useful as provisions in developing a meaningful learning process. The meaningfulness of the learning process is seen from the integration of learning theories with the stages of learning that are carried out. Through Mini Research students are able to integrate learning theories in the implementation of learning. This is of course students are able to juxtapose between theoretical and real practice in learning. This statement is in accordance with findings (Chang et al., 2018), that project-based learning is actively able to explore real world problems and challenges, and integrate them through knowledge and good practices.

The results of a survey on the implementation of Mini Research showed that its implementation is very important in order to develop teachers' abilities to create innovative and creative learning. This is in accordance with the main tasks and functions of teachers related to pedagogic competence. The importance of project-based tasks through Mini Research is in accordance with findings (Chang et al., 2018) that project-based assignments are able to foster independent thinking, discovery and solving learning problems and perform tasks based on experience through learning practices, actively exploring real world problems and challenges, and acquire new knowledge (Alamri, 2021; Wang 2022).

Project-based learning through Mini Research is considered important according to students. Mini Research is able to stimulate students' desire to continue learning, hone social skills, develop leadership, and apply all the knowledge gained during their education to improve the quality of education. Apart from that, according to the Mini Research task force student, this is a breakthrough that deserves appreciation. Through a careful and meticulous mini-research, students can jointly explore hidden potentials, as well as hone critical thinking in order to create sustainable learning. In addition, with this mini research assignment, students can apply innovative learning theories obtained during their education to be actualized in practical actions at their place of duty.

On the other hand, students' opinions regarding Mini Research assignments are a means for students to learn to prepare themselves for making assignments at the end. With continuous coaching and guidance during the

implementation of mini-research, better quality research and written work will be produced in the future. This statement is in line with Chang et al. (2018) that giving mini-research assignments is the first step to training students to conduct research on a mini scale before carrying out actual research such as final assignments. Through Mini Research it is hoped that they will apply their creative ideas in written form thus in the future they will be able to carry out actual research, and apply meaningful learning (Anon 2019; Chang et al. 2018).

Furthermore, the results of interviews with students obtained information that the task activities in the form of Mini Research still had things in the form of weaknesses. The weakness lies in time. Mini research according to students requires a long time, while the process of lecture activities is still limited. If students do not have great motivation, it will be difficult to manage time, and will be late in submitting assignments. In addition, the experience and knowledge of students who have just entered semester 1 are still minimal. Therefore, students expect more frequent guidance, thus the resulting Mini Research is more focused and in accordance with the demands of learning outcomes. On the other hand, students' ability to write is still lacking. The results of the interviews obtained information that students had difficulties in finding references, minimal experience in quoting and paraphrasing writing. This is evidenced by the similarity level of student Mini Research reports which show that 37.4% of students have a similarity level above 30%.

4.2. Conclusion

Student's perception of understanding of content in the module and usefulness of the material with daily tasks are in the very good and good categories. Furthermore, the perception of understanding of project-based assignments through Mini Research are in the very good and good categories. Thus, in general students' understanding of project-based assignments through Mini Research is very good. Regarding to the perception Implementation of Project-Based/Mini-Research Assignments is generally perceived to be in the very good category. Thus, students have the view that they have carried out Mini Research assignments in very good categories, in terms of selecting topics, determining titles, determining research steps, and seeking theoretical studies. Student's perception of the aspect of writing report are in very good and good categories. These results indicate that students already understand report writing and the usefulness of preparing reports in Mini Research. In addition, from this study it can be concluded that most students have understood a lot of the material in the module because the presentation is quite communicative, clear, and is complemented by illustrations and exercises. The material in the module is very relevant to students' duties as teachers. The learning theories learned are very useful in creating the learning process. These learning theories are in accordance with the developments and learning demands in the Era of Freedom to Learn. Students have quite good understanding in project-based assignments through Mini Research. Through Mini Research assignments, students are able to juxtapose learning theories through learning practices. The best contribution made by students is through Mini Research assignments that can inspire students to continue learning, hone social skills, develop leadership, and apply all the knowledge gained to improve the quality of education. Students carry out mini research referring to the implementation guidelines and making mini research reports provided. Thus, they expect that the guideline will be made more detailed and complete with information on assignments that must be carried out by students. Based on the weaknesses and suggestions from students, information was obtained that further: intensive guidance on the implementation of Mini Research; a complete guide of project-based assignments through mini research, technical guidance in searching references and techniques to avoid plagiarism.

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253-Impact of Digital Capabilities of Learners on the Effectiveness of Their e-Learning Experience

Sujevi Sapukotanage¹

Abstract

This paper examines the influence of the digital capabilities of learners on the effectiveness of their e-learning experience. The digital experience that the learner receives through online platforms may not be the same experience that he/she receives in the physical classroom. In such a context academic institutions need to ensure that each individual learner receives a quality digital learning experience built on the foundational principles of providing equitable, inclusive, accessible learning environments for all students since they are one of the most important stakeholders in the digital learning environment. Student feedback from remote teaching during the COVID-19 pandemic revealed an equity gap and has raised a need to optimize the quality of digital learning experiences for minoritized students. A survey conducted among final year students of the Bachelor of Management Studies (Hons.) degree programme of the Open University of Sri Lanka revealed that there is a positive influence of digital capabilities of the learner on the effectiveness of their e-learning experience. Digital proficiency and Digital learning and development were the dimensions of digital capabilities that were mostly influencing the effectiveness of e-learning. Those who have the capacity to participate in and benefit from digital learning opportunities, identify and use digital learning resources, participate in learning dialogues via digital media and use learning apps and services find e-learning to be effective. Those who have an understanding of the opportunities and challenges involved in learning online and of their own needs and preferences as a digital learner find e-learning to be effective. These findings reveal that the learners who actively engage in digital platforms are reaping more benefits from e-learning. It establishes the fact that the learner characteristics related to technology awareness and motivation to use digital platforms act as prerequisites for successful e-learning. This further establishes the need for educating the learners of their responsibility towards the effectiveness of e-learning in an era where the use of digital platforms for learning is inevitable.

Keywords: *Digital capabilities, e-learning, online platforms*

1. Introduction

Learning is an activity that involves a lot of interaction between and among learners. With the COVID pandemic people got minimum opportunities for interaction with one another. Even government actions had a common goal of reducing the spread of the coronavirus by adopting measures that limited social contact (Gonzalez et al., 2020). Interaction allowed for, in 'learning' for a learner was minimum in this scenario. The pandemic also generated the need to change pedagogical approaches and introduce virtual education (Kamysbayeva et al., 2021). As a result the experience that the learner receives in the classroom has been transferred to an online platform. The digital experience that the learner receives through this exercise may not be the same experience that he/she receives in the physical classroom. In such a context academic institutions need to understand learners' expectations since students or learners are one of the most important stakeholders in the digital learning environment. Studies conducted in many other countries have proved that listening and responding to learner needs and concerns is clearly having an impact on providing a good learning experience. This makes it very important for the academic institutions to obtain an understanding of the digital learning experience of the learners.

It is also important to ensure that each individual learner receives a quality digital learning experience built on the foundational principles of providing equitable, inclusive, accessible learning environments for all students. With the adoption of online platforms for teaching there have been concerns over the delivery of the course contents fulfilling these principles. As a result, more than ever before, it is now essential that the service provider meets the learning needs of minoritized students through effective digital course design and teaching strategies.

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Aydin and Tasci (2005) say that there have been shreds of evidence that the introduction of e-learning initiatives have failed because institutions and their constituents were not prepared for the experience. Therefore Obtaining better data on the student experience potentially enables an institution to identify and address issues of concern to learners.

The importance of this understanding has been explained in prior research studies highlighting the fact that, if students do not perceive e- learning as a positive development or infrastructure, a consequence is that they may disengage from the learning process.

Therefore the present research was conducted to analyze the influence of digital capabilities of the learners registered for level six of the Bachelor of Management Studies Degree Programme on the effectiveness of their e- learning experience. Section two of this paper explains the method used in the study followed by findings and the discussion.

1.1. E-learning

In today's scenario learning has stepped into the digital world in which teaching professionals and students are virtually connected. The use of a desktop, laptop, or smartphones and the internet forms a major component of this learning methodology (Radha et al.,2020).

E-learning encompasses a pedagogical approach that typically aspires to be flexible, engaging and learner centered. It not only differs from traditional learning (i.e., face-to-face learning that takes place in a classroom environment) in the medium by which learning is delivered but also affects the teaching and learning approaches used.

1.1.2. Critical success factors for e-learning

The model of learning activity design introduced by Beetham (2007) explains how the interaction of the learner with the environment leads to planned outcomes with the support of other people, through the design of a learning activity. It indirectly addresses the critical success factors for the learning activity design.

The concept behind this model could be related to the efforts of an academic institution, in providing any other learning experience for a learner. Accordingly the learner characteristics together with the influence of the learning environment can be associated with the e-learning experience of the learner, in a similar manner.

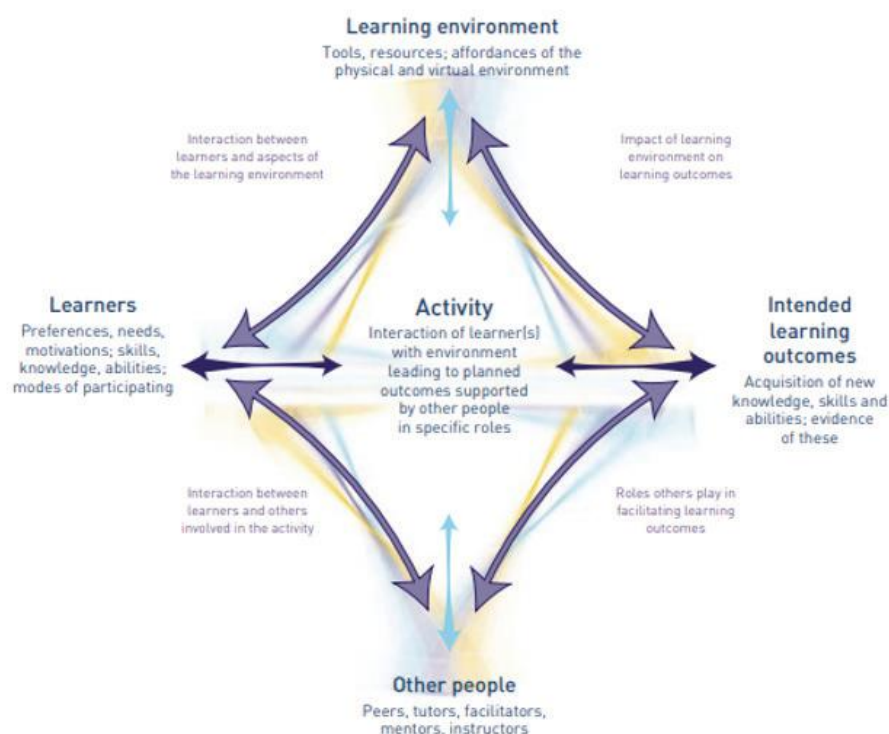


Figure 1. A Model of Learning Activity Design

Buhasiri (2012) has stated that technology awareness, motivation, and changing learners' behavior are prerequisites for successful e-learning implementations. This could be identified similar to the learner characteristics introduced by Beetham (2007). Alqahtani (2020) also identified the student's pace of learning, commitment, attitude, motivation, knowledge of computer systems, and demographics as critical success of e-learning. The technology awareness of the learner identified by both these authors can be identified under the broad theme of 'Digital Capabilities' of the learner. Martzoukou et al (2020) has stated that digital literacy and digital competence involve not only technology mastery, i.e. the abilities, competencies, capabilities and skills required for using digital technology, media and tools, but also a digital mindset, which consists of attitudes and behaviours necessary to develop as a critical, reflective and lifelong twenty-first century learner. Technological readiness has been identified as one of the aspects of preparedness for e-learning identified by Aydin and Tasci (2005). These factors measure how much resource they owned, not only the equipment factor but also measure the skills and attitudes of users and managers (Firmansyah et al., 2020). Therefore it is reasonable to consider the digital capabilities of the learner as the independent variable in studying the effectiveness of e-learning experience of a learner.

JISC is a UK higher, further education and skills sectors' not-for-profit organization for digital services and solutions which has identified a digital capabilities framework where they include a comprehensive list of attributes which could be treated as digital capabilities. This framework has clearly identified the digital capabilities under five dimensions. In this study the said framework is used to operationalize the variable 'digital capabilities'.

1.2. Effectiveness of E-learning

Effectiveness of e-learning could be identified according to the model of learning activity design where the achievement of intended learning outcomes could be attributed to effectiveness. They are the acquisition of new knowledge, skills and abilities. A study conducted by Kaur et al (2020) has identified 10 factors to measure effectiveness of e-learning. These also cover the main themes of knowledge, skills and abilities. They have measured effectiveness in comparison to a regular classroom experience. The indicators they have used are, offering convenience, meeting individual learning needs, contributing to effective communication, building skills and knowledge, offering better understanding, interaction level, doubt sessions, balancing of practical and theoretical experience, grooming of professional career and assignment submission. Noesgaard and Ørngreen (2015) say that out of the papers they reviewed for their research, 57% (52/92) examined effectiveness within higher education, in which context the most prominent definition of e-Learning effectiveness was 'learning outcome', with 56% (29/52) of these papers applying this definition.

2. Method

This study adopted a quantitative approach. In the conceptual framework developed for the study, the independent variable was 'Digital Capabilities of the learner' while the dependent variable was the 'effectiveness of e-learning experience'. Digital proficiency, literacy, creation, communication, development and self actualising (Annex 1) were identified as the dimensions along which the digital capabilities of the learner were measured. Effectiveness of e-learning experience was measured by the extent to which the learner perceived that he has acquired new knowledge, skills and abilities. The reason for selecting the self-perceived digital capabilities as the independent variable, was that it is the learner who can best assess his or her capabilities.

2.1. Data Collection

The unit of analysis of this study is the learner. The sample of respondents selected for the study were those who have registered for level six of the Bachelor of Management Studies degree programme in 2020/21. These learners are offered the courses through the Learning Management System (LMS). Some features contained in the LMS to support e-learning are assignments, quizzes, and assessments.

A pre designed questionnaire was shared with the learners in the form of a google form to collect data for the study. Ninety (90) responses were received.

2.2. Analysis

Regression analysis was used to analyze the impact of the independent variable on the dependent variable. The results of this exercise presented in Tables 1 and 2 show the impact of digital capabilities of the learner on the e-learning effectiveness.

According to the R² value that was yielded in the model summary shown in Table 1, it showed that digital capabilities (consisting of six dimensions) explain nearly 54% of the effectiveness of e-learning experience.

Table 1. Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .734 ^a | .539 | .505 | .27107 |

a. Predictors: (Constant), SELFT, DIGITALPROFICIENCYT, LITERACYT, DEVELOPMENTT, CREATIONT, COMMUNICATIONT

The beta coefficients of 0.514 with a significance of 0.000 for digital proficiency and of 0.518 with a significance of 0.000 for development, in Table 2 show that among several dimensions of digital capabilities those two dimensions have a significant impact on the effectiveness of e-learning experience.

Table 2. Coefficients^a

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|---------------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| (Constant) | .469 | .444 | | 1.058 | .293 |
| DIGITALPROFICIENCYT | .684 | .107 | .514 | 6.381 | .000 |
| LITERACYT | .015 | .088 | .017 | .169 | .866 |
| CREATIONT | .116 | .065 | .223 | 1.790 | .077 |
| COMMUNICATIONT | -.170 | .092 | -.239 | -1.849 | .068 |
| DEVELOPMENTT | .290 | .066 | .518 | 4.406 | .000 |
| SELFT | -.014 | .075 | -.024 | -.189 | .851 |

a. Dependent Variable: EFFECTIVENESST

3. Findings

The finding of the study conducted among final year students of the Bachelor of Management Studies (Hons.) degree programme of the Open University of Sri Lanka was that there is a positive influence of digital capabilities of the learner on the effectiveness of their e-learning experience. However, not all aspects that could be considered as digital capabilities do not have an equal influence on the effectiveness of the e-learning experience of the learner. Digital proficiency and Digital development were the dimensions of digital capabilities that were mostly influencing the effectiveness of e-learning. Since digital proficiency was measured using the respondent's use of ICT based devices such as computer, cell phone, television, tablet etc., the confidence in adopting new devices, software and services related to ICT, getting updated with the matters related to ICT, ability to handle IT related problems and the ability to design and implement ICT solutions, it shows that in getting an effective outcome from learning in e-platforms the learner has a significant role to play in getting his/her skills sharpened.

Digital productivity was measured using the ability to use ICT based tools to carryout tasks effectively and productively, capacity to choose devices, software, applications to suit different situations after considering the costs and benefits, ability to adapt and where necessary adapt digital tools to personal requirements, capacity to work fluently across a range of tools and the understanding of how digital technology is changing practices at home, workplace, social life. It is also evident that the learner needs to know the ways and means of getting the best out of digital usage.

Digital learning was measured using the capacity to participate in and benefit from digital learning opportunities, identify and use digital learning resources, participate in learning dialogues via digital media and use learning apps and services and the understanding of the opportunities and challenges involved in learning online and of own needs and preferences as a digital learner. Digital teaching was measured using the capacity to support and develop others in digitally -rich settings to teach, to work in a teaching or curriculum team to design learning opportunities, to support and facilitate learning and be proactive in peer learning with the effective use of

digital resources and the understanding of the educational value of different media for teaching, learning and assessment and of different educational approaches and their application in digitally rich settings. It showed that those who have the capacity to participate in and benefit from digital learning opportunities, identify and use digital learning resources, participate in learning dialogues via digital media and use learning apps and services find e-learning to be effective. Those who have an understanding of the opportunities and challenges involved in learning online and of their own needs and preferences as a digital learner find e-learning to be effective.

4. Discussion and Conclusion

These findings reveal that the learners who actively engage in digital platforms are reaping more benefits from e-learning. It establishes the fact that the learner characteristics related to technology awareness and motivation to use digital platforms act as prerequisites for successful e-learning. Buhasiri (2012) has stated that technology awareness, motivation, and changing learners' behavior are prerequisites for successful e-learning implementations. The findings of the study endorsed those explanations of Buhasiri (2012). Motivation of the learner which the previous researcher highlighted was clearly evident from the fact that digital development had a significant impact on the effectiveness of e-learning experience. The fact that a learner's motivation and attitude to engage in digital activities are crucial for effective e-learning was stated by Martzoukou et al (2020) too.

The conclusion that could be arrived from the findings of this study is that in ensuring equitable, inclusive, accessible learning environments for all learners, both the learner and the service provider have an equally important role to play. This further establishes the need for educating the learners of their responsibility towards the effectiveness of e-learning in an era where the use of digital platforms for learning is inevitable. In most of the situations the service provider is held responsible for not providing equitable, inclusive, accessible learning environments. Then only the presence of a 'minoritized' group is relevant. However, according to the findings of the study, even if the service provider is good at providing the infrastructure, if the learner doesn't develop his/her interest and skills an effective e-learning experience cannot be expected. The service provider could facilitate the learners to refresh and update their knowledge by ensuring the availability of facilities for learning.

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Annex 1:

Digital Capabilities Framework

| ICT (digital) proficiency | |
|-----------------------------|--|
| Digital proficiency | <ul style="list-style-type: none"> ✦ The use of ICT-based devices, applications, software and services ✦ The confident adoption of new devices, applications, software and services and the capacity to stay up to date with ICT as it evolves. The capacity to deal with problems and failures of ICT when they occur, and to design and implement ICT solutions ✦ An understanding of basic concepts in computing, coding and information processing |
| Digital productivity | <ul style="list-style-type: none"> ✦ The use of ICT-based tools to carry out tasks effectively, productively and with attention to quality ✦ The capacity to choose devices, applications, software and systems relevant to different tasks having assessed their benefits and constraints; and to adopt and (where necessary) adapt digital tools to personal requirements such as accessibility ✦ The capacity to work fluently across a range of tools, platforms and applications to achieve complex tasks ✦ An understanding of how digital technology is changing practices at work, at home, in social and in public life |

| Information, data and media literacies (critical use) | |
|---|---|
| Information literacy | <ul style="list-style-type: none"> ✦ The capacity to find, evaluate, manage, curate, organise and share digital information ✦ The capacity to interpret digital information for academic and professional/vocational purposes, and to review, analyse and re-present digital information in different settings. A critical approach to evaluating information in terms of its provenance, relevance, value and credibility ✦ An understanding of the rules of copyright and open alternatives eg Creative Commons, and of the ability to reference digital works appropriately in different contexts |
| Data literacy | <ul style="list-style-type: none"> ✦ The capacity to collate, manage, access and use digital data in spreadsheets, databases and other formats, and to interpret data by running queries, data analyses and reports. The practices of personal data security ✦ An understanding of: how data is used in professional and public life; legal, ethical and security guidelines in data collection and use; the nature of algorithms; of how personal data may be collected and used |
| Media literacy | <ul style="list-style-type: none"> ✦ The capacity to critically receive and respond to messages in a range of media – text, graphics, video, animation, audio – and to curate, re-edit and repurpose media, giving due recognition to originators. A critical approach to evaluating media messages in terms of their provenance and purpose ✦ An understanding of digital media as a social, political and educational tool and of digital media production as a technical practice |

Digital creation, problem-solving and innovation (creative production)

| | |
|---|---|
| Digital creation | <ul style="list-style-type: none"> » The capacity to design and/or create new digital artefacts and materials such as digital writing, digital imaging, digital audio and video, digital code, apps and interfaces, web pages » An understanding of the digital production process and the basics of editing and coding |
| Digital research and problem-solving | <ul style="list-style-type: none"> » The capacity to use digital evidence to solve problems and answer questions; collect and collate new evidence; evaluate the quality and value of evidence, and to share evidence and findings using digital methods » An understanding of digital research methods and of different data analysis tools and techniques |
| Digital innovation | <ul style="list-style-type: none"> » The capacity to adopt and develop new practices with digital technology in different settings (personal and organisational, social and work-based). The capacity to use digital technologies in developing new ideas, projects and opportunities » An understanding of innovation, enterprise and project management in digital settings |

Digital communication, collaboration and participation (participation)

| | |
|------------------------------|--|
| Digital communication | <ul style="list-style-type: none"> » The capacity to communicate effectively in digital media and spaces such as text-based forums, online video, audio and social media; design digital communications for different purposes and audiences; respect others in public communications; maintain privacy in private communications; identify and deal with false or damaging digital communications » An understanding of the features of different digital media for communication and of the varieties of communication norms and needs |
| Digital collaboration | <ul style="list-style-type: none"> » The capacity to participate in digital teams and working groups; collaborate effectively using shared digital tools and media; produce shared materials; use shared productivity tools; work effectively across cultural, social and linguistic boundaries » An understanding of the features of different digital tools for collaboration, and of the varieties of cultural and other norms for working together |
| Digital participation | <ul style="list-style-type: none"> » The capacity to participate in, facilitate and build digital networks; participate in social and cultural life using digital media and services; create positive connections and build contacts; share and amplify messages across networks; behave safely and ethically in networked environments » An understanding of how digital media and networks influence social behaviour |

| Digital learning and development (development) | |
|--|---|
| Digital learning | <ul style="list-style-type: none"> » The capacity to: participate in (and benefit from) digital learning opportunities; identify and use digital learning resources; participate in learning dialogues via digital media; use learning apps and services (personal or organisational); use digital tools to organise, plan and reflect on learning; record learning events/data and use them for self-analysis, reflection and showcasing of achievement; monitor own progress; participate in digital assessment and receive digital feedback; manage own time and tasks, attention and motivation to learn in digital settings » An understanding of the opportunities and challenges involved in learning online – and of own needs and preferences as a digital learner (eg access, media, platform and pedagogy) |
| Digital teaching | <ul style="list-style-type: none"> » The capacity to support and develop others in digitally-rich settings to teach, to work in a teaching or curriculum team, to design learning opportunities, to support and facilitate learning; be proactive in peer learning – all while making effective use of the available digital tools and resources » An understanding of the educational value of different media for teaching, learning and assessment, and of different educational approaches and their application in digitally-rich settings |

| Digital identity and wellbeing (self-actualising) | |
|---|--|
| Digital identity management | <ul style="list-style-type: none"> » The capacity to: develop and project a positive digital identity or identities and to manage digital reputation (personal or organisational) across a range of platforms; build and maintain digital profiles and other identity assets such as records of achievement; review the impact of online activity; collate and curate personal materials across digital networks » An understanding of the reputational benefits and risks involved in digital participation |
| Digital wellbeing | <ul style="list-style-type: none"> » The capacity to: look after personal health, safety, relationships and work-life balance in digital settings; use digital tools in pursuit of personal goals (eg health and fitness) and to participate in social and community activities; act safely and responsibly in digital environments; negotiate and resolve conflict; manage digital workload, overload and distraction; act with concern for the human and natural environment when using digital tools » An understanding of the benefits and risks of digital participation in relation to health and wellbeing outcomes |

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255-Construction of Lifelong Learning System for Sustainable Development of Large Scale and High Quality Farmers: A Case Study of China

Tingting Zhao¹, Guangde Li², Zhaodi Meng³, Hou Songyan⁴

Abstract

Through the unremitting efforts of the whole nation, China has achieved the total elimination of 98.99 million rural poor people from poverty under the current standard in 2021, creating a miracle on earth that has caught the world's attention. At the same time, we note that as the world's largest country in terms of population size, China's current agricultural population still totals more than 500 million, accounting for about one-ninth of the global agricultural population. Proceeding from the actual process of economic and social development and industrial transformation, the Chinese government has continuously increased its attention to the cultivation of "high-quality farmers" and successively introduced a series of effective and important measures. This research is based on the results of the survey on the learning status and needs of high-quality farmers (completed in March 2023) with 38000 samples from 30 provinces (cities and districts) in China. This study quantified the demographic characteristics, sustainable development indicators, lifelong learning needs and other dimensions of high-quality farmers and various groups closely related to their sustainable development. Then, from the perspective of the era of digital development of education, a lifelong learning system is built to meet the sustainable development of high-quality farmers, which integrates academic education, technical skills training, credit bank overpass and quality cultivation. And propose six dimensions of guarantee mechanisms: digital learning resources, flexible and accessible learning channels, multi-terminal and multi-entry learning platforms, a combination of online and offline learning support services, funding support for the participation of multiple social entities, and cultivation methods suitable for regional characteristics. Finally, this paper summarizes and presents the effects of high-quality farmers' education from the aspects of the achievements of high-quality farmers' lifelong education system construction, the driving role of learners' regional industrial development, and the strategic support of Chinese path to agricultural and rural modernization, so as to provide the "Chinese solution" of high-quality farmers' lifelong learning for the world.

Keywords: High-quality farmers, sustainable, lifelong learning, system, large-scale

1. Research Background and Significance

On May 29, 2023, General Secretary Xi Jinping emphasized at the fifth collective study of the Political Bureau of the Communist Party of China Central Committee that accelerating the construction of a strong education country will provide strong support for the great rejuvenation of the Chinese nation. Talent is the key to rural revitalization. The cultivation of high-quality farmers is an important focus point for promoting the revitalization of talents in rural areas. In the 19 years of training practice since 2004, the Open University of China has always insisted on serving the "agriculture, rural areas and farmers", focusing on the fundamental question of "what kind of people to train, how to train people, and for whom to train people", and making full use of modern information technology to carry out online higher and continuing education for adult learners in rural areas. and cultivates local practical talents who know, love, strengthen, and develop agriculture. It has walked out of the road of promoting large-scale and high-quality farmers' training by digitization of education

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with Chinese characteristics, and formed a model of high-quality farmers' training which can be learned from, replicated, and popularized. In 2021, it was awarded the UNESCO Top Prize for Education Informatization⁵.

From the concept and connotation of high-quality farmers, existing studies generally consider high-quality farmers to be the upgraded version of new professional farmers, who have a high level of cultural level and comprehensive literacy, and are capable of applying the norms and technical standards of agricultural production and management to meet the requirements of modern agricultural standardization, specialization, and large-scale production to achieve a higher level of agricultural labor productivity and lead the development of rural industries (Kang, 2018; Li, 2021; Lv, 2022). In terms of cultivating high-quality farmers, government departments at all levels, agricultural extension schools, agricultural colleges and universities, as well as agricultural parks, agribusinesses and specialized farmers' cooperatives have all been involved in the training of high-quality farmers (Lv and Shi, 2023). In order to implement relevant training policies, local governments at all levels often carry out training activities related to farmers' skills upgrading in multiple lines, and there is a lack of communication and coordination among training units, which often leads to duplication of training content and overlap of training targets, and some farmers do not have the opportunity to participate in the training activities (Liu and Gao, 2021). The multiple supply of training services leads to the fragmentation of funds for agriculture-related training, fragmentation of training content, and greatly reduced training effectiveness (Peng, 2021). From international experience, high-quality farmers are usually called farmer entrepreneurs, service-oriented rural practical talents, new professional farmers, agricultural managers, and agro-industrial operators (Wen and Chen, 2021). Agricultural modernization countries such as the United States, Germany and Japan have taken the cultivation of rural talents as a key undertaking for developing the countryside, and have promoted the cultivation of their rural talents by means of legal safeguards, policy support, innovative education models, and the strengthening of educational infrastructure (Gao, et al., 2018). In the United States, the government has played an active leading role in the cultivation of rural talents, and has promoted the implementation of talent cultivation programs through agricultural legislation, the construction of a management system and the use of social capital (Hu and Tian, 2019). Germany has a unique agricultural vocational education system, adopting the "dual system" education model of school training and enterprise practice, which has cultivated a large number of highly skilled agricultural workers (Miao, et al., 2015; Liang, et al., 2019). In Japan, an education model led by government departments with the participation of schools, enterprises, and agricultural associations has been adopted to cultivate high-level agricultural operators who can be rooted in rural areas and adapt to modern agriculture (Wang and Xia, 2021; Qin and Fang, 2021). Based on this, this study defines the scope of China's high-quality farmers (new vocational farmers) as modern agricultural practitioners who are engaged in agriculture as their occupation, have certain professional skills, and derive their income mainly from agriculture. This group includes managers of China's grassroots governments and villagers' self-governing organizations, as well as agricultural producers and operators with modern agricultural technology skills, and extends to those who returned to the countryside to start up their own businesses in recent years after serving in the urban areas or in the military.

2. Building a Lifelong Learning System for Large-Scale, High-Quality Farmers

This study stands at the historical point of the implementation of Chinese-style modernization of agriculture and rural areas and rural revitalization strategy, bases on the basic reality of a strong educational country and the change of the digital era of education, comprehensively compares the characteristics of the development of high-quality farmers' groups in the international and domestic markets, carries out the portrait of the characteristics of the high-quality farmers' groups and the related groups by relying on the solid data basis of the previous research of the research group, focuses on the three dimensions of the sustainable development of this group under the current context, and scientifically and systematically builds a lifelong learning system that adapts to the demands of sustainable development of the high-quality farmers based on the law of adult learner's learning and theories of lifelong learning, so as to provide the support for the talents for the great rejuvenation of the Chinese nation.

⁵ On April 6, 2021, UNESCO Paris Headquarters announced that the Open University of China of "One College Student per Village" has won the "the UNESCO King Hamad bin Isa Al-Khalifa 2020 Prize for the use of Information and Communication Technologies in Education", the highest award in the United Nations system.

This study focuses on the lifelong learning needs of high-quality farmers in the context of the digital era, sorts out the lifelong learning demands of high-quality farmers and the difficulties and challenges they face from the perspective of sustainable development, and ultimately builds a lifelong learning system that meets the needs of the sustainable development of high-quality farmers. This research content fills the current research gap in the field of sustainable development of high-quality farmers, and enriches the application and practice of lifelong education in rural talent cultivation.

The overall structure of large-scale high-quality farmers' lifelong learning system can be specifically divided into four parts, as shown in Figure 1.

First of all, we systematically sort out and study the national development policies and directions such as the strategy of education for a strong nation, the development goal of Chinese-style modernization of agriculture and rural areas, and the strategy of revitalization of rural talents, and we fully collate and analyze the education policies, initiatives and guarantee systems of international developed countries and economies for high-quality farmers' groups, so that we can realize the scientific and objective clarification of the positioning and requirements of the sustainable development of high-quality farmers in China's current historical period.

Secondly, starting from the results of the "Study on the current situation and demand of high-quality farmers in China" completed in April 2023, according to the occupational segmentation standards of high-quality farmers defined in this study (the group is framed as grass-roots governors of villages, agricultural product e-commerce talents, large-scale professional households, family farmers, agricultural machinery service workers, veterans, etc.), we quantitatively portrayed the lifelong learning characteristics and needs of high-quality farmer groups. At the same time, qualitative and quantitative analysis of the sustainable development of this group is closely related to the characteristics of two groups: high-quality farmer educators, and grass-roots government workers. In order to lay a good research foundation for a more comprehensive construction of the lifelong learning system required for the sustainable development of high-quality farmers.

Thirdly, focusing on the goal of cultivating grassroots talents in the national rural revitalization strategy, taking international experience and China's development practice into consideration, and using the sustainable development theory system as the basic basis, focusing on the three areas of regional policy orientation, economic and social development, and technical skills demand, the study will explore the comprehensive demands of the sustainable development of high-quality farmers.

Finally, based on the above multi-level analysis of the sustainable development of high-quality farmers, the paper builds a path based on "lifelong learning concept awareness enhancement, high-quality farmers' sustainable development needs, background of education digital era" and "academic education, technical skills training, credit bank flyover, quality and literacy cultivation". It is guaranteed by "digital learning resources, flexible and accessible learning channels, multi-terminal and multi-entry learning platforms, online and offline learning support services, financial support with multi-subject participation in society, and cultivation methods suitable for regional characteristics", which can meet the sustainable development of high-quality farmers, and put forward corresponding safeguard measures.

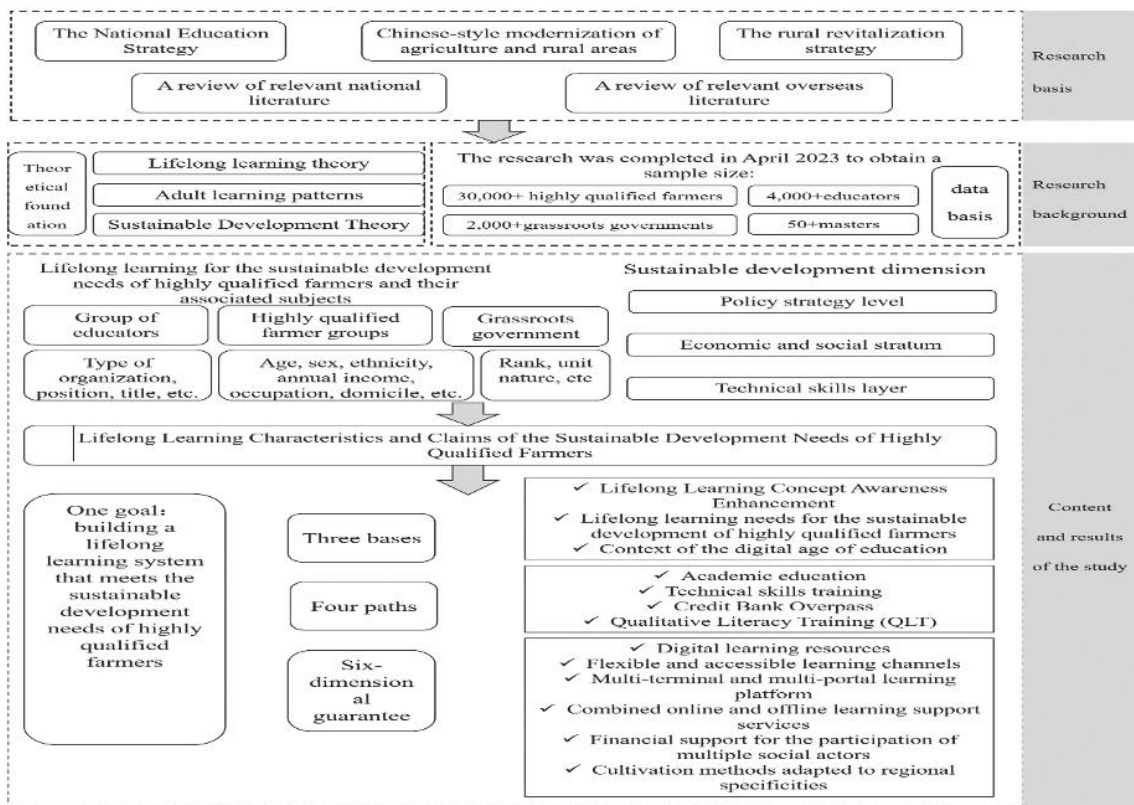


Figure 1.

3. Exploring the Formation of A “Three Links and Six Modules” Model for the Digital Cultivation of High-Quality Farmers

The Open University of China continues to explore and practice the application of various advanced information technologies such as big data, artificial intelligence and virtual reality in the cultivation of rural grassroots talents. Relying on the digital teaching platform, the university has strengthened the deep integration of various media resources and realized the digitalization of learning resources, the digitalization of teaching process and management, and the digitalization of examination and evaluation. The integrated application of teaching, learning, evaluation, management and research has gradually formed a “three links and six modules” high-quality farmer digital training model. As of July 2023, 1,026,800 local talents (including 36,500 undergraduate students and 990,300 junior students) in agriculture-related majors have been trained nationwide, providing solid support for local talents to promote the implementation of the Chinese-style agricultural and rural modernization and rural revitalization strategy.

3.1. Relying on Big Data Technology, Dynamic Tracking of the Characteristics of the National Learner Group to Achieve Accurate Teaching

The cultivation of high-quality peasant talents is faced with multi-dimensional differences such as the degree of economic development in the ground zone and the characteristics of learning behaviors of different learner groups. Therefore, relying on big data technology to carry out regular survey and research work in designated groups is an effective scientific means to fully grasp the basic status quo, difficulties,

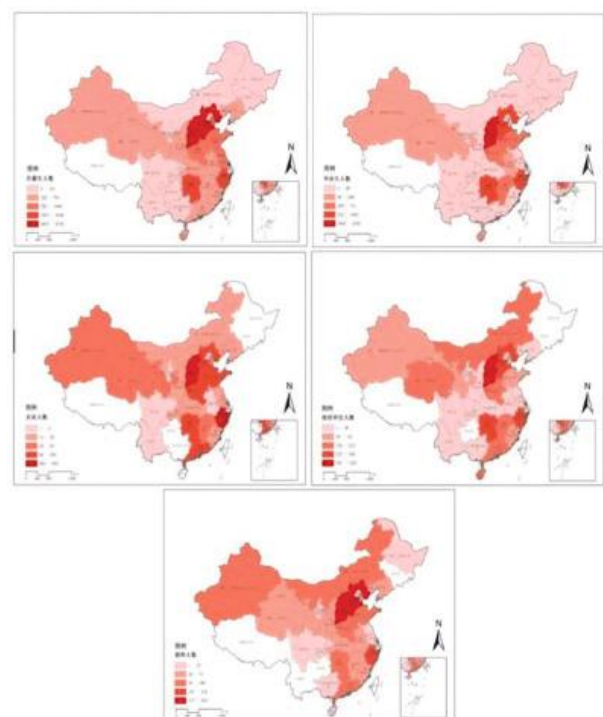


Figure 2. Spatial distribution of multi-population survey samples

expectations and needs of Chinese rural local learners based on information-based digital learning. The latest phase is a multi-group empirical survey completed in 30 provinces (municipalities directly under the Central Government and autonomous regions) from December 2022 to April 2023. The survey involved the group demographic characteristics of rural native learners, teachers and employers, and the combination of qualitative and quantitative indicators such as the needs of digital talent training. A total of 48,599 learner samples were collected. 4,429 teacher samples; 5854 samples of employers (government); There are 7,639 samples of employers (enterprises), as shown in Figure 2 and 3. The empirical investigation provides a scientific basis for the decision-making of high-quality farmers training under the new round of scientific and technological revolution and industrial change, and also forms an important data basis for the multi-objective training, personalized training and regional training of high-quality farmers.

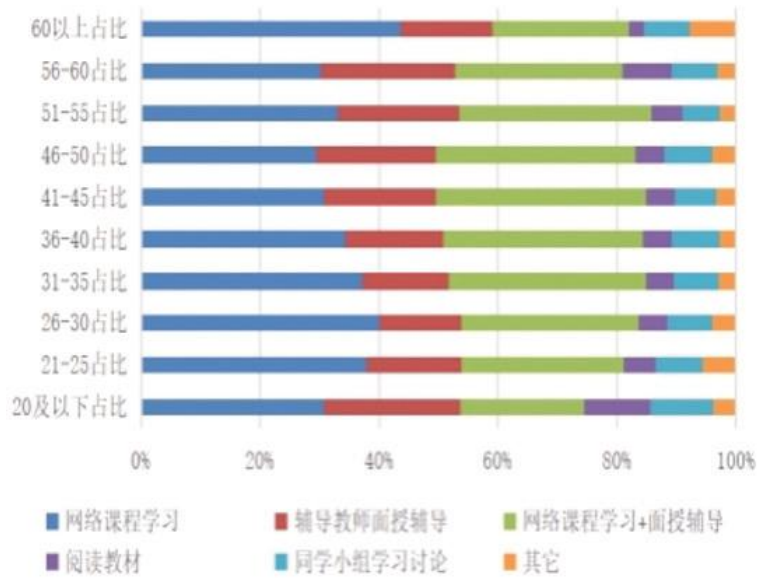


Figure 3. Classification of learning style preferences of learners of different ages

3.2. Highlighting the Advantages of Digitalization, the “Three Links and Six Modules” High-Quality Farmer Training Model has Achieved Remarkable Results

Because most of the high-quality farmer talents have group characteristics such as on-the-job, prominent work-study contradiction, older age, and weak learning foundation, in the nearly 20 years of practical work of school running, the Open University of China has gone through the process of exploring, practicing, supplementing and perfecting, and has formed an online education model based on digital technology that meets the learning needs of this group, that is, the “three links and six modules” model of digital rural native talent training has been operating with remarkable results. As shown in Figure 4.

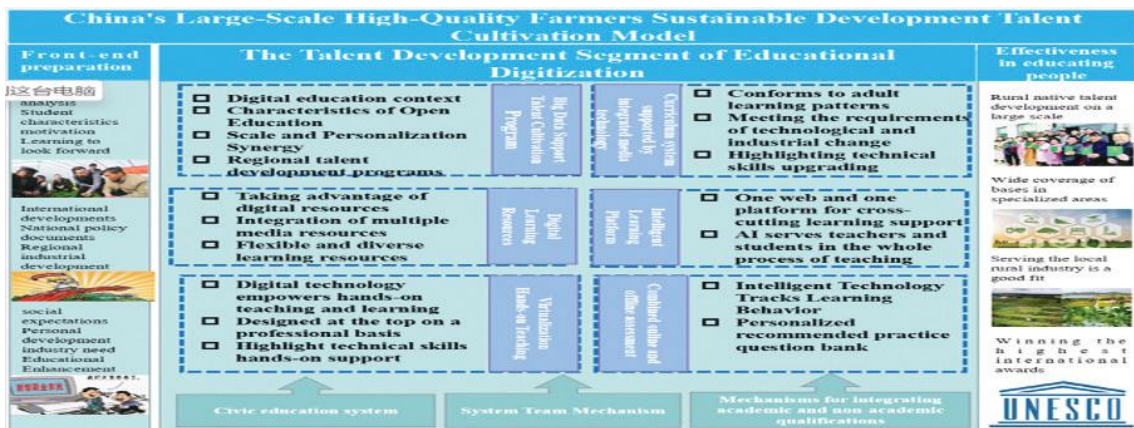


Figure 4. Model of large-scale high-quality farmer training of “three links and six modules” in China

The “three links” refer to the front-end preparation link of talent cultivation, the process link of large-scale, high-quality online cultivation of farmers (summarized as the “six modules”) and the evaluation of the effectiveness of cultivation. The front-end preparation process includes the analysis of learners’ academic conditions, the analysis of relevant national and local policies, and the needs and expectations of the hiring market for rural revitalization talents.

“Six modules” refers to the formulation module of talent training plan supported by big data in the process of large-scale high-quality farmers online training, the construction module of curriculum system supported by

financial media technology, the use module of digital learning resources, the operation module of intelligent learning platform, the practical teaching module of virtual reality technology, and the combination of online and offline examination and assessment module. At the same time, three guarantee mechanisms of ideological and political education mechanism, system team mechanism and academic and non-academic accommodation mechanism are designed to implement the high-quality operation of the six modules in the whole process of education.

After the completion of the talent cultivation process, the review and evaluation of the whole chain of talent cultivation from the perspectives of cultivation scale, professional structure, fit with local industries, quality and influence of learners, etc. are carried out in a timely manner. In this way, problems are discovered, root causes are identified, experiences are summarized, and demonstrations are promoted, so as to realize the logical closure of the large-scale and high-quality farmer cultivation work of the Open University of China.

4. Fully Stimulating the Relevance of Digital Learning Resources for High-Quality Farmers

Learning resources are the foundation of talent cultivation, and for rural grassroots adult learners, due to their “work-study conflicts” and other practical difficulties, they are characterized by typical fragmented learning. At the same time, this group is more purposeful in learning, and emphasizes the practicality of learning resources, and the demand for digital learning resources is more urgent than the on-campus learning in ordinary universities. Based on this, the Open University of China closely follows the needs of learners in the design of teaching materials, curriculum system, lifelong learning resources construction, etc., constantly follows up and iterates digital information technology, develops and optimizes more useful and easy-to-learn resources, and guarantees the high-quality teaching and learning of high-quality farmers.

4.1. Stimulate the Advantages of Informationization, and Build a Rich Content of Integrated Media Teaching Materials System

According to the results of the learner survey completed by the Open University of China in April 2023, with the continuous development of digital technology, compared with traditional paper textbooks, digital media teaching materials are becoming more and more popular with more learners⁶. This new type of teaching material exists in the form of traditional paper teaching materials combined with digital, while loading on digital terminals to read, dynamically updated content, which can enable learners to obtain more and richer learning resources including pictures, videos, aid materials, and other materials on the Internet, and teachers can also update relevant content on the Internet in a timely manner. In the early stage, the National Open University has developed more than 160 “integrated” professional course learning packages for rural learners (including paper textbooks, video textbooks, course study guides, formative assessment books, assessment instructions, etc.). In order to meet the increasingly diversified needs of learners, on the basis of the original course packages, Digital media teaching materials are constructed in different ways, such as new construction, reconstruction and reconstruction, and a rich content of media teaching materials system has been formed. Among them, the textbook “Garden Design” won the first National Textbook Construction Award of the National Textbook Committee, and “Cattle Raising Technology”, “Poultry Raising Technology”, “Water-saving irrigation technology” and “Prevention and Treatment of Common Animal diseases” were selected into the recommended catalogue of key publications of farm libraries organized by the National Press and Publication Administration. “Special Animal Breeding (2nd edition)” and “Food Factory Design and Equipment (2nd edition)” were selected as the first batch of “14th Five-Year Plan” vocational education national planning textbooks.

4.2. Realizing Modularized Teaching and Providing Flexible and Efficient Online Course Learning Resources

In the process of cultivating high-quality farmers, the Open University of China has constructed a modularized curriculum system of “public basic courses + professional basic courses + professional courses + comprehensive practice courses + general knowledge courses + ‘three agricultural’ special courses” based on the concept of open courses in accordance with the characteristics of the socio-economic development of different regions. Modularized curriculum system. Learners of different majors can choose diversified course contents suitable for themselves according to their actual needs and on the basis of meeting the unified professional standards. The goal of synergy between the scale and personalization of talent cultivation has been realized.

⁶ Results of the Open University’s major scientific research project: Survey on the Current Situation of Cultivation of Talents for Rural Revitalization in China and its Demand (Project No. Z21A272-3).

At the same time, in order to make the learning process of learners more convenient and efficient, each compulsory course of agriculture-related majors has built an online course that can be learned at any time and anywhere, relying on the digital learning platform. The content design of online courses fully considers the characteristics of online teaching, integrates learning, interaction, testing, assessment and other functions in one, and realizes online “one-stop” learning for learners. Learners can learn independently through text and video textbooks at the end of the course, interact with teachers and classmates in the discussion area, and check their learning results at any time in the “assessment module”. If they have more learning needs, they can come to the “Expand resources” section. By introducing MOOCs from Chinese universities, uploading by teachers, and importing from outside the platform, more supplementary learning resources are provided for learners and the learning content is further enriched.



Figure 5. Screenshot of online courses and functions in the Open University of China learning network

4.3. Developing VR Experimental Resources and Expanding Practical Teaching Paths Under Virtual Reality Technology

High-quality farmers are practitioners of rural revitalization who work and live at the most basic level. Compared with the learning of theoretical knowledge, the ability to practice technical skills is often of greater concern and expectation to them. The Open University of China fully utilizes the means of virtual reality technology, and continuously builds and improves virtual experimental resources through the mechanisms of development, sharing and introduction. By guiding students to use and complete virtual experiments, it not only solves the problem that offline internship training of agricultural courses is easily affected by agricultural time and production time and space, but also allows learners to complete the technical skills practical practice in a way that is closer to the times and technology.



Figure 6. Virtual experiment resources of the course "Foundation of Plant Pest Control" of Open University of China

5. Continuously Expanding the Serviceability of Intelligent Learning Platforms for Lifelong Learning of High-Quality Farmers

Mining and analyzing the tracking data of online education teaching and learning, and reforming the whole process of teaching on the basis of quantitative index characteristics is an effective way for education digitalization to serve the cultivation of high-quality farmers. The Open University of China learning network (<http://one.ouchn.cn>) undertakes various functions such as effective acquisition, smooth transmission, scientific analysis and rational utilization of online education big data, which is the key force driving the innovative development of digital education and the main carrier of daily teaching and learning activities for hundreds of thousands of learners and teachers.

5.1. Playing the Role of Big Data Technology Support, Guaranteeing the Modernization of Online Education to Improve the Level of Governance

The characteristics of the Open University of China at four levels determine that the governance of the open education system is more complicated than that of ordinary colleges and universities, and the rural grass-roots teaching system, as a nerve end, needs more rapid, direct, effective, scientific and standardized guidance. The Open University of China has played a key supporting role in data elements and built a "smart cockpit of the Open University of China" based on the digital learning platform, effectively improving the governance capacity of the system and providing a solid guarantee for the training of rural talents. For students, teachers, majors, courses, management, and services, smart cockpit of the Open University of China has established a core data index system of "recruitment-teaching-learning-exam-lesson", stimulated the vitality of education data, built a data sharing and exchange ecological environment for institutions of the Open University, and initially formed a prototype system of data dynamic monitoring and early warning of "true learning, true examination, true examination". The realization of data sharing across regions, departments and levels has promoted the effective improvement of education productivity.

5.2. Improving the Platform's Intelligent Service Functions to Enhance the Effectiveness and Efficiency of Online Teaching and Learning

Relying on the learning network teaching platform, it explores the integration of artificial intelligence (AI) technology into the whole chain of teaching and learning to serve the cultivation of high-quality farmers, which has produced good results in guaranteeing the continuity of learning for rural learners, enhancing the effectiveness of learning support services and promoting educational equity. The intelligent teaching platform that deeply integrates AI technology establishes a learning preference diagnosis covering multi-dimensional characteristic indicators for students based on preliminary student group research and registration information, and understands each student's learning needs and learning habits through big data analysis during the learning process to track and remind the learning progress in a timely manner. At the same time, we continue to promote the intelligent reform of the teaching process based on the curriculum knowledge map, realizing the networking of curriculum knowledge points, the dynamic planning of learning paths, the visualization of the learning process, the intelligent pushing of learning resources, and the automation of assessment and evaluation. Empowered by digital technology, grass-roots learners can truly feel the efficient and timely support and services in the learning process.

5.3. Strengthening the Effectiveness of Synergistic Cooperation in the National System and Realizing Online Teamwork Among Open Education Teachers

The digitization of education cannot be separated from teachers, and the ultimate purpose of technology application is to serve teaching and educating people. The construction of teachers of agricultural specialties in the open education system has long been characterized by problems such as poor matching of regions, industries, specialties and teachers, and uneven distribution of teachers' strength. In the process of education digitization, the Open University of China has explored the soft power of high-quality farmer training by relying on the intelligent teaching platform, stimulating the synergy of the national system, and strengthening the digitization of the faculty, which effectively guarantees the quality of the training.

The Open University of China has set up a faculty pool covering four levels of the school system on the learning network teaching platform, in which the information of teachers from different divisions and colleges within the system are all concentrated, and established a faculty group with specialization as a unit, and set up a nationwide network teaching team for agriculture-related courses with courses as a unit. The agriculture-related courses in different regions provide learners with effective, timely and professional learning support services with the strength of the team, which well solves the problem of uneven distribution of teachers and provides a good program and template for the subsequent construction of teachers in agriculture.

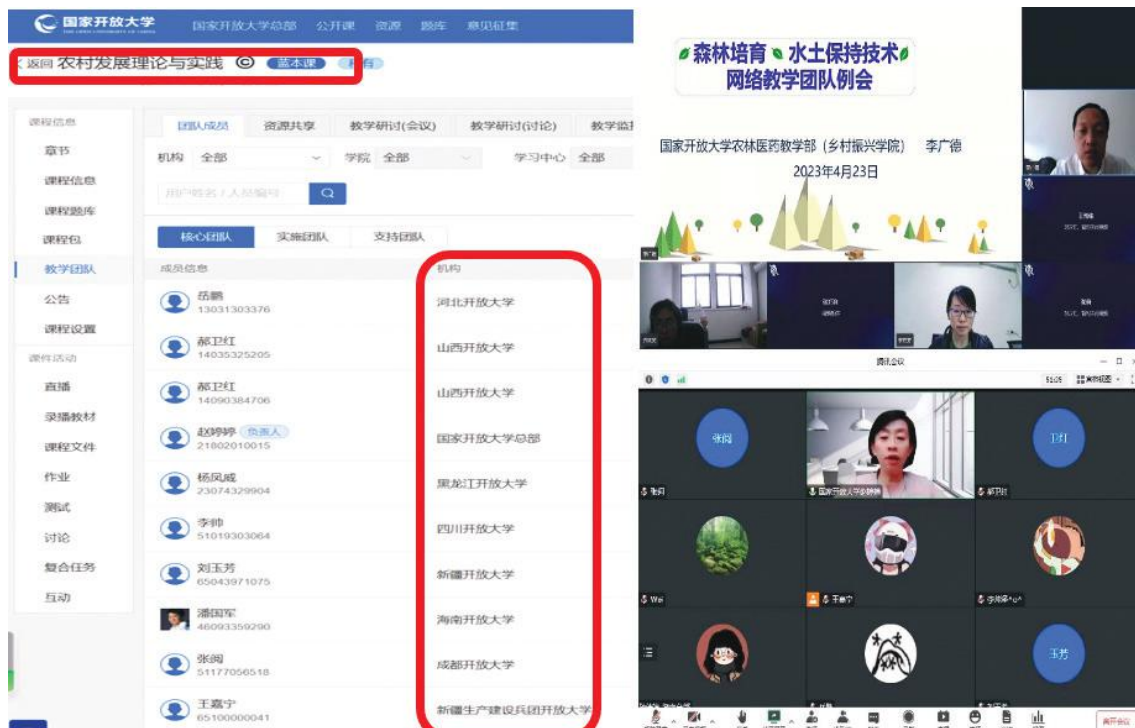


Figure 7. Screenshot of the online collaboration work of the Open University of China online course teaching team

6. Strive to Build the Demonstration and Influence of Local Talent Information Training Results

6.1. Achieving the Goal of Large-scale Training of Local Talents in Informatization, and Assisting in the High-quality Implementation of the Rural Revitalization Strategy

On July 6, 2023, Minister Huai Jinpeng pointed out at a press conference on the theme of “Authorities Talking about the Start” that the digitalization of education is an important element of education modernization, and that we should better build an open university to provide a learning environment for the whole society, which does not necessarily mean that all of us have to go to school. How to make full use of and give full play to the advantages of digitization, high-quality training “without leaving work”, “without leaving home”, practical and applicable high-quality farmers is a new important issue in the field of education, but also the National Open University in the realization of the strategy of a strong education country. It is also the mission of the Open University of China in realizing the strategy of a strong education nation.

In the process of training high-quality farmers, the Open University of China has built a smart learning platform that can meet the diverse needs of learners. Designed and developed more than 100 courses and a variety of media quality learning resources in line with the characteristics of rural college students; Fully excavate the ideological and political elements of the curriculum, adopt the way of promoting each other online and offline, and explore a new mode of teaching reform that combines ideological and political education with agricultural education to implement the fundamental task of moral and human development; The blended teaching mode based on self-learning package, network teaching, combination of centralized face-to-face teaching and mobile learning, and application of artificial intelligence is optimized. Attaches great importance to the important role of practical teaching in the teaching process and students’ follow-up growth, adopts a variety of ways to carry out practical teaching according to local conditions, at the same time, relies on the government, colleges and universities, scientific research institutes and enterprises to carry out vocational skills training for students, improve students’ innovation and entrepreneurship ability, and stimulates students’ entrepreneurship enthusiasm by holding innovation and entrepreneurship competitions. A large number of advanced models of innovation and entrepreneurship have emerged nationwide, and a talent training model that conforms to the reality of rural areas and farmers and embodies the characteristics of higher vocational education has been constructed.

6.2. Intelligent Technological Means Have Benefited Disadvantaged Groups and Underdeveloped Regions, Promoting the Realization of the Goal of Educational Equity

In the process of training high-quality farmers, the Open University of China pays special attention to the educational needs and development of the central and western regions and economically underdeveloped areas, strengthens the supply and service of higher education, and takes multiple measures to promote precise poverty alleviation through education. First, it has initially established a tuition-sharing mechanism whereby the Open University of China reduces or waives some tuition fees, local governments subsidize others, and individuals bear some of the burden; second, it has docked with education poverty alleviation projects and poor families in various regions, and cultivated peasant college students for poor families free of charge; third, it has strengthened its policy favoritism towards the central and western parts of China and the less-developed regions. According to preliminary estimation, the Open University of China has reduced and exempted more than 140 million yuan of fees for grass-roots farmers and college students nationwide by lowering the fees; the Open University of China has also carried out educational poverty alleviation projects such as the “Long March Belt,” with a cumulative total of more than 90 million yuan of financial support, which has greatly improved the coverage of China’s higher education in remote and underdeveloped areas, and has contributed to the reduction of geographical disparities in higher education and the urban-rural divide. This has greatly increased the coverage of higher education in remote and underdeveloped areas of China, and has played a real role in narrowing the geographical and urban-rural gaps in higher education and promoting educational equity.

6.3. A Person To Go To School, Drive the Whole Village to Get Rich, the Training of Local Talents Has Formed the “Open University” Brand

Under the influence of school education, classmate encouragement, government support and other factors, the high-quality farmers trained by the Open University of China have formed a “leading goose” atmosphere of active entrepreneurship and leading demonstration in the vast rural grassroots. For example, 1,763 students

from 2012 to 2016 in Jiangxi have started their own businesses, established 1,109 farmers' cooperatives, and lifted 9,651 rural households out of poverty. The entrepreneurial behavior of rural college students in the local area often leads to the following and imitation of the public, attracts the development of a large number of similar or supporting industries, and forms a development pattern of emerging industries with small industries and large clusters. It has achieved remarkable results in driving the employment, entrepreneurship and prosperity of rural groups, and often brings the social effect of “reviving an industry, living a local economy, and enriching the people”. Liu Zhun, a 2021 undergraduate majoring in rural regional development from Hengyang Open University in Hunan Province, combined the rural industry development theory he learned with local characteristic industries in his post as secretary of the general party branch of Meihua Village, innovated poverty alleviation in rich farmers' high-quality rice planting industry, and integrated, co-built and shared resources through cooperatives, poor households and village collectives. Form a replicable and popularizable industrial poverty alleviation model of “village committees build platforms, cooperatives perform operas, and poor households benefit”. It has effectively raised the income of the whole village farmers and developed and strengthened the village collective economy. On the basis of the village collective obtaining a stable source of income, Liu Zhun advocated the establishment of a village-level senior dining hall, which solved the practical difficulties of life for the village elderly and sick villagers, and also realized the original mission of learning agriculture and loving agriculture and participating in the cause of rural revitalization.



Figure 8. Wei Qiuxiang, a student from Jiangxi, led her neighbors to grow rich in the orchard



Figure 9. Liu Zhun, a student from Hunan Branch, helps villagers learn to use drones

6.4. Based on the Whole Country and Influencing the World, Providing Solutions for Global Educationally Disadvantaged Regions and Populations

Over the past 19 years, the Open University of China has gradually expanded from 24 branches and 68 learning centers to 1,153 learning centers in 42 branches nationwide. It has always insisted on taking root in the countryside and serving farmers, and has cultivated a large number of practical rural talents who can “can stay, be useful and work well” on the spot. According to sample surveys, the proportion of graduates staying in their hometowns has reached an average of 90 percent, and they have gradually grown into pioneers and role models leading the development and innovation of rural undertakings, improving the level of grass-roots governance in the countryside, and gaining the general recognition of all sectors of the community, thus providing a powerful guarantee of talents for the cause of rural revitalization in China.

In 2021, the results of this work won the highest honor in the field of education informatization within the United Nations system - “UNESCO King Hamad Bin Isa Al-Khalifa Prize for the use of Information and Communication Technologies in Education in 2020”, which provides a reference and replicable solution for the

educational development of the global educationally disadvantaged areas and disadvantaged people, forming the “Chinese paradigm” of online education in agricultural and rural areas, which has been widely recognized in the international arena.



Figure 10. The Open University of China of “One College Student per Village “ won the UNESCO King Hamad bin Isa Al-Khalifa 2020 Prize for the use of Information and Communication Technologies in Education (2021)

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256-An Analysis of Secondary School Students' Readiness for Online Learning in the Context of Different Variables

Emin ÖZEN¹, Nil GÖKSEL²

Abstract

This study's objectives are to assess the demographic and technological readiness of Eskişehir Province secondary school students (grades 9–12) for online learning in the context of these characteristics. The study, which was constructed using the cross-sectional survey model, the study's link was distributed to all high school students enrolled in both public and private institutions during the fall semester of the 2022–2023 school year and the data were gathered from 507 (n=507) learners. With the aid of the SPSS package application, the data was examined. A 5% significance level and 95% confidence interval are used to evaluate the results. In addition to diagnostic/descriptive statistics about the study group, sub-factor averages, and factor correlations are examined. Additionally, since a normal distribution is given, the t-test is employed for variables with two sublevels, and one-way ANOVA is used for variables with more than two sublevels when comparing quantitative data linked to the research objectives. If the ANOVA test results are different, the binary differences are determined using the appropriate Post-Hoc tests based on the homogeneity of the variances. According to the data obtained in the study, it was concluded that students' general readiness levels for online learning were high. When analyzed according to the sub-dimensions of the scale, it is seen that students' computer self-efficacy and self-learning levels are medium, while their internet use self-efficacy is high. When the results of the study group are examined, it is found that 56.1% of the participants are male and 43.9% are female, 67.1% of the participants are students enrolled in private schools, and 32.9% are enrolled in public schools. The highest participation rates in the study were found to be in grades 9 and 10, with 32.1% and 29.0%, respectively. Twelve-year-olds had the lowest engagement percentage, at 9.2%, and when the researchers break down the distribution by the high school they attended, it becomes clear that those who attended science and analytic high schools participated the most. When the findings pertaining to the problem situation are examined, it is concluded that high school student's readiness for online learning does not differ based on the participants' gender, that those who receive training on the use of technology in education develop higher readiness than those who do not, that those who have higher skill levels in the use of computer programs and applications and web 2.0 tools have higher readiness than those who have lower skill levels, and that those who have higher skill levels develop higher readiness than those who have lower skill levels. Given all of these claims, it is obvious that students' technological readiness for online learning is influenced more by technology use than by demographics. In light of the foregoing, it is determined that stronger technology usage abilities and increased technological integration into the classroom are necessary for students to be better equipped for online learning. It is believed that crucial data from this study was gathered to comprehend the readiness levels of pupils for online learning. However, it is advised that the study's shortcomings be taken into account and that in the future, more thorough research with larger sample sizes be done.

Keywords: *Online learning, readiness, secondary education, open and distance learning, parametric tests*

1. Introduction

One may argue that the education industry is most impacted by technological advancements and digital change. In other words, as information and communication technology have advanced in recent years, so too has our understanding of education and training (Gülbahar, 2012). The fact that online education is accessible without regard to time or place restrictions, that it provides opportunities for lifelong learning, and that it is used

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in international emergencies like Covid-19 are thought to be among the most critical factors in its growing popularity worldwide. This reveals an educational paradigm that needs to be examined and developed. To better comprehend the effects of the quick development of information and communication technologies on online education, it is crucial to evaluate how, how much, and to what degree digital environments contribute to the act of permanent learning.

In recent years, internet-based online education has grown more commonplace in Turkey as well as in many other nations throughout the world; nonetheless, both teachers and students must update their knowledge and abilities for online learning. Additionally, in order to reap the advantages of instructional practices, instructors and students must stay current with the fast-paced advances in education that characterize this century. This is due to the fact that modern educational trends are supported by computers and the digital world (Richardson & Swan, 2003).

Online education is a form of learning that allows learners to work collaboratively by interacting with their instructors, peers, and the environment (Katz, 2002), provides opportunities to learn without time and space limits (Hill, 2000), provides convenience and flexibility (Poole, 2000), and allows learners to have more control over when and how they complete learning activities (Demir Öztürk & Eren, 2021). Therefore, online learning is a collection of systems in which teachers and students collaborate actively to learn, and as a result, the standard of education rises directly in correlation. However, a systematic method should be used in the appropriate planning, design, development, assessment, and implementation of e-learning environments if the whole thing is to be deemed effective (Mercado, 2008).

2. Related Literature

2.1. Overview of Online Learning

Online learning, which is explained with different concepts such as web-based education, internet-based education, and e-learning in the literature, is basically a version of the same concept named in different ways (Pala & Erdem, 2015). This learning style can also be defined as access to information independent of time and space through information and communication technologies and conducting teaching activities in online learning environments. The use of technology to access learning materials and interact with other students, instructors, and the environment, when students are away from their instructors, is the main concept of online learning across several definitions (Anderson, 2008, p. 16). Using technology to access learning activities is another description of online learning (Carliner, 2003).

Online learning is a form of learning that has become popular with computer networks. Thus, the 21st century begins with a paradigm shift in attitudes toward online learning, and a new understanding of the nature of learning is influencing the definition, design, and delivery of education (Harasim, 2000). Online learning:

- In terms of scope, it refers specifically to the delivery of educational content and instruction through online platforms or the internet. It often focuses on the use of digital technologies to facilitate distance learning.
- In terms of interactivity, it usually emphasizes the use of interactive technologies and communication tools to facilitate participation and collaboration between learners and instructors. It may include live virtual classrooms, discussion forums, instant messaging, video conferencing, and other interactive features.
- In terms of context, it is often associated with formal education, such as online courses offered by educational institutions or e-learning platforms dedicated to academic subjects. It is often used in the context of structured learning environments with defined objectives, assessments, and accreditation.

Comparing online learning to traditional classroom-based learning has many benefits. It offers learners ease and flexibility in their learning by enabling them to access learning resources and take part in activities at their own pace and from any location with an internet connection. Additionally, it makes it possible for students to learn on their own schedules and with the topics and resources that best meet their requirements. In addition, online learning often includes multimedia elements such as videos, simulations, and interactive exercises, making the learning experience more engaging and interactive. Similarly, the advantages of online learning for tutorials are varied. For example, lessons can be held anytime, anywhere, online materials can be updated and learners can see changes instantly (Anderson, 2008). This form of learning is effective in supporting higher levels of cognition, promoting learner perception and knowledge (Westberry, 2009), as well as convenience, time savings, and cost savings (Aithal & Shubhrajyotsna, 2016). These elements can be listed as positive points that encourage the adoption and continued use of online learning.

On the other hand, online instruction has significant drawbacks in addition to its benefits (Almosa, 2002). For instance, online learners are less successful than traditional learners because they are more quickly cut off from the material being taught, lack interaction, and form weaker relationships. Online learning is badly impacted by a number of other problems, including plagiarism, falsification, instructor role distortion, and the incapacity to effectively study purely scientific subjects involving practice-based learning.

Online learning platforms can be found in a variety of educational settings, from K-12 schools to higher education institutions and professional development programs. They can also offer fully online courses, blended learning (combining online and face-to-face instruction), or supplementary materials to support traditional classroom learning. In general, online learning has the following characteristics due to its flexibility, accessibility, and potential for personalized learning experiences (Harasim, Hiltz, Teles, & Turoff, 1995):

- *Learning Networks:* In the context of online environments that facilitate collaborative learning and knowledge construction, they create interactive and participatory spaces where learners can engage in meaningful dialogues, share ideas, and co-create knowledge.
- *Social Construction of Knowledge:* Emphasizing the social aspect of learning, it is argued that knowledge is constructed through interaction and collaboration. In this context, online learning environments provide opportunities for students to engage in discourse, discussion, and knowledge construction.
- *Online Dialogue:* Dialogue is of great importance in online learning. Effective online learning experiences involve thoughtful and reflective conversations, questioning assumptions, and exploring different perspectives. In addition, online dialogue helps students develop critical thinking skills and deepen their understanding of the subject matter.
- *Facilitation and Moderation:* Tutors act as facilitators or moderators in online learning environments. They are responsible for creating a supportive and inclusive learning community, guiding discussions, providing feedback, and creating an environment conducive to collaborative learning.

2.2. Readiness for Online Learning

Online learning readiness refers to the set of skills, attitudes, and resources that individuals need to participate effectively in online learning. It includes a combination of technical, academic, and personal competencies that enable learners to navigate online platforms, participate in virtual classrooms, and succeed in online courses.

Online education is very different from conventional face-to-face education. This learning style demonstrates that students are prepared, capable, and eager to use information and communication technology (Dada, 2006) since it allows them to manage their own learning without having face-to-face meetings with teachers (Chung & Vloreen Nity Mathew, 2020). Online learning readiness is defined as “being mentally and physically prepared for some online learning experiences and actions” (Borotis & Poulymenakou, 2004). In this context, the ability to be ready to perform a behavior in an online environment can be seen as readiness for online learning in this context.

It is necessary to look into the key elements of ensuring the online learner’s active participation in the course because students’ readiness for online learning has a significant impact on both their willingness to participate in the course and the quality of online learning (Abuhassna, Awae, Bayoumi, Alzitawi, Alsharif, & Yahaya, 2022). When seen along this axis, the following points can explain some crucial elements of preparation for online learning:

Technical Skills: Online learning requires basic technical skills to navigate digital platforms, access online materials and communicate effectively. Learners should be comfortable using computers, web browsers, e-mail, and online collaboration tools. They should also have the ability to troubleshoot common technical problems and be familiar with specific technologies used in online learning environments.

- *Self-Discipline and Time Management:* Online learning often offers flexibility in terms of when and where students can interact with course materials. However, self-discipline and effective time management skills are required to stay organized, set goals, and allocate sufficient time to complete assignments. Being able to create and stick to a study schedule is crucial for success in online learning.
- *Motivation:* Online learning requires self-motivation and a sense of personal responsibility for learning. Learners should be motivated to actively participate, engage with the content and ask for clarification when needed. They should also be persistent in overcoming difficulties and maintaining their focus throughout the course.

- *Digital Literacy and Information Literacy*: Online learners need to possess digital literacy skills, which include the ability to search, evaluate and critically assess information found online. They should be able to distinguish reliable sources from unreliable ones and use online resources effectively to support their learning. Information literacy skills are necessary to conduct research, cite sources and engage in academic discourse.
 - *Effective Communication Skills*: Online learning often involves communication through written text, discussion forums, and virtual interactions. Learners should have good written communication skills, including the ability to express themselves clearly, ask questions and engage in meaningful discussions. Active listening skills and the ability to interpret and respond to others' messages are also important.
- Access to Technology and Resources*: Online learners need reliable access to a computer or mobile device
- with an internet connection. They should have the necessary software and hardware requirements to access course materials and participate in online activities. Access to relevant resources such as textbooks, online libraries, and research databases is also crucial for online learning success.

The emergence of internet-based activities has contributed significantly to the realization that we need a better understanding of online learning environments. Effective online teaching practices foster the conditions in which online learning takes place. Such practices are strengthened by effective course design principles, structures, and practices. Learners' readiness for online learning is important in influencing the quality of online learning as well as their willingness to participate (Warner, Christie, & Choy, 1998). Readiness, which is defined as the learner's readiness in terms of time allocation, discipline, and interest in e-learning (Parlakkılıç, 2015), additionally includes learners' ability to get used to technical difficulties, adapt to collaborative learning, and work at their own pace synchronously and/or asynchronously (Schreurs, Ehlers, & Sammour, 2008).

3. Purpose of the Study

The goal of this study is to assess, within the context of demographic and technological use characteristics, how prepared Eskişehir Province secondary school students (9th, 10th, 11th, and 12th grade) are for online learning. The following queries are sought-after solutions by this study in this context.

What are the readiness levels of secondary school students in online learning according to the following variables:

1. Gender
2. Technology Use
3. School Type (Public-Private High School)
4. Class Level
5. Level of Use of Computer Programs and Applications
6. Type of High School and
7. Skill in using Web 2.0 tools.

4. Method

The research was designed in the cross-sectional survey model of the quantitative method (Büyüköztürk, et al., 2012). The cross-sectional survey model aims to reveal the existing situation, variables, and relationships between variables by revealing the general situation by collecting data at a single time to illuminate a situation, variable, or phenomenon.

4.1. Study Group

The study's participants were secondary school students in the province of Eskişehir. The link to the data-collecting tool was provided to the appropriate students from the automation system with the intention of reaching the population within the parameters of the study. Additionally, data were gathered from 507 (n=507) students within the parameters of the study, and according to Creswell (2013), survey studies can generalize results from surveys with 360 or more participants to the entire population.

4.2. Ethical Statement

Research ethics permission for this study was obtained with the decision numbered E-88074293-605-01-65577715 on 12.04.2023.

4.3. Data Collection

In the collection of the data, the 'online survey' method (which is a faster, more effective, and economical method that is seen to be increasing in popularity in the literature) was used. The questionnaires were uploaded to the 'Google Forms' online survey platform and the link to access the form was shared with the learners.

4.4. Data Collection Tools

4.4.1. Participant Information Form

In this study, the Participant Information Form, which was prepared in accordance with the purpose of the research, included questions about gender, teaching level, skills in using computer programs and applications, major, years of experience, etcétera.

4.4.2. High School Students' Readiness Scale for Online Learning

The scale developed by Ramazanoğlu, Gürel & Çetin (2022) is a 5-point Likert-type scale consisting of 3 sub-dimensions and 20 items, validity and reliability tests were applied and no obstacle was found in its application to high school students.

4.5. Data Analysis

The data obtained was analyzed with the help of the SPSS package program. The findings were evaluated at a 95% confidence interval and 5% significance level. Sub-factor averages and factor correlations were analyzed and diagnostic statistics about the study group were included. In addition, in the comparison of quantitative data, a t-test was used for variables with two sub-levels, and one-way ANOVA was used for variables with more than two sublevels. In case of a difference in the Anova test, Post-Hoc tests were used to determine the pairwise differences.

5. Findings

The skewness and kurtosis coefficients of the scores obtained from the online learning readiness scale of secondary school students were found to be between +1.5 and -1.5. According to the values obtained, it can be said that the data meet the normality assumption (De Carlo, 1997). Descriptive statistics of secondary school students' scores from the online learning readiness scale are presented in Table 1.

Table 1. Findings Related to the Scores of Secondary School Students' Readiness Scale for Online Learning

| Variable | n | Min. | Max. | Cover | S.D. | Skewness | Kurtosis |
|---------------------------|-----|------|------|-------|------|---------------|---------------|
| Online Learning Readiness | 507 | 1,00 | 5,00 | 3,40 | ,873 | -,455
,109 | -,553
,218 |

Table 1 presents the arithmetic mean and standard deviation values of secondary school student's readiness for online learning scale. The score ranges of the data obtained in Likert scale type should be considered equal and the average score range factor should be 0.79 (Çokluk, et al., 2010). In revealing the current score range; the lowest score value (1) is subtracted from the highest score value to be obtained from the scale item and this value is found by dividing the total value by the number of degrees and finally, the score ranges are determined (Erkuş, 2012). In this context, the evaluation ranges of the relevant scale are shown in Table 2.

Table 2. Item Rating Intervals of Secondary School Students' Readiness for Online Learning Scale

| Level | Item Value Ranges |
|---------------|-------------------|
| 1 – Very Low | 1,00 – 1,79 |
| 2 – Low | 1,80 – 2,59 |
| 3 – Medium | 2,60 – 3,39 |
| 4 – High | 3,40 – 4,19 |
| 5 – Very High | 4,20 – 5,00 |

In the context of all these statements in Table 2, it is seen that the average level of students' mathematics attitudes is at a "high" level with 3.40. Cronbach's Alpha value was examined to determine the reliability level of the scale used in the study. It was seen that Cronbach's Alpha internal reliability coefficient is .936 and the scale had a very high reliability.

5.1. Findings Related to the Study Group

In this section, frequency, and percentage distributions of the data collected through the participant information form are shown in tables. Table 3 shows the distribution of students according to their gender.

Table 3. Distribution Table According to Gender of Students

| Variable | Groups | Frequency | Percentage |
|----------|--------|-----------|------------|
| Gender | Male | 205 | 43,9 |
| | Female | 302 | 56,1 |
| | Total | 507 | 100 |

As seen in Table 3, it is understood that 56.1% of the study group who responded to the relevant scale within the scope of the study consisted of male participants and 43.9% of female participants.

Table 4 shows the distribution of students according to school type.

Table 4. Distribution of Students by School Type

| Variable | Groups | Frequency | Percentage |
|-------------|----------------|-----------|------------|
| School Type | Private School | 334 | 67,1 |
| | Public School | 163 | 32,9 |
| | Total | 507 | 100 |

As seen in Table 4, it is seen that 67.1% of the study group who responded to the relevant scale within the scope of the study consisted of participants studying in private schools and 32.9% in public schools.

Table 5 shows the distribution of students according to their grade levels.

Table 5. Students' Grade Levels

| Variable | Groups | Frequency | Percentage |
|-------------|------------|-----------|------------|
| Grade Level | 9th grade | 171 | 32,1 |
| | 10th grade | 158 | 29,0 |
| | 11th grade | 138 | 26,7 |
| | 12th grade | 40 | 9,2 |
| | Total | 507 | 100 |

As seen in Table 5, when the participation status of the study group who responded to the relevant scale within the scope of the study was examined according to the grade levels, it was observed that the 9th grade with 32.1% and the 10th grade with 29.0% participated the most in the study. It was also seen that the 12th graders participated the least with 9.2%.

Table 6 shows the distribution of students according to the type of high school they attended.

Table 6. Students' Schools of Education

| Variable | Groups | Frequency | Percentage |
|-------------|--------------------------------------|-----------|------------|
| School Type | Anatolian High School | 200 | 39,0 |
| | Science High School | 270 | 52,7 |
| | Liberal arts | 19 | 4,2 |
| | Vocational and Technical High School | 18 | 4,1 |
| | Total | 507 | 100 |

When the participation of secondary school students in the study was analyzed in terms of the types of schools they attend, it was seen that students studying in Anatolian and Science High Schools showed intense participation in the study and constituted nearly 90% of the participant group. It was seen that the lowest participation is from Vocational and Technical High Schools with 4.1%.

5.2. Findings Related to the Problem Statement

1- Do Students' Readiness for Online Learning Differentiate According to Gender?

Table 7. T-test Table Related to Gender Variable

| Variables | Groups | Cover | T | P | Cohen's |
|---------------------------|--------|-------|--------|------|---------|
| Online Learning Readiness | Woman | 3,38 | -1,150 | ,702 | |
| | Male | 3,44 | | | |

Independent samples t-test was conducted to test whether there was a statistically significant difference between the online learning readiness of secondary school students in different gender groups. As a result of the related analysis, no significant difference was found in the readiness of secondary school students for online learning in terms of gender variable ($P=.702>.05$).

2- Do Students' Readiness for Online Learning Differentiate According to the Status of Receiving Training on Technology Use?

Table 8. T-test Table Related to the Status of Receiving Training on Technology

| Variables | Groups | Cover | T | P | Cohen's |
|---------------------------|--------|-------|-------|-------|---------|
| Online Learning Readiness | Yes | 3,58 | 4,018 | ,028* | ,45 |
| | No | 3,35 | | | |

It was examined whether the readiness of secondary school students for online learning differed according to their previous education on educational technology and a statistically significant difference was found between the groups ($P=.028<.05$). Cohen's d values of the found difference were analyzed. It was seen that the relevant value for the sub-dimensions with a significant difference between them was 0.45 and has a medium effect size. It was also seen that the readiness level of the group who received training on technology was higher.

3- Do Students' Readiness for Online Learning Differentiate According to School Type (Public-Private High School)?

Table 9. T-test Table Related to School Type

| Variables | Groups | Cover | T | P | Cohen's |
|---------------------------|---------|-------|-------|------|---------|
| Online Learning Readiness | Public | 3,36 | -,875 | ,793 | |
| | Private | 3,42 | | | |

Independent samples t-test was conducted to test whether there was a statistically significant difference between the online learning readiness of secondary school students in different school types. As a result of the related

analysis, no significant difference was found in the readiness of secondary school students for online learning in terms of school type variable ($P=.793>.05$).

4- Do Students' Readiness for Online Learning Differentiate According to Class Level?

Table 10. One-way Anova Table according to the grade levels of the students participating in the study

| Variables | Groups | Cover | F | P | Difference |
|-------------|------------|-------|-------|-------|------------|
| Grade Level | 9th grade | 3,47 | 5,929 | ,001* | 4-1 |
| | 10th grade | 3,48 | | | 4-3 |
| | 11th grade | 3,57 | | | |
| | 12th grade | 3,83 | | | |

As a result of the ANOVA analysis, it was seen that the readiness of secondary school students studying in Eskişehir for online learning differs according to the grade levels they study ($P<0.05$). Post-Hoc tests were used to determine between which groups the differentiation occurred. Since the variances were homogeneous ($P=,147>.05$), Hochberg GT2 test was performed because the sample distribution was not equal.

According to the results of the Post Hoc test for grade levels, it was seen that the 12th-grade students differed from the other groups. It was also seen that as the grade level increases, the mean readiness for online learning also increases.

5- Does Students' Readiness for Online Learning Differ According to the Level of Use of Computer Programs and Applications?

Table 11. One-way ANOVA Table according to the level of computer programs and applications usage skills of the students participating in the research

| Variables | Groups | Cover | F | P | Difference |
|-----------|--------|-------|------|-------|------------|
| PC Level | Low | 3,42 | ,374 | ,000* | 3-1 |
| | Medium | 3,55 | | | 3-2 |
| | High | 4,05 | | | |

As a result of ANOVA analysis, it was seen that the readiness of secondary school students studying in Eskişehir for online learning differs according to the level of skill of using computer programs and applications ($P<0,05$). Post-Hoc tests were used to determine between which groups the differentiation occurred. Since the variances were homogeneous ($P=,147>.05$), Hochberg GT2 test was performed because the sample distribution was not equal.

According to the Post Hoc test results related to the skill levels of using computer programs and applications; it was seen that students with high skill levels differ from other groups. It was observed that as the skill level of using computer programs and applications increases, the mean readiness for online learning also increases.

6- Do Students' Readiness for Online Learning Differ According to the Type of High School They Attend?

Table 12. One-way Anova Table according to the type of high school of the students participating in the study

| Variable | Groups | Cover | F | P | Difference |
|-------------|--------------------------------------|-------|-------|-------|------------|
| School Type | Anatolian High School | 3,29 | 4,825 | ,003* | 1-2 |
| | Science High School | 3,49 | | | |
| | Liberal arts | 3,50 | | | |
| | Vocational and Technical High School | 3,21 | | | |

As a result of the ANOVA analysis, it was seen that the readiness of secondary school students studying in Eskişehir for online learning differs according to the type of high school they study ($P < 0.05$). Post-Hoc tests were used to determine between which groups the differentiation occurred. Since the variances were homogeneous ($P = .127 > .05$), Hochberg GT2 test was performed since the sample distribution was not equal.

According to the results of the Post Hoc test related to the high school types, it was seen that the students studying in Science High Schools differ from the students studying in Anatolian High Schools. It was also seen that the mean readiness for online learning of the students studying in science high school was higher than the students studying in other high school types.

7- Do Students' Readiness for Online Learning Differentiate According to Their Skill Levels in Using Web 2.0 Tools?

Table 13. One-Way Anova Table according to the level of students' Web 2.0 Tools Usage Skills

| Variable | Groups | Cover | F | P | Difference |
|----------------------|--------|-------|--------|-------|------------|
| Web 2.0 Usage Skills | Low | 2,64 | 43,433 | ,000* | 1-2 |
| | Medium | 3,22 | | | 1-3, 2-3 |
| | High | 3,61 | | | |

As a result of the ANOVA analysis, it was seen that the readiness of secondary school students studying in Eskişehir for online learning differs according to their skill levels in using web 2.0 tools ($P < 0.05$). Post-Hoc tests were used to determine between which groups the differentiation occurred. Since the variances were homogeneous ($P = .342 > .05$), Hochberg GT2 test was performed since the sample distribution was not equal.

According to the Post Hoc test results related to the skill level of using Web 2.0 tools; it was seen that students with high skill levels differ from all groups. It was also seen that as the skill level of using Web 2.0 tools increases, the mean readiness of students for online learning also increases.

6. Discussion and Conclusion

In this study, the readiness levels of secondary school students for online learning were examined in terms of different variables. There are different academic studies on the first sub-research question of the study, which is (1) whether middle school students' readiness for online learning differs according to **gender**. However, most of these studies do not cover middle school students. For example, in the studies conducted by Çakır and Horzum (2015), Pullu and Gömleksiz (2020), Baygeldi, Öztürk, and Dikkartın Övez (2021), it was determined that the gender variable did not have a significant effect. Additionally, a study conducted by (Yu, 2021) revealed the impact of gender on online learning. According to the findings, gender has no effect on online class participation; however, educational level and personality traits affect online class participation. Also, gender has no effect on online exam results; however, educational level and personality traits affect online exam results. When evaluated in this context, the studies examined are similar to the data of this study and they prove that there is no significant difference in terms of the readiness of secondary school students for online learning regarding gender.

When the second sub-research question of the study, which is (2) whether middle school student's readiness for online learning differs according to the level of technology use training is examined, it can be argued that students who received technology use training had higher levels of readiness for online learning than those who did not (Martin, Stamper & Flowers, 2020). Students who received technology use training had higher scores in the sub-dimensions of adapting to the online learning environment, online communication, and online learning motivation than those who did not receive technology use training. There was no significant difference between the students who received and did not receive technology use training in the sub-dimension of online learning skills. This study shows that technology uses training plays an important role in increasing middle school students' readiness for online learning. Since there are not many studies on this topic, it is difficult to give a definitive answer to this question. However, some studies have found that students who are trained in the use of technology are more prepared for online learning and show higher academic performance. Therefore, it can be said that more research is needed to answer this question. Readiness for online learning includes various competencies, such as online learner attributes, time management, communication, and technical skills

(Martin, Stamper & Flowers, 2020). Training in the use of technology to develop these competencies can help students adapt to the online learning environment and learn effectively (Vonderwell & Savery, 2004). When considered in the context of technology, the data obtained are similar to other studies in the literature and the readiness of the students receiving support within the scope of technology shows a difference at the same rate. In other words, students' readiness for online learning differs according to their training in technology use; so, it can be concluded that the readiness level of the groups who received training on technology is found higher.

The third sub-research question of the study focuses on whether students' readiness for online learning differs according to school type (public-private high school). One study evaluated the readiness levels of school administrators in public and private high schools for online learning. The results revealed that the level of readiness of public high school administrators for online learning was significantly higher than that of private high school administrators. The study stated that the reason for this may be that public high school administrators can provide more resources and support (Bana, Basanes & Malabarbas, 2022). On the other hand, there have been studies showing the opposite data. For example, only 26% of public schools are online or have access to the internet, and over 5,000 of them are located in rural areas without electricity, according to DepEd's ICT Service Director Aida Yuvienco, as cited by Ilona (2021). In this study, in contrast to the above studies, no significant difference was found in terms of school-type in terms of middle school students' readiness for online learning.

The fourth sub-research question of the study focuses on whether students' readiness for online learning differs according to their class level. This finding is in parallel with the study conducted by Sakal (2017). According to the studies in the literature, readiness for online learning is a multifaceted concept that can vary depending on different student characteristics and environmental conditions. Therefore, it is critical for educators and researchers to assess the readiness of secondary school students for online learning and provide the necessary support and guidance to improve this readiness before opening online courses. In this way, secondary school students will experience online learning in a more positive and successful way (Bhaumik & Priyadarshini, 2020).

The fifth sub-research question of the study peruses whether the students' readiness for online learning differs according to the level of use of computer programs and applications. The study conducted by Martin, Stamper and Flowers (2020) underlines the fact that in terms of self-directed learning, learner control, and online communication self-efficacy, students who used more computer programs and applications were more prepared for online learning. These studies did point out, however, that there may be additional variables that affect students' preparation for online learning, such as learning preferences, learning styles, and individual traits. As a result, based solely on the frequency of use of computer programs and applications, a firm judgment cannot be reached. The degree to which a student is prepared for online learning may rely on a number of variables that must be evaluated both separately and collectively (Chung, Subramaniam & Dass, 2020). According to the data gathered in this study, it is seen that the students with high skill levels differ from the other groups and as the skill level of using computer programs and applications increases, the average readiness for online learning also increases.

The sixth sub-research question of the study examines if the students' readiness for online learning differs according to the type of high school they attend. For Turkish high school pupils, an online learning readiness assessment was created in a study conducted by (Ramazanoğlu, Gürel & Çetin, 2022). This scale has three components: self-learning, online self-efficacy, and computer self-efficacy. The study's findings indicate that high school students' levels of preparation for online learning were not significantly different depending on the kind of high school they attended. In other words, there was no statistically significant difference in students' preparation for online learning between Anatolian high schools, science high schools, social sciences high schools, and vocational high schools.

The seventh, and the last sub-research question of the study scrutinizes if the students' readiness for online learning differs according to their skill levels in using Web 2.0 tools. According to one of the research conducted by (Geng, Law & Niu, 2019), students' technology competence and preparedness for e-learning had a beneficial impact on their ability to study independently, which is crucial for learning online. The level of comfort and confidence in using technology for educational reasons is referred to as technology ready. According to the survey, pupils who were more tech-savvy were also more likely to use Web 2.0 applications for educational purposes. This finding is parallel to the results obtained in the study of Demir and Eren (2021). In this study, students with high skill levels stand out from all other groups, according to the Post Hoc test

findings regarding the skill level of using Web 2.0 tools. It has been observed that as students' mean readiness for online learning grows, so does their proficiency with Web 2.0 tools. As a result, it appears from the findings that there is a correlation between students' preparation for online learning and their proficiency with Web 2.0 tools. To validate this association and investigate additional variables that can influence the results of online learning, more research is necessary.

In the axis of all these statements, this study can be considered as an important step to determine the readiness levels of secondary school students towards online learning and to understand the effect of various variables on this readiness. The study reveals the effect of students' attitudes and skills towards online learning, technological competencies, learning motivation, and self-efficacy perceptions on their readiness for online learning. In this context, the findings of the study are especially important for educators, school administrators and educational policymakers. In a period when online learning is becoming more and more widespread, developing and implementing effective online education strategies for students is vital to increase their success and engagement levels. In this context, providing opportunities to improve students' technology skills, increasing their motivation to learn, and strengthening their self-efficacy perceptions can positively affect their online learning experiences.

As a result, it can guide educators and educational policymakers to develop various strategies to improve the online learning experience. For example, they can increase students' readiness for online learning by providing them with opportunities to develop their technology skills. At the same time, it is also important to strengthen students' self-efficacy perceptions and increase their motivation to learn. These strategies can contribute to the effective implementation of online learning.

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257-Roles of Open Universities in Education Providing for People with Visual Impairments: Some Propositions

Le Minh Tien¹

Abstract

Statistics from the Vietnamese Central Eye Hospital show that in Vietnam, there are currently more than 2 million people who have visual impairments, accounting for nearly 2% of the population. In Vietnam, according to the research document published by the United Nations Population Fund (UNFPA) in 2011, the literacy rate of the blind and the people with visual impairments is about 38.5%, the employment rate of this population is less than 21.0%. In general, traditional higher education does not provide accessibility for the people with visual impairments. It can be seen that the number of literate blind people currently accounts for a very low percentage, while the opportunity to access knowledge is a fundamental right of each person recognized by law. Moreover, in 2022, Vietnam has joined the Marrakesh Treaty to protect the interests of visual impaired people. The Marrakesh Treaty is the first copyright treaty based on human rights core, with specific reference to the UN Convention on the Rights of Persons with Disabilities (CRPD) and the Universal Declaration of Human Rights of 1948 (UDHR). The ratification and implementation of the Marrakesh Treaty will contribute to promoting the implementation of CRPD and UDHR in improving access to information and knowledge, which is an essential element to help people with disabilities educate and improve knowledge, skills, job creation, income and poverty reduction. This paper aims to explore the difficulties, challenges faced by the visually impaired people in accessing higher education in Vietnam. From the identification of these difficulties and challenges, the author would like to propose some propositions that the open university can apply to improve the higher education access for the people with visual impairments in Vietnam in the context of industry 4.0.

Keywords: *Open education, open universities, distance education, People with visual impairment, Vietnam..*

1. Introduction

According to the World Health Organization (WHO), the term visual impairment is used to describe a restriction of one or more functions of the eye or visual system. This can range from mild vision impairment to total blindness. It cannot be corrected to normal vision with prescriptive lenses or surgery. In fact, visual impairment is a global problem that affects a large portion of the population in the world. Some data from WHO shows this problem: globally, there are 285 million people are estimated to be visually impaired worldwide, in which 39 million are blind and 246 have low vision. About 90% of the world's visually impaired live in low-income settings. 82% of people living with blindness are aged 50 and above.

Vietnam also has a significant number of people with visual impairments. Based on the results of the national survey on people with disabilities in 2016 by the General Statistics Office, in coordination with the ministries, government agencies, NGOs and international organizations, there are 6,225,519 people with disabilities, of which around 2,000,000 are visually impaired and blind. Moreover, the majority of individuals with visual impairments also suffer from other disabilities such as hearing or mobility difficulties (GSO, 2016).

2. Difficulties of Individuals With Visual Impairments in Higher Education Access

Education provides a gateway to better employment and increased civic engagement. For people with disabilities in general and for people with visual impairment in particular, the denial of education can be a

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significant obstacle to future participation in society. In reality, individuals with visual impairments face various difficulties in their daily lives due to their limited or lack of vision. Studies from around the world, as well as in Vietnam, have demonstrated that individuals with disabilities are less likely to receive education. According to the Viet Nam Household Living Standards Survey (2006), there are only 2.53% of blind people who have a college education or higher. Research by Richardson *et al.*, (2002) indicated that the representation of students with visual impairments in UK higher education was lower than any other group of students. Students with visual impairments constituted only 0.12% of all students normally resident in the UK. In addition, students with visual impairments had been admitted to higher education on the basis of lower qualifications than those with no reported disability.

Educational attainment of people with visual impairment in Hong Kong is also low; only 6.6% have a post-secondary degree (Hong Kong Blind Union, 2021). Research by McDonnall and Tatch (2021) in the US showed that an individual with visual impairment is much less likely to obtain a college degree compared to a person without a disability (15.9% vs 34.5%).

Access to higher education for the visually impaired is difficult due to their disadvantaged characteristics. According to Mboshi's research (2018), the characteristics of learners with visual impairments include:

- Intellectual capacities are similar to those of vision students.
- They have no ability to use sight to help them develop concepts.
- Their concept development is influenced by their tactile experience.
- They are unable to use visual imagery.
- They can't use non-verbal cues.
- They cannot identify or pick up small items.
- Writing is a challenge for them or they are unable to write within the lines.
- Reading books in the normal range is a challenge for them, causing them to bring the book/object closer to their eyes.

Visually impaired students are frequently excluded from certain subjects such as mathematics and science because their lecturers do not have the skills and equipment to deliver these subjects to children with visual impairments. Due to these disadvantages, providing higher education for the visually impaired necessitates non-traditional methods and practices.

3. Roles of Open Universities in Education Providing for People With Visual Impairments

In 2010, the National Assembly of Vietnam promulgated a Law on persons with disabilities, including articles that stipulate that educational institutions must ensure the right to education of people with disabilities. For example the following articles:

Article 28. Modes of education applicable to persons with disabilities

1. Education applicable to persons with disabilities includes integrative education, semi-integrative education and exclusive education.
2. Integrative education is the main mode of education for persons with disabilities. Semi-integrative education and exclusive education will be implemented if conditions for persons with disabilities to study by integrative education are not yet fully met.
3. Persons with disabilities, their parents or guardians shall opt for modes of education suitable to the personal development of persons with disabilities. Families shall create favorable conditions and opportunities for their members with disabilities to study and develop according to their personal capabilities.

Article 30. Responsibilities of educational institutions

1. To ensure teaching and learning conditions suitable to persons with disabilities, to be disallowed to refuse admission of persons with disabilities in contravention of law.
2. To renovate and upgrade physical teaching and learning foundations which fail to meet the conditions on access by persons with disabilities.
3. To provide peculiar teaching and learning programs, equipment and documents suitable to every form and degree of disability.

Thus, the providing of education for the disabled in general and the visually impaired in particular has been regulated by law. Moreover, it is common to think that open universities are academic institutions sharing

common characteristics, core values and missions. In fact, one of the basic values of open universities is to offer quality open and distance higher education to all citizens, regardless of their personal characteristics. For instance, Ho Chi Minh City Open University (Vietnam) defines its mission as promoting a society with active learning by offering the most flexible and obtainable methods of education to students.

However, higher education institutions, including open universities, are challenged to open their doors to a diverse student population with different backgrounds. They also face the challenge of providing quality higher education using the best available technology, while making it easy and flexible for students to access.

Therefore, open universities must take the lead in providing education to people with disabilities in general and the visually impaired through their strengths in distance education and the application of new technologies. Indeed, distance learning or distance education is a method that is suitable for individuals with disabilities, and especially for those with visual impairments, because it can help them integrate more easily into the educational and social environment. According to Lionarakis (2004), the mission of distance education is the creation and provision of alternative educational opportunities, as well as the open access to these opportunities for everyone so that the ideal of open education may be fulfilled.

One of the most effective approaches to open education is Massive Open Online Courses (MOOCs). MOOCs are a new trend in higher education, and open universities are natural practitioners of massive open online courses, as suggested by the name of open university. The Ho Chi Minh City Open University also picked up on this trend in 2021. To date, this university has offered 61 Vietnam Massive Open Online Courses (VMOOCs) including 19 VMOOCs in Business Administration, 13 VMOOCs in Law, 12 VMOOCs in Accounting, 12 VMOOCs in Financial - Banking and 5 VMOOCs in Linguistics.

It is evident that open courses make it easier for people with disabilities and visual impairments to access higher education. Nonetheless, individuals with disabilities, and particularly those who are visually impaired, require more than that. In fact, the most current educational materials, such as textbooks, are still in traditional print paper or pdf form. This causes the learning process to be more challenging for the visually impaired. Therefore, it is necessary to provide educational materials in electronic form that are compatible with the software used by students with visual impairments, that is also transformed to Braille, large-print, or audiotape format. Simultaneously, the provision of the educational materials in the proper form should be accompanied by the relevant technical equipment for the lecturers, as well as relevant training for these issues.

4. Conclusion

In many countries around the world, particularly in developing countries, the visually impaired persons are considered a marginalized group in the education process. The integration and equal higher educational opportunities for the visually impaired in many countries can sometimes be controversial due to the lack of adequate materials/equipment, and the high cost of materials invoiced for the effective teaching and learning. Moreover, the visual impaired students face serious challenges in obtaining some of these materials. Therefore, the open universities with a mission to provide open education, distance education, and learning opportunities for all should be pioneers in providing education for the visually impaired persons in society. Despite efforts, there are still many open universities that do not have specialized programs or staff for students with disabilities, particularly those with vision problems.

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Best Practice Award Silver Medal

266-iBook Plus: An Interactive Book-Based Approach in Open and Distance e-Learning

Roberto B. Figueroa Jr.¹

Abstract

The ever-changing landscape of e-learning necessitates novel approaches to engage and empower distance learners. This paper investigates the potential for iBook Plus, a novel interactive book-based approach, to enrich online courses and encourage meaningful student interactions. By combining H5P's interactive book framework with other cutting-edge technologies such as *Discord* and *FrameVR*, a comprehensive and immersive learning environment is produced. The iBook Plus approach utilizes the interactive book format to deliver engaging content by integrating text, multimedia elements, and interactive activities seamlessly. Embedded within the book are interactive exams, simulations, and multimedia resources that enable students to actively engage in their learning. This method not only promotes active learning, but also enables individualized, self-paced learning experiences tailored to the requirements of each student. The integration of *Discord* provides a chat-based platform for real-time discussions and collaborative learning to enhance the interactive book experience. Even in remote learning environments, students can engage in lively discussions, exchange ideas, seek clarifications, and form study groups, nurturing a sense of community. Furthermore, the use of *FrameVR*, a metaverse-based co-creation platform, enables novel collaborative and immersive learning opportunities. In a shared virtual environment, students can create virtual spaces within the metaverse where they can collaborate, experiment, and co-create content. This interactive and immersive approach fosters greater student engagement, improves critical thinking skills, and fosters creativity. In conjunction with *Discord* and *FrameVR*, the iBook Plus approach creates a comprehensive e-learning ecosystem that incorporates the benefits of both synchronous and asynchronous learning. The incorporation of these technologies creates a dynamic and interactive learning environment for students, which facilitates knowledge acquisition, peer interaction, and instructor feedback. After analyzing data across four trimesters where it was implemented, findings suggest that the iBook Plus approach effectively engaged learners and increased their learning satisfaction.

Keywords: *Interactive Book, Online Learning, Virtual Reality, Discord, HTML 5 Pages.*

1. Introduction

Distance education scholars agree on the importance of engagement and interaction for distance learners. Bernard et al. (2009) and (Moore (1989) emphasized the importance of interaction in distance education, especially between learner and content. Technology-enhanced education systems, such as interactive multimedia, can significantly improve learner-content interaction. Case studies show that interactive content like e-books can improve learning outcomes and learner satisfaction (Ally, 2004; Sun & Chen, 2016).

In the Philippines, while the use of interactive materials through various activities and modules that are either shipped with learning management system (LMS) or included as add-ons from other providers has been practiced at various open and distance e-learning (ODeL) institutions, the use of portable and extensible interactive books has just been recently explored. This paper aims to describe a technology-enhanced approach that was piloted in two courses at the University of the Philippines Open University (UPOU) in early 2022 which involves integrating portable interactive books with auxiliary platforms for enhancing the learning experience by boosting interactions among students, teachers, and content.

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2. Related Literature

Research suggests that the use of interactive materials in distance learning institutions could have significant implications for their courses. These can encompass a range of resources, including multimedia presentations, online quizzes, and interactive books. The use of such materials can transform a conventional online learning environment into one that is engaging and dynamic.

The utilization of interactive resources within the context of remote learning has the potential to establish a dynamic learning environment that fosters student involvement and augments the overall educational encounter. The incorporation of interactive materials in distance learning courses can bring about significant changes as it could increase the interaction between the learner and content which is said to be linked to academic achievement (Zimmerman, 2012). These changes are not just in terms of course delivery, but they also extend to aspects like student satisfaction, learning outcomes, and course completion rates (Baker, 2016; Sahin, 2007). Interactive materials can enhance the learner's satisfaction by making learning more engaging and enjoyable.

Chat-based programs were shown to support online learner interactions among peers and their teachers. Previous studies have demonstrated a beneficial association between online interactions. Chang and Smith (Chang & Smith, 2008) discovered a positive correlation between online interactions and heightened levels of satisfaction among participants. Other studies suggest that increasing interactions among teachers and learners as well as creating a learning community can help students persist in online courses (Anderson, 2004; Chang & Smith, 2008; Yuan & Kim, 2014; Zimmerman, 2012).

However, despite the potential benefits of these resources, there are noticeable gaps in the existing literature that need to be addressed for the full potential to be realized. Most studies focus on individual aspects or specific tools within interactive learning materials or chat platforms, leaving a gap in understanding how these elements interact as a comprehensive system. There is a scarcity of studies comparing student evaluation teaching (SET) scores and comments among courses that used integrative approaches to increase student engagement against previous offerings without them. This paper attempts to address these gaps by presenting a technology-enhanced approach and uses available SET data to evaluate its effectiveness. The study described in this paper was guided by two research questions:

1. Did the iBook approach improve the experience of online learners through SET scores?
2. What were the impressions of online learners on the iBook approach and its components?

3. Method

The iBook Plus approach was developed using a conceptual model illustrated in Figure 1 based on Anderson's educational interactions where he identified the different interactions needed for deep and meaningful learning to happen among distance learners (Anderson, 2004).

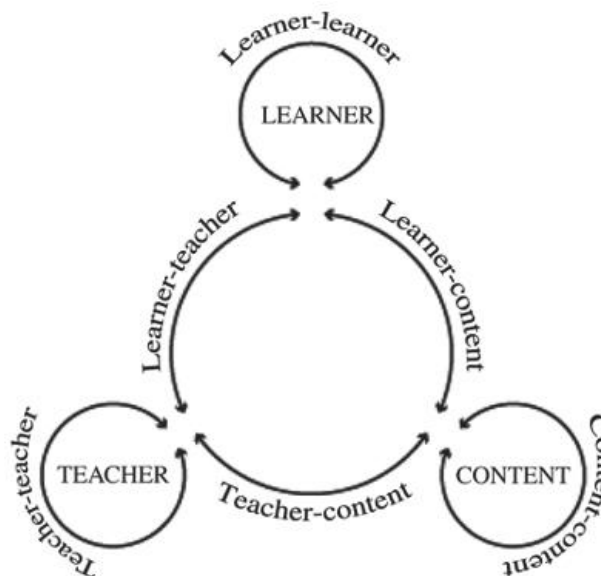
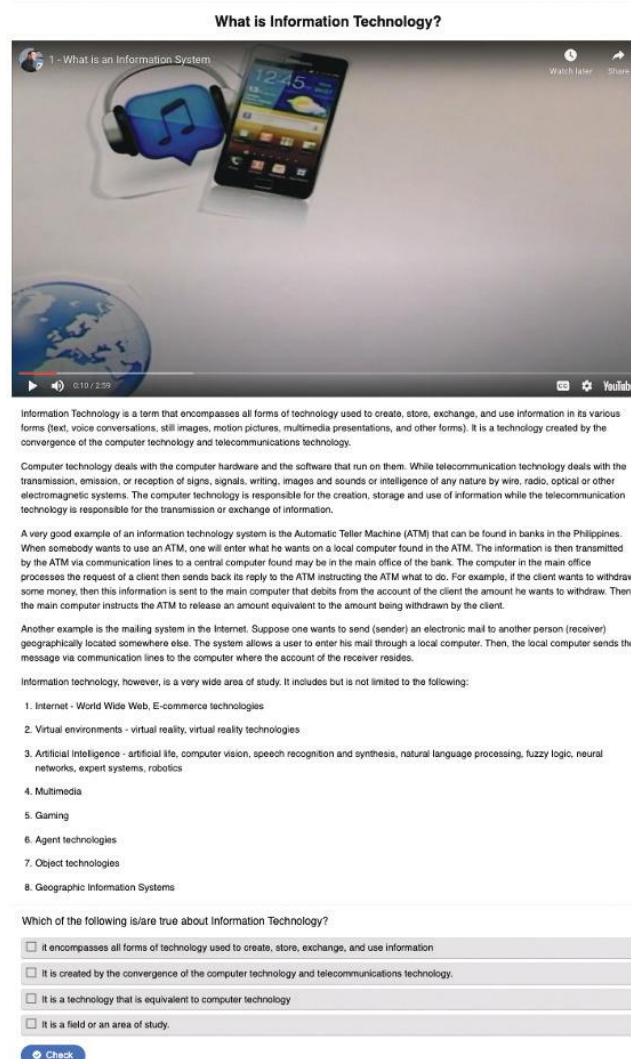


Figure 1. Anderson's (2004) Educational Interactions

Learner-content interaction in the context of online learning pertains to the manner in which students interact with the instructional material, encompassing their active participation in the processing and comprehension of the content. **Teacher-content** interaction encompasses the active involvement of the instructor in the process of designing, curating, and modifying instructional materials to align with the specific requirements and educational goals of the learners. **Learner-learner** interaction places emphasis on the exchange and cooperation among students, fostering mutual learning and fostering a communal atmosphere. **Teacher-teacher** interaction refers to the collaborative and communicative relationship between educators, which typically involves the exchange of materials, strategies, and feedback in order to improve teaching methodologies. The concept of **content-content** interaction pertains to the interdependence of different content elements within a specific course or across multiple courses. This interdependence aims to establish a coherent and consistent learning experience, often employing hyperlinks, cross-references, or integrated multimedia to facilitate a seamless and interconnected learning pathway. Collectively, these interactions establish an intricate network of connections that enhance the depth and diversity of the online learning experience.

3.1. The Approach

The iBook Plus approach aims to enable these interactions through three primary technologies that are rooted in a portable HTML5-based modular activity called H5P or HTML 5 Pages. Particularly, the interactive book activity which could host an array of other H5P and external components. These interactive books or iBooks replaced or were offered as alternatives to the PDF-based modules in the courses. These iBooks featured interactive objects that can be read, watched, and manipulated by the students. This approach aimed to make the learning process more engaging and interactive. Since small automatically graded activities can be inserted within pages, active learning could also be facilitated. This is illustrated in Figure 2 which is a screenshot of a page from an iBook in the courses.



What is Information Technology?

1 - What is an Information System

Watch later Share

Information Technology is a term that encompasses all forms of technology used to create, store, exchange, and use information in its various forms (text, voice conversations, still images, motion pictures, multimedia presentations, and other forms). It is a technology created by the convergence of the computer technology and telecommunications technology.

Computer technology deals with the computer hardware and the software that run on them. While telecommunication technology deals with the transmission, emission, or reception of signs, signals, writing, images and sounds or intelligence of any nature by wire, radio, optical or other electromagnetic systems. The computer technology is responsible for the creation, storage and use of information while the telecommunication technology is responsible for the transmission or exchange of information.

A very good example of an information technology system is the Automatic Teller Machine (ATM) that can be found in banks in the Philippines. When somebody wants to use an ATM, one will enter what he wants on a local computer found in the ATM. The information is then transmitted by the ATM via communication lines to a central computer found in the main office of the bank. The computer in the main office processes the request of a client then sends back its reply to the ATM instructing the ATM what to do. For example, if the client wants to withdraw some money, then this information is sent to the main computer that debits from the account of the client the amount he wants to withdraw. Then, the main computer instructs the ATM to release an amount equivalent to the amount being withdrawn by the client.

Another example is the mailing system in the Internet. Suppose one wants to send (sender) an electronic mail to another person (receiver) geographically located somewhere else. The system allows a user to enter his mail through a local computer. Then, the local computer sends the message via communication lines to the computer where the account of the receiver resides.

Information technology, however, is a very wide area of study. It includes but is not limited to the following:

1. Internet - World Wide Web, E-commerce technologies
2. Virtual environments - virtual reality, virtual reality technologies
3. Artificial Intelligence - artificial life, computer vision, speech recognition and synthesis, natural language processing, fuzzy logic, neural networks, expert systems, robotics
4. Multimedia
5. Gaming
6. Agent technologies
7. Object technologies
8. Geographic Information Systems

Which of the following is/are true about Information Technology?

It encompasses all forms of technology used to create, store, exchange, and use information

It is created by the convergence of the computer technology and telecommunications technology.

It is a technology that is equivalent to computer technology

It is a field or an area of study.

Check

Figure 2. An iBook page containing textual content, a video supplement, and auto-graded quiz.

A grade report of how the learner performed in each activity is automatically generated in the summary page of the iBook. This provides ample opportunities for **learner-content** interaction. Because of the portable and remixable nature of H5P, teachers can also reuse and remix it for their own classes. In this way, knowledge and experience is passed down from the previous teacher to the next while the latter makes improvements for the specific context of their class paving the way for **teacher-teacher** interaction. The iBook allows for embedding external resources aside from normal linking. The technology behind it, H5P, is also well integrated with major learning management systems (LMS) like Moodle, BrightSpace, Canvas, and even massive open online course (MOOC) platforms like open edX. This means that tracking and grading data of learners would automatically be reflected on their LMS gradebooks. This exemplifies **content-content** interaction. A snapshot of the iBook summary that is automatically synchronized with the gradebook of the LMS is shown in Figure 3.

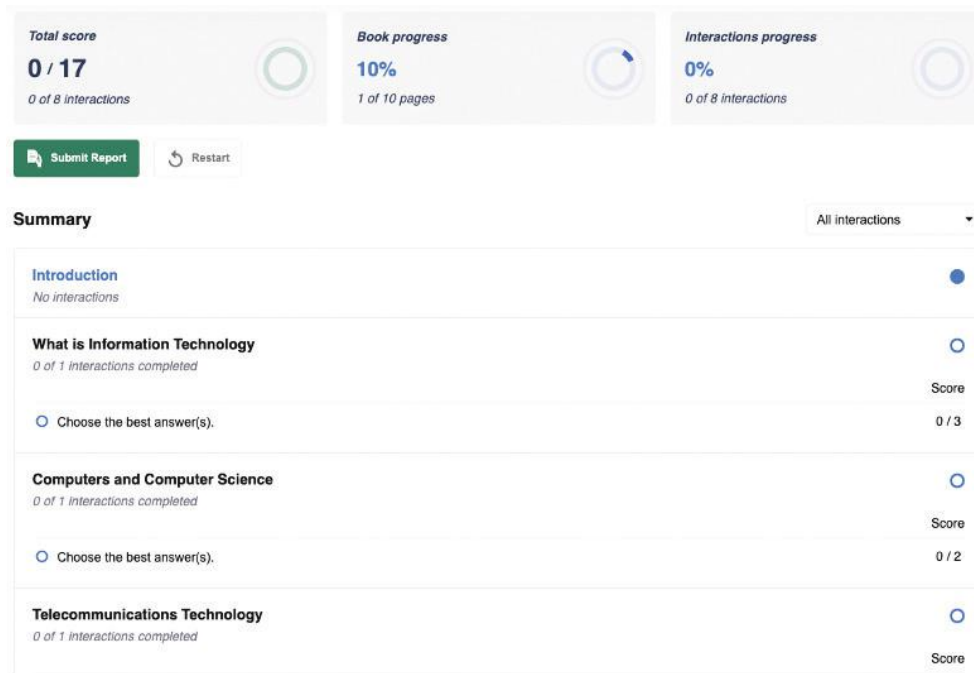


Figure 3. A screenshot of a sample iBook summary

As mentioned earlier, the use of interactive books was reinforced with two platforms to foster **learner-learner** and **learner-teacher** interactions. The first platform that is integrated in this approach is **Discord** (<https://discord.com/>), a web-based multi-channel chat platform. This platform was used to create a persistent online community where students could discuss, collaborate, and clarify uncertainties about the course content with the teacher and with one another. It also provided a platform for the teachers to provide real-time feedback and guidance to the students. Figure 4 shows a snapshot of a channel that allowed learners to showcase their generative art. Peers were able to respond to these artworks through comments or *emojis*.

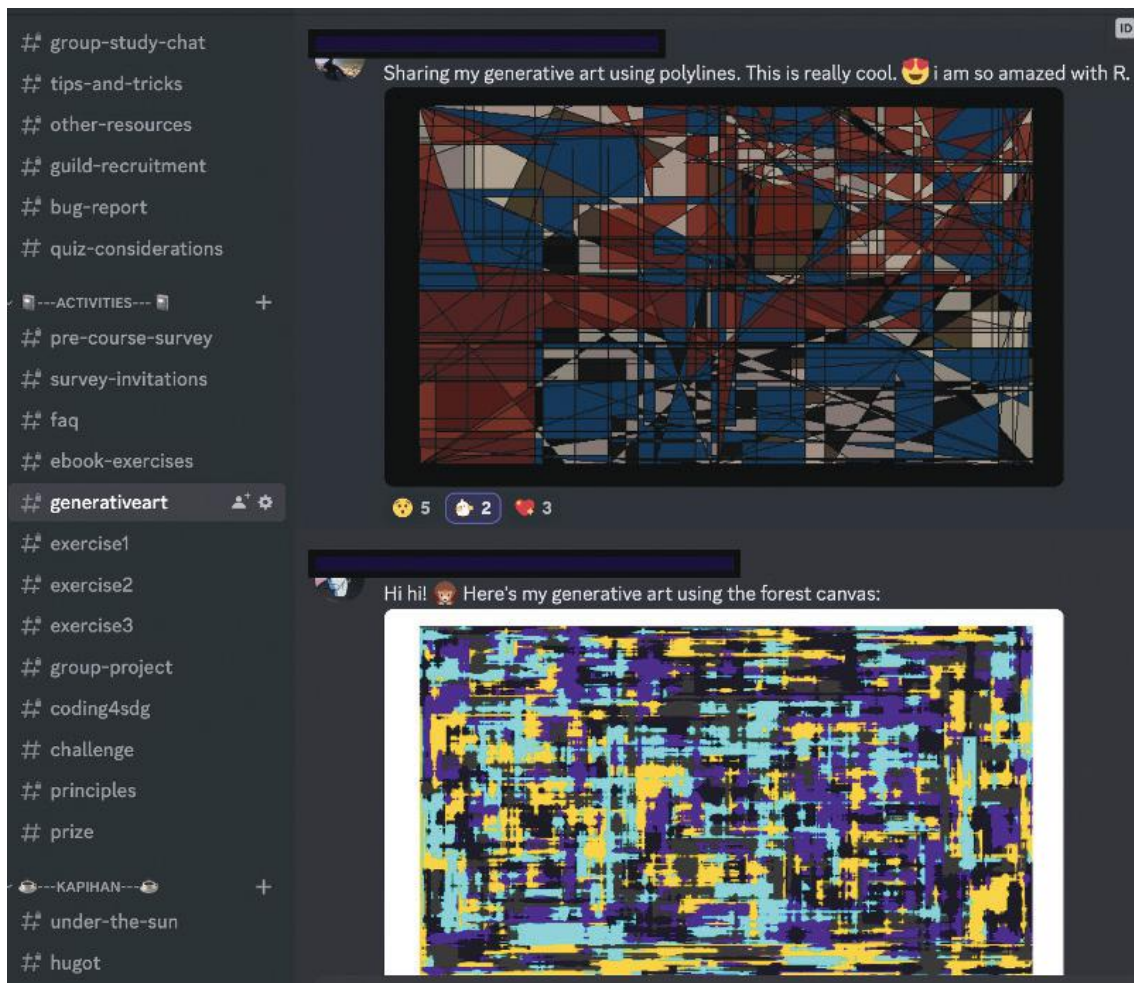


Figure 4. A screenshot of Generative Art in Course A's Discord Server

Another layer of interaction that enables co-creation and object manipulation was added in this approach through a metaverse platform called **Frame-VR** (<https://framevr.io/>). The Discord server was divided into various channels based on the topics of the course materials. This enabled students to engage in focused, topic-specific discussions, encouraging collaborative learning. Bots that were equipped with simple artificial intelligence (AI) features were also installed to take care of community moderation, gamification, and even content-generation from within the server. Teachers were active on the Discord server, participating in discussions, answering queries, and providing feedback. They also initiated threads on important topics, encouraging students to delve more deeply into the subject matter. There were also **teacher-only** channels where invited lecturers and tutors interacted with the course managers to exchange knowledge and suggestions fostering **teacher-teacher** interactions.

FrameVR was used for virtual meetups among learners and guest experts where they interacted through their digital avatars. A virtual exhibit was used where creative works from students were shown to guests and feedback was given. This provided an environment that imitated real-life interactions, adding an extra layer to the learning experience. While the platform supported **learner-learner**, **teacher-learner**, **teacher-teacher** interactions, it provided different layers of interaction between learners and materials represented by digital objects in the metaverse. Figure 5 shows a screenshot of a knowledge sharing meeting among participants in FrameVR.



Figure 5. A Knowledge-sharing session of a learning community in the Metaverse.

A summary of how the iBook approach technologies were used and how they supported pedagogical interactions are summarized in Table 1.

Table 1. Technologies and Supported Interactions among Learners (L), Teachers (T), and Content (C).

| Technology | Primary Supported Interactions | Other Supported Interactions |
|------------|--------------------------------|------------------------------|
| A. iBook | L-C, C-C | T-T |
| B. Discord | L-L, L-T, T-T | L-C |
| C. FrameVR | L-L, L-T, T-T | L-C |

3.2. Data Collection and Analysis

The context involves two online courses taught at UPOU. While the approach was applied in 2022, data from the previous years were also collected for comparison. One of the courses is about programming (Course A). The other is an introductory information technology course (Course B). The real course titles and codes were not mentioned on purpose to preserve the anonymity of the teachers and students. Furthermore, the actual terms and years will also be replaced by year 1, 2, and 3 for comparing satisfaction scores among students.

The study prioritized the assessment of student satisfaction through readily available data from end-of-term student evaluations of teaching. Both quantitative and qualitative data were employed in the study to enable a comprehensive analysis.

The quantitative data provided measurable and tangible evidence of the students' satisfaction levels. On the other hand, the qualitative data provided deeper insights into the students' experiences and perceptions. This data was analyzed through reflexive thematic analysis, a method that allows for the identification, analysis, and interpretation of patterns and themes within the data. The qualitative analysis offered nuanced understandings of students' experiences, illuminating the impact of the iBook Plus approach beyond the numerical evidence.

4. Findings

The findings were organized according to the two research questions asked in the study. The first research question was answered by comparing the SET scores of Course A and Course B when the iBook approach was implemented (Year 3) with the previous implementations where it was not utilized (Year 1 and Year 2). Table 2 shows a summary of normalized mean SET scores of each course in three years.

Table 2. Mean SET scores of Course A and Course B in Year 1, Year 2, and Year 3

| Course | Year 1 | Year 2 | Year 3 |
|----------|--------|--------|--------|
| Course A | 4.064 | 4.141 | 4.833 |
| Course B | 4.257 | 4.593 | 4.791 |

The mean increase in mean SET scores from Year 1 to Year 3 in Course A was 0.769 while that between Year 2 and Year 3 was 0.692. On average, there was an increase of 0.731 points in mean SET scores when the iBook approach was implemented in Course A. Meanwhile, in course B, there was increase of 0.534 units of mean SET scores between Year 1 and Year 3 and there was an increase of 0.198 units of mean SET scores between Year 2 and Year 3. An average of 0.366 margin numerically supports the hypothesis that the iBook approach was effective as evidenced by SET ratings. However, while many factors could have played a part in increasing the SET scores, the qualitative data was able to increase our confidence in attributing the improvement of SET scores to the iBook approach.

Data from the student comments across five terms and courses resulted in the themes and subthemes that were summarized in table 3.

Table 3. Thematic Analysis of Course A

| Year | Themes | Subthemes |
|------|------------------------|--|
| 1 | • Strengths | <ul style="list-style-type: none"> • High Visibility and Responsiveness of the Teacher • Effective Use of Technology • Competence of the Teacher • The use of Piazza as a Tool • Engaging Content |
| | • Areas of Improvement | <ul style="list-style-type: none"> • Course Requirements • Multiple Platforms • Need for more Personalized Approach • Navigation in Piazza • Difficulty in Managing Sites • Course Guide and Activity |
| 2 | • Strengths | <ul style="list-style-type: none"> • Appreciation for the Teacher • Interesting Use of Different Platforms |
| | • Areas of Improvement | <ul style="list-style-type: none"> • Strong abhorrence towards Piazza • Complexity of Piazza |
| 3 | • Strengths | <ul style="list-style-type: none"> • Appreciation for the use of iBooks • Appreciation for the use of Discord • Engaging Approach • Hybrid and Collaborative Learning Environment • Course Content and Structure • High Satisfaction |
| | • Areas of Improvement | <ul style="list-style-type: none"> • Lack of voiced portions in iBooks • Lack of Synchronous Meetings • Organization of information on Discord |

From the themes and subthemes that emerged, there was a continued sense of dissatisfaction with the use of Piazza, another application that was used to promote learner-learner and teacher-learner interactions as it was not integrated with the modules. It was presented as a separate activity. The user-interface was also said to be confusing and unnecessarily complex. While the engagement coming from the teacher was appreciated in both of the previous terms, there was only a general appreciation of the variety and interactivity of technologies that were used. In contrast, the year when the iBook approach was launched saw specific positive comments on the use of interactive books and the use of discord. The collaborative and hybrid environment provided by the metaverse through FrameVR was also praised by the students. The thematic analysis of Course B had a similar trend as shown in Table 4.

Table 4. Thematic Analysis of Course B

| Year | Themes | Subthemes |
|------|--------------|---|
| 1 | • Strengths | <ul style="list-style-type: none"> • High visibility and responsiveness of the teacher • The teacher was seen as a great communicator. • Good course organization and scheduling • Encouragement of creativity among students |
| | • Weaknesses | <ul style="list-style-type: none"> • Difficulty in understanding the material. • Desire for more synchronous meetings • Concerns about the deadlines • Lack of visual activities • Lack of fun and interactive activities |
| 2 | • Strengths | <ul style="list-style-type: none"> • Good course organization and scheduling • Relevance and engagement in activities |
| | • Weaknesses | <ul style="list-style-type: none"> • Construction of assessment • Lack of quality in materials • Desire for more feedback • Lack of examples and engaging activities |
| 3 | • Strengths | <ul style="list-style-type: none"> • Appreciation for the teacher's enjoyable teaching style • Interactive and easy to understand iBooks • The discord server created a sense of community. • Hybrid and Collaborative Learning Environment • Responsive and supportive nature |
| | • Weaknesses | <ul style="list-style-type: none"> • Request to fix some bugs • Too much information on Discord • Request for more synchronous meetings |

While there were no complaints regarding certain technologies used in the previous offerings of course B, the way the module was written was the biggest issue. Many students reported that it was very difficult to understand. Furthermore, the lack of timely feedback on their submitted works was reported as a major issue. This was addressed by the iBooks because they featured videos that visualized the textual content of the modules while adding some automatically graded check-up questions and presented them in an integrated fashion. Again, the hybrid and collaborative learning environment brought about by Discord and FrameVR was seen as a great motivator among the students of Year 3. On the other hand, the bug that was reported by students was the apparent inability of the iBooks to store student progress when they have not interacted with the iBook after a certain time. This makes them have to re-take all assessment activities in the iBook to have their scores recorded. Some learners viewed it as a good opportunity for reviewing while others saw it as inconvenient. Fortunately, the new version of H5P has addressed this issue. Once again, the organization and amount of information shared on Discord seemed to have overwhelmed some students.

5. Discussion and Conclusion

The study described in this paper investigated the use of the iBook Plus approach and its impact on the general experience and satisfaction of distance learners in two courses of an open university in the Philippines by analyzing their numerical and textual answers to SET questionnaires. The findings were consistent with the existing body of research in several aspects. While the benefits of integration of tools for swift feedback (HatziaPOSTOLOU & Paraskakis, 2010; Lister, 2014; O'Byrne, Patry, & Carnegie, 2008) and combining various media to support learning (Roberto Bacani Figueroa Jr, 2023; Mayer, 2002) were supported by literature, but certain discrepancies are evident. Furthermore, integrating the platforms and activities using a holistic, portable, and expandable framework was supported by previous research on the use of multiple tools and platforms (Saplacan et al., 2020).

The positive response to the use of iBooks, Discord, and FrameVR is consistent due to their ability to facilitate high quality interaction among teachers, learners, and content validated the course design based on Anderson's educational interaction and echoed the positive findings of an earlier study on the use of interactive platforms for programming (Roberto B Figueroa Jr & Amoloza, 2015). However, the combination of these technologies in an integrated approach was key to synergizing their potentials while diminishing the disadvantages associated with using multiple technologies in a course especially because one of the three interactions was prominently maximized through the iBooks and were supported by the chat and metaverse platforms to increase learner-learner and teacher-learner interactions. This supports the expanded version of the interaction equivalency theorem in business settings which states that an online course can demonstrate effectiveness in terms of satisfaction and knowledge transfer by meeting the following criteria: (a) incorporating at least one of three types of interaction (learner-content, learner-teacher, or learner-learner) prominently in the course design, and (b) ensuring that the course delivery aligns consistently with the chosen type of interaction (Padilla Rodriguez & Armellini, 2015). The findings could update this expanded version as it applies to formal learning settings.

The results also suggest that the implementation of a cohesive and user-centric technological framework like the iBook Plus Approach in online educational settings has the potential to augment student contentment and involvement as it is consistent with the literature regarding integrating fragmented tools into a personal learning environment (Dabbagh & Kitsantas, 2012).

While the results were encouraging, they were limited by the lack of granular data that could have facilitated more generalizable results through inferential statistics. Thus, it should be the focus of future iterations of the study.

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273-A Study Of Skill Application And Students' Satisfaction Between Online and Face-to-Face Learning Undergraduate Student Groups in Sukhothai Thammathirat Open University

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Abstract

Sukhothai Thammathirat Open University (STOU), located in Thailand, mainly utilizes a distance education system for a majority of its course offerings. This approach affords students from various geographical locations the opportunity to access education without the limitations of physical attendance, thus enhancing inclusivity and accessibility. However, there are certain courses that require face-to-face learning. This traditional method is particularly vital for courses that necessitate hands-on skills and adherence to professional council standards. The tactile experience, direct interaction with instructors, and collaboration with peers in a face-to-face environment augment learning effectiveness and cultivate interpersonal skills. In the wake of the COVID-19 pandemic, a significant shift occurred. STOU transitioned from face-to-face to online learning for the “Practicum in Community-Based Public Health” course within the School of Health Sciences. This change was mandated by the need to maintain continuity in learning while adhering to safety guidelines to mitigate the spread of the virus. Online learning offers numerous benefits including flexible scheduling, convenience in the learning environment, and a reduction in commuting time and costs. However, it may also present challenges such as technical issues, diminished social interaction, and a need for self-discipline and motivation. This analytical research aims to compare skill application and students' satisfaction in two key areas: “Physical Assessment and Basic Medical Care” and “Public Health Work in Communities”. The comparison was drawn between skills acquired online during the height of the COVID-19 pandemic and those acquired through face-to-face learning post-pandemic. The data was collected via a Google Form questionnaire, and an 85% response rate was achieved, with 111 out of 131 students who were enrolled during the second semester of 2021 and the first semester of 2022 providing feedback. The majority of respondents (62.2%) were female. Intriguingly, there was no substantial difference in scores for the application of acquired skills between the two groups. Moreover, both online and face-to-face student groups reported high satisfaction scores (4.51 and 4.34 out of 5, respectively). However, 78.4% expressed a preference for face-to-face learning post-pandemic. This suggests that online learning can indeed effectively enhance skills in Public Health as effectively as face-to-face learning, underlining its potential as a viable learning approach. However, some skills are better acquired through in-person instruction, emphasizing the importance of blended learning which combines the advantages of both online and traditional learning methods. As the educational landscape continues to evolve, a blended learning approach should be integrated into the instructional model. Further research is also needed to continue exploring the most effective methods of teaching and learning in our increasingly digital world.

Keywords: *Skill Application, Satisfaction, Learning Management System, Online Learning, Face-To-Face Learning*

1. Introduction

The global health emergency, known as the coronavirus disease outbreak of 2019 (COVID-19), has impacted Thailand since January 13, 2020. The virus is highly contagious and difficult to manage as it can spread rapidly through respiratory droplets, causing significant changes in people's lives. Precautions such as lockdowns and social distancing became necessary to slow the virus's transmission (WHO, 2023). These measures

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significantly impacted the world's educational system, necessitating the rapid adoption of online learning and temporary closure of educational institutions. This shift from traditional face-to-face classes to online learning platforms, also known as emergency remote education, ensured uninterrupted education (She, Ma, Jan, Sharif Nia, & Rahmatpour, 2021).

Sukhothai Thammathirat Open University (STOU) is a distance learning-based open university, offering students the opportunity to engage in educational activities using various media, including primary and supplemental resources in print and digital formats. These resources include interactive exercises such as workshops, seminars, and supplemental instructions. Due to the challenges posed by the COVID-19 pandemic, STOU has developed an online learning system using Microsoft Teams (STOU, 2023). The system allows participants to record video lectures, disable their microphones, and engage in text-based discussions. Teachers can use this system to monitor students' academic progress and evaluate educational outcomes through tests and assessments (Microsoft, 2023). Despite the efficiency of online distance learning, it may not fully meet the requirements of certain subjects, especially those requiring hands-on professional experience. Some courses necessitate face-to-face instruction to enable students to adhere to professional council standards and complete courses with practical skill requirements. The tactile experience, direct interaction with instructors, and peer collaboration in a face-to-face setting enhance learning effectiveness and foster interpersonal skills.

The School of Health Sciences offers a "Practicum in Community-based Public Health" course. This course integrates all the information and skills students acquire before completing their Bachelor of Public Health program in Community Public Health. The course includes a 4-day training session on special skills at STOU. It encompasses eight physical assessment and basic medical care skills and nine skills for community public health work, making a total of 17 skills. Many of these skills, especially those related to physical examination, can be challenging to learn via online learning platforms. After completing the training, students undertake a 280-hour internship at one of the sub-district health-promoting hospitals. Finally, students are required to present the skills they have practiced for an additional two days.

As mentioned previously, the researchers aimed to examine the correlation between skill application and student satisfaction in two key areas: "Physical Assessment and Basic Medical Care" and "Public Health Work in Communities". The study compared skills learned online during the peak of the COVID-19 pandemic with those taught face-to-face post-pandemic. Therefore, even though online learning can be effective, it may not fully replace face-to-face learning in specific courses that require practical skills, especially those that involve hands-on experiences. The school should consider implementing a blended learning approach to ensure that students can acquire the necessary practical skills while also benefiting from the flexibility and convenience of online learning.

2. Method

This study employs a cross-sectional design. Data was collected twice, in September 2022 and March 2023. The population included students enrolled in the "Practicum in Community-based Public Health" course in the second semester of the academic year 2021 (65 students) and the first semester of the academic year 2022 (66 students), totaling 131 students. A Google Form questionnaire was used to gather information from all members of the population. Actual data collection occurred during the second semester of the academic year 2021 with 62 participants (response rate: 95.38%) and the first semester of the academic year 2022 with 49 participants (response rate: 74.24%), yielding a total of 111 participants (response rate: 84.7%). The survey was administered after the students completed their coursework.

The data collection instruments for this study include an independently developed questionnaire, which comprises three sections. The first section pertains to personal details, such as gender, level of education, and preferred learning format for this subject. The second section, concerning the application of taught skills, consists of 17 questions on a 6-point Likert scale ranging from "not applicable" to "highly applicable." The third section measures students' satisfaction regarding their learning experience in this course, gauged by 14 Likert scale questions, from "least satisfied" to "highly satisfied." The score range for the first section was 0 to 5, while the second section ranged from 1 to 5.

After the data collection, the researchers reviewed the questionnaire responses for completeness and converted the text data to numbers using dedicated software. This was followed by a statistical analysis that included 1) analyzing the general information using descriptive statistics and 2) comparing the mean skill application scores and satisfaction levels of students with online and face-to-face learning experiences using an Independent t-test.

3. Findings

The majority of participants in this study were female, accounting for 62.2% of respondents. The course was taken by 55.9% of the students in the second semester of the academic year 2021, and by 44.1% in the first semester of the academic year 2022. There were no significant differences in both skill application and student satisfaction between online and face-to-face learning formats. In terms of skill application, online students scored an average of 4.13 out of 5, while face-to-face students scored slightly higher with an average of 4.19 out of 5. For student satisfaction, as outlined in Table 2, the average score for the online group was 4.51 out of 5, while the face-to-face group had an average score of 4.34 out of 5.

Table 1. General profile of study participants (n=111)

| Variable/Category | No. (%) |
|--|-----------|
| Gender | |
| Male | 42 (37.8) |
| Female | 69 (62.2) |
| Group | |
| the second semester of the academic year 2021 (Online Learning) | 62 (55.9) |
| the first semester of the academic year 2022 (Face-to-face learning) | 49 (44.1) |
| Provide your opinion on the learning format after the COVID-19 pandemic | |
| Online Learning | 24 (21.6) |
| Face-to-face learning | 87 (78.4) |

Table 2. Compares the mean scores for applying the skill application scores and satisfaction of students with online learning (n = 62) and face-to-face learning (n = 49) using an Independent t-test.

| Factor | Learning | Scores | | p-value |
|------------------------|--------------|--------|-------|---------|
| | | Mean | SD | |
| Skill application | Online | 4.13 | 0.723 | 0.758 |
| | Face-to-face | 4.19 | 1.200 | |
| Students' satisfaction | Online | 4.51 | 0.654 | 0.341 |
| | Face-to-face | 4.34 | 0.980 | |

4. Discussion and Conclusion

Female respondents constituted 62.2% of the total sample. Interestingly, there was no noticeable difference in the results of skill application between the two groups despite the fact that the online group had slightly lower skill application ratings. This outcome aligns with a research investigation by Basar, Mansor, Jamaludin, and Alias (2021), which revealed that students in the online group underperformed compared to those in the face-to-face group. Moreover, both face-to-face and online student groups indicated high levels of satisfaction (4.51 and 4.34 out of 5, respectively). This outcome contradicted Lin's study findings (Lin, 2022), which suggested that online learning resulted in lower overall student satisfaction compared to face-to-face learning. However, post-pandemic, 78.4% of students expressed a preference for face-to-face instruction. This finding contrasted with results provided by Zheng, Bender, and Lyon (2021), but agreed with the results reported by Atwa et al. (2022). These findings suggest that both face-to-face and online learning can effectively enhance public health skills, highlighting the potential of online learning as a valuable teaching strategy. However, some skills, particularly those relating to physical examinations, are better learned through hands-on training. This emphasizes the importance of blended learning (Atwa et al., 2022; Stoian, Fărcaiu, Dragomir, & Gherhe, 2022), which combines the advantages of both online and traditional learning methods (Stoian et al., 2022). As the educational landscape continues to evolve, the teaching model should incorporate a blended learning approach.

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282-Enhancing Interpersonal Skills and Promoting Cultural Harmony Among Students of Open Distance Learning Institutes Through Scouting

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Abstract

Co-curricular Activities and personality development are co-related in a student's life. Involvement in co-curricular activities provides them with opportunities to excel among peers but also helps them to have practical exposure to professional life skills. Eventually, the chances of success in professional life increased for the student who involved in co-curricular activities and interpersonal skills development opportunities. This paper presents an inclusive overview of the significance, challenges, and possible effective strategies to incorporate them into the co-curricular activities of Open Distance Learning (ODL) institutions to promote regional and cultural harmony through scouting. "The Scout Movement is a Global Educational Youth Movement that contributes to the education of young people through a system based on Scout Promise and Law". The scout movement enables young people to be active citizens who create positive change in their communities and around the globe through shared values. Mostly the students of ODL institutions struggle with interpersonal skills development, especially those who have never been to any conventional educational institute of diverse cultures and communities. We at the Virtual University of Pakistan are introducing co-curricular activities by scouting for more than 114k students coming from 130 different cities, 201 local campuses, and 59 different study programs to develop their interpersonal skills to give them an equal chance to embark on a great professional career aligned to their specialization or area of interest. The research aims to determine the need for a scouting method for ODL students, which includes outdoor activities, namely, a patrol system that develops team building and leadership qualities, social work engagement to teach volunteerism, integration camps for cultural exchange, hiking and trekking to sensitize them about climate change affects, awareness campaigns, first aid, and emergency preparedness & response skills to empower them with lifelong skills to kick start a good professional career. Research shows that the participation of faculty, staff, and students in co-curricular activities, especially by using the scout method, not only helps them kick start a vibrant professional career but be responsible citizens of society.

Keywords: *Co-curricular activities, Personality development, Interpersonal skills, Open Distance Learning (ODL), Scout Movement*

1. Introduction

In the contemporary educational landscape, the role of co-curricular activities in shaping students' holistic development has gained significant recognition. As education evolves beyond the traditional confines of classrooms, the significance of fostering well-rounded individuals capable of excelling academically and contributing meaningfully to society becomes increasingly evident. This research paper delves into the symbiotic relationship between co-curricular activities and personality development, focusing on their impact within the unique context of students enrolled in Open Distance Learning Institutes to address feeling of isolation (Mishra & Aithal, 2023), (Foley & Marr, 2019). Specifically, the paper explores the potential of scouting as a co-curricular activity to enhance interpersonal skills and promote cultural harmony among students.

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1.1. The Paradigm Shift in Education

Co-curricular activities represent a paradigm shift in education, acknowledging the importance of fostering skills beyond the confines of traditional classrooms. These activities encompass a diverse range of extracurricular engagements that extend learning beyond textbooks, providing students with opportunities to cultivate skills, attitudes, and values that contribute to their holistic growth (Mishra & Aithal, 2023). By emphasizing realistic learning and practical application, co-curricular activities offer a comprehensive educational experience that values cognitive development alongside essential life skills (Jorge, et al., 2020).

1.2. Co-curricular Activities and Personality Development

Co-curricular activities are integral part to personality development of students, enhancing skills beyond the classroom. These activities foster confidence, teamwork, and problem-solving abilities (Mancha & Ahmad, 2016).

1.3. The Open Distance Learning Context

Open Distance Learning Institutes cater to a diverse student demographic, often comprised of individuals with varying backgrounds, responsibilities, and commitments. While distance learning offers flexibility, it can sometimes result in limited opportunities for social interaction and community engagement (Foley & Marr, 2019). Co-curricular activities have the potential to address these challenges by providing platforms for personal development, fostering a sense of belonging, and enriching the overall learning experience for distance learners (Benson, 2016).

1.4. Scouting as a Catalyst for Interpersonal Skills and Cultural Harmony

This research paper centers specifically on scouting as a co-curricular activity that holds promise in enhancing interpersonal skills and promoting cultural harmony among Open Distance Learning Institutes students. The core values of scouting, including respect, collaboration, and community engagement, align seamlessly with the goals of nurturing well-rounded individuals capable of thriving in diverse settings (Broström, 2016). Through active participation in scouting activities, students are exposed to real-world experiences that cultivate empathy, tolerance, and cross-cultural understanding, all essential components of effective interpersonal skills and cultural harmony (Matt, 2019).

2. Literature Review

The study goal was to gain insights into how participation in the Scout Movement affects these critical aspects of development. Extracurricular activities are acknowledged for their role in enhancing the holistic growth of young people. Engaging in activities beyond the classroom offers chances to acquire new skills, personal development, and active social interaction (Mahoney, et al., 2003). The literature specifically focuses on the Scout Movement as an extracurricular option and its possible impact on educational achievements, self-confidence, and social ability. “The Influence of the Scout Movement as a Free Time Option on Improving Academic Performance, Self-Esteem and Social Skills in Adolescents” explores the exclusive effects of the Scout Movement on youth development. This movement is characterized by its emphasis on outdoor activities, teamwork, leadership development, and values-based learning (World Organization of the Scout Movement). These components align with broader theories of positive youth development, suggesting that the Scout Movement may contribute to academic, social, and psychological growth (Broström, 2016). Research indicates that extracurricular activities can positively affect academic performance by fostering discipline, time management, and motivation (Fredricks, 2006). The review considers how the structured nature of the Scout Movement’s activities may lead to better time management skills and a positive work ethic, ultimately influencing academic success (Broström, 2016).

The Scout Movement’s focus on skill acquisition, goal achievement, and recognition of individual contributions may increase adolescents’ self-worth and confidence. The review assesses how these elements of the Scout Movement impact participants’ self-esteem. Extracurricular activities often provide opportunities for adolescents to interact with peers, fostering the development of social skills, teamwork, and communication (Brown, 2005). The Scout Movement’s collaborative nature, group activities, and shared experiences offer a platform for adolescents to engage with diverse individuals and develop essential interpersonal skills. The review investigates the range in which the Scout Movement enhances participants’ social competencies (Broström, 2016).

In conclusion, the study sheds light on the potential impact of the Scout Movement on educational performance, self-confidence, and societal skills among youngsters. By examining the movement's alignment with theories of positive youth development and extracurricular benefits, this review contributes to understanding how participation in the Scout Movement may positively impact adolescents' overall development. The research helped us understand the impact of the scout movement on improving academic performances and social skills (Broström, 2016).

The transition from participant to leader within youth organizations is important in leadership development. This literature review explores existing research and theoretical frameworks that contribute to understanding the learning process to lead, specifically focusing on the Swedish scout movement. This analysis aims to contextualize this transition's unique experiments, strategies, and outcomes, shedding light on the broader implications for youth leadership development. Numerous studies emphasize the transformative potential of youth leadership development programs. Youth organizations such as the Scout movement provide platforms for young individuals to acquire essential skills, values, and experiences that prepare them for leadership roles (Council, 2021). According to Stogdill's leadership traits theory, leaders develop specific attributes like communication skills, decision-making abilities, and interpersonal relationships through formal and informal learning experiences (Stogdill, 1948).

The transition from being a participant to a leader within a youth organization is not without challenges. Researchers like "Posner and Kouzes" argue that young individuals often encounter a "leadership identity crisis" during this transition, where they struggle to reconcile their self-perception as followers with leadership responsibilities (Posner, 2008). The Swedish scout movement's context might introduce additional challenges, such as managing group dynamics and responsibilities while preserving a sense of companionship. The concept of experiential learning, introduced by (Kolb, 1984), aligns well with the Scout movement's pedagogical approach. Kolb's learning cycle, including solid involvement, reflective surveillance, theoretical conceptualization, and active examination, resonates with the scout movement's emphasis on learning through doing. This connection suggests that the transition from participant to leader could be facilitated by actively engaging young individuals in planning, decision-making, and problem-solving within the scout activities (McLeod, 2023).

Empowerment theories highlight the significance of providing youth autonomy, self-efficacy, and exploring opportunities. In the Swedish scout movement context, this could involve encouraging young individuals to take ownership of their learning and leadership development. Moreover, mentorship emerges as a critical component, as established leaders within the movement can guide and support transitioning participants, aiding them in developing leadership skills and confidence. The cultural and organizational context of the Swedish scout movement plays a pivotal role in shaping the leadership transition process. Hofstede's cultural dimensions theory could shed light on how cultural values impact leadership expectations and practices within the movement. Furthermore, the movement's unique structure, activities, and traditions might influence how participants perceive leadership and aspire to lead (Broström, 2016).

The literature review underscores the importance of understanding the evolution from participant to leader within the Swedish scout movement as a dynamic process intertwined with broader leadership development theories. By examining the challenges, strategies, and contextual factors that shape this transition, this review lays the groundwork for the research paper to explore the details of learning to lead within the unique environment of the Swedish scout movement. Through synthesizing existing knowledge, the research paper contributes to a deeper understanding of youth leadership development. It offers insights that can inform the scout movement and other youth organizations seeking to cultivate effective and responsible leaders (Broström, 2016).

The development of leadership skills among students has gained significant attention in educational research, given its relevance to preparing individuals for future responsibilities. Extracurricular activities hold a significant place. This review takes a closer look at the study (Kim & Wargo, 2023). "Involvement in Extracurricular Activity: Does it Matter to Student Leadership Development?" Leadership development, a multifaceted endeavor, spans various skills, knowledge bases, and attitudes that equip individuals to steer and inspire others (Mahoney, et al., 2003). The study aims to establish whether involvement in extracurricular activities positively impacts student leadership development. Prior research has provided insights into the potential link between extracurricular involvement and leadership development. Astin's involvement theory (1984) suggests that participation in extracurricular activities contributes to students' personal and intellectual growth, which could indirectly impact leadership skills. It also assessed factors such as leadership roles, responsibilities, and skills acquired through extracurricular engagement (Munir & Zaheer, 2021).

The results of their study suggest a significant positive correlation between extracurricular involvement and leadership development. The students involved in more extracurricular activities reported higher leadership skills and competencies. Furthermore, students who hold leadership roles within these activities exhibited more advanced leadership qualities, including communication, team building, creativity, decision-making, and problem-solving abilities. The outcomes of the study carry several effects for educational institutions and policymakers. Integrating diverse extracurricular activities into the curriculum could enhance students' exposure to leadership experiences and challenges (Kim & Wargo, 2023). Educational institutions could also design structured leadership development programs within extracurricular activities to foster leadership skills intentionally. Future research could delve deeper into the mechanisms through which extracurricular involvement influences leadership development and explore potential moderating factors. "The study sheds light on the significant role of extracurricular activities in students' leadership development. The positive correlation between involvement in extracurricular activities and leadership skills underscores the importance of these activities in cultivating a well-rounded and capable future workforce". The research paper addresses the relationship between extracurricular involvement and leadership development, guiding educational administrators and institutions to provide holistic learning experiences for students (Mishra & Aithal, 2023).

Youth scouting programs have long been associated with outdoor adventures, team activities, and companionship. However, the Boy Scouts of America's (BSA) emphasis extends beyond recreational pursuits. The article "Scouting: Excellent Training for Life," published by the Laurel Highlands Council of the Boy Scouts of America, explores the diverse life skills and values that scouting programs teach to participants. This literature review delves into the article's content, emphasizing the range of skills gained through scouting and their long-term implications. Scouting is a holistic platform that equips youth with practical skills and character-building values. Through engaging activities like camping, hiking, boating, and swimming, participants experience experiential learning that goes beyond traditional classroom settings. Notably, the skills acquired through these activities are often more effectively retained due to the enjoyable nature of the learning process. One essential aspect of scouting is the emphasis on community service, instilled in participants as early as age five to ten. Group leaders organize projects that allow young scouts to serve their environment, community, or organizations. These service experiences foster skills in communication, collaboration, and work ethic. The attitude of service cultivated in scouts promotes emotional maturity and lays the foundation for future volunteering and committee service (Council, 2021).

Scouting's outdoor camping trips provide participants with valuable skills in wilderness survival and environmental education. Activities encompass first aid, safety, and physical wellness, preparing scouts for indoor and outdoor settings. Importantly, scouts are educated about environmentally-friendly practices, fostering a commitment to conservation and enabling them to be stewards of nature. These skills extend to medical and outdoor emergency preparedness, promoting healthy lifestyles and careers in conservation. Scouting instills leadership skills from a young age, allowing scouts to engage in role-modeling tasks and progressively take on more significant responsibilities. Leadership training covers event planning, communication, and effective execution of activities (Council, 2021). As scouts lead camp activities or ensure the safety of others, they learn to manage time, coordinate resources, and communicate goals. These skills are transferable to school, community projects, and future careers. Scouting programs offer a unique opportunity for early career exploration, allowing scouts to explore fields of interest in a supportive and low-pressure environment. Programs such as Stem Scouts expose participants to science, technology, engineering, and mathematics. Events like the Pinewood Derby, Rain Gutter Regatta, and Space Derby introduce hands-on physics experiences. This early exposure empowers scouts to make informed decisions about their future careers through guest speakers, mentoring, field trips, and job shadowing (Rober, 2011).

The Laurel Highlands Council's article underscores the multifaceted benefits of scouting, emphasizing its role as a platform for life skills and character development. Beyond outdoor adventures, scouting equips youth with skills in community service, environmental education, leadership, and career exploration. The BSA's commitment to character development and leadership training resonates with its mission of preparing young people for life. The inclusive nature of modern scouting, allowing girls to participate alongside boys, further enhances the organization's impact. The Boy Scouts of America's programs in Western Pennsylvania, Western Maryland, and parts of West Virginia enrich participants' lives and prepare them for lifelong success by fostering a sense of community, friendships, and adventure (Council, 2021).

Considering the research title and literature review we have done, the research question arises "Is Scouting helpful to develop & enhance interpersonal skills and promoting cultural harmony among students of Virtual University of Pakistan?"

3. Methodology

The research is exploratory and qualitative. Structured interviews were conducted to gather motivations to join in scouting activities. We analyzed a few chosen pertinent papers and articles about extracurricular activities, student leadership, and scouting forms the paper's basis (Mishra & Aithal, 2023). To determine the function of extracurricular and co-curricular activities, interpersonal skills development, and scouting, the authors have tried to incorporate the study of primary data. This research is based on information from 692 complete interviews from the Virtual University of Pakistan students pursuing education in regular degree programs. They have shown interest in being part of scouting at VU. In addition to answering the 14 other questions of regional information, the motivation statements and any scouting background before this registration to join scouting were asked of the students.

4. Findings

The motivations driving students to join scouting are multifaceted and reflect their aspirations for personal growth, meaningful experiences, and positive societal contributions; the summarized responses from 692 participants through creating eleven common themes via Nvivo Thematic Analysis. The themes, codes, excerpts from transcripts given in below chart for reference.

| Themes | Codes | Excerpts from Transcripts |
|------------------------------------|------------------------------------|--|
| Personal Development and Learning | Self-confidence, Leadership | "Scouting helps youth develop academic skills, self-confidence, ethics, leadership skills, and citizenship skills that influence their adult lives." "Students will learn new things and skills. Scouting is versatile and helps in personal development." |
| Exploration and Adventure | Outdoor adventures, Challenges | "Always interested in extra activities...excited to meet some experienced people and get some new skills." "Scouting offers a chance for hands-on learning, facing challenges, and enjoying outdoor adventures." |
| Social Interaction and Networking | Friendships, Diverse backgrounds | "Meet other students and share my experience with them through knowledge." "Scouting involves interacting with students from all over the country...meet new friends and learn new things." |
| Community Service and Volunteerism | Contribution, Social welfare | "Volunteerism is my hobby...opportunity to learn from young generation...helps show commitment and passion for community and personal growth." "Scouting provides a way to serve humanity, address social issues, and contribute to the community." |
| Cultural Exchange and Diversity | Cultural harmony, Diversity | "Good opportunity to live together to learn something new...experience the company of different people." "Scouting helps promote cultural harmony by bringing students from different areas together and learning about diverse cultures." |
| Leadership and Teamwork | Leadership, Team collaboration | "Scouting helps in learning new skills...budgeting, project management, and teamwork." "Scouting is a platform to develop leadership skills and work collectively as a team towards common goals." |
| Outdoor Exploration and Nature | Outdoor activities, Adventure | "In Scouting, individuals of all ages learn unused things and abilities...spend time in nature." "Scouting provides adventure and personal growth opportunities by engaging in outdoor activities and connecting with the natural world." |
| Confidence Building and Overcoming | Overcoming challenges, Confidence | "Interest to introduce so specifically." "Scouting provides opportunities to overcome challenges, face fears, and gain confidence through its various activities and experiences." |
| Academic and Career Enhancement | Skill-building, Future success | "Scouting helps youth develop academic skills...affect their adult lives." "Scouting is versatile...skills beneficial for academic and professional goals, such as leadership, ethics, and communication." |
| Positive Memories and Fulfillment | Memorable experiences, Fulfillment | "Want to experience some extra activities...create some beautiful memories of life." "Participants look forward to creating memorable experiences and deriving personal fulfillment through participation in scouting activities." |
| National Pride and Service | Serving nation, Community | "Want to represent Virtual University of Pakistan...can manage mega events...scouting activities during school and college." "Scouting is seen as an opportunity to serve the nation, positively represent the university, and contribute to community development." |

The Results derived from the responses are as under:

4.1. Personal Development and Learning

Students aim 1354 times to enhance self-confidence, leadership abilities, and ethical values. Scouting offers a practical platform for life skills development.

4.2. Exploration and Adventure

Students express 218-time excitement about exploring new activities, engaging in outdoor adventures, and breaking away from routines. Scouting provides hands-on learning and opportunities to face challenges.

4.3. Social Interaction and Networking

Building friendships and connecting with like-minded individuals from diverse backgrounds are strong motivators. Participants anticipate 99 times for forming lasting relationships and expanding their social networks.

4.4. Community Service and Volunteerism

Students value the chance to contribute to society through community service and volunteer activities about 383 times. They see scouting as a way to impact communities and foster social welfare positively.

4.5. Cultural Exchange and Diversity

Students were 106 times shown enthusiastic feelings about meeting people from different cultures and regions during their responses. Scouting promotes cultural harmony, understanding, and learning from diverse perspectives.

4.6. Leadership and Teamwork

Developing leadership skills and collaborating effectively within a team drive participation comes 176 times. Scouting provides a platform to lead and work collectively towards common goals.

4.7. Outdoor Exploration and Nature

The allure of spending time in nature, engaging in outdoor activities, and experiencing the natural world is a recurring theme repeated 630 times. Participants seek adventure and personal growth through these experiences.

4.8. Confidence Building and Overcoming Challenges

Many students express a desire to overcome personal fears and challenges. The attribute got 728 times coverage. They believe scouting activities will empower them to face challenges, boosting their confidence.

4.9. Academic and Career Enhancement

Students recognize 92 times the potential for skill-building that aligns with their academic and professional goals. Leadership, ethics, and communication are considered valuable for future success.

4.10. Positive Memories and Fulfillment

Students look forward to creating memorable experiences, having fun, and achieving personal fulfillment through participation in scouting activities. The coverage of the theme was 405 responses.

4.11. National Pride and Service

Some participants view scouting as an opportunity to serve the nation, represent the university positively, and contribute to national and community development. The passion for serving the nation got 482 responses.

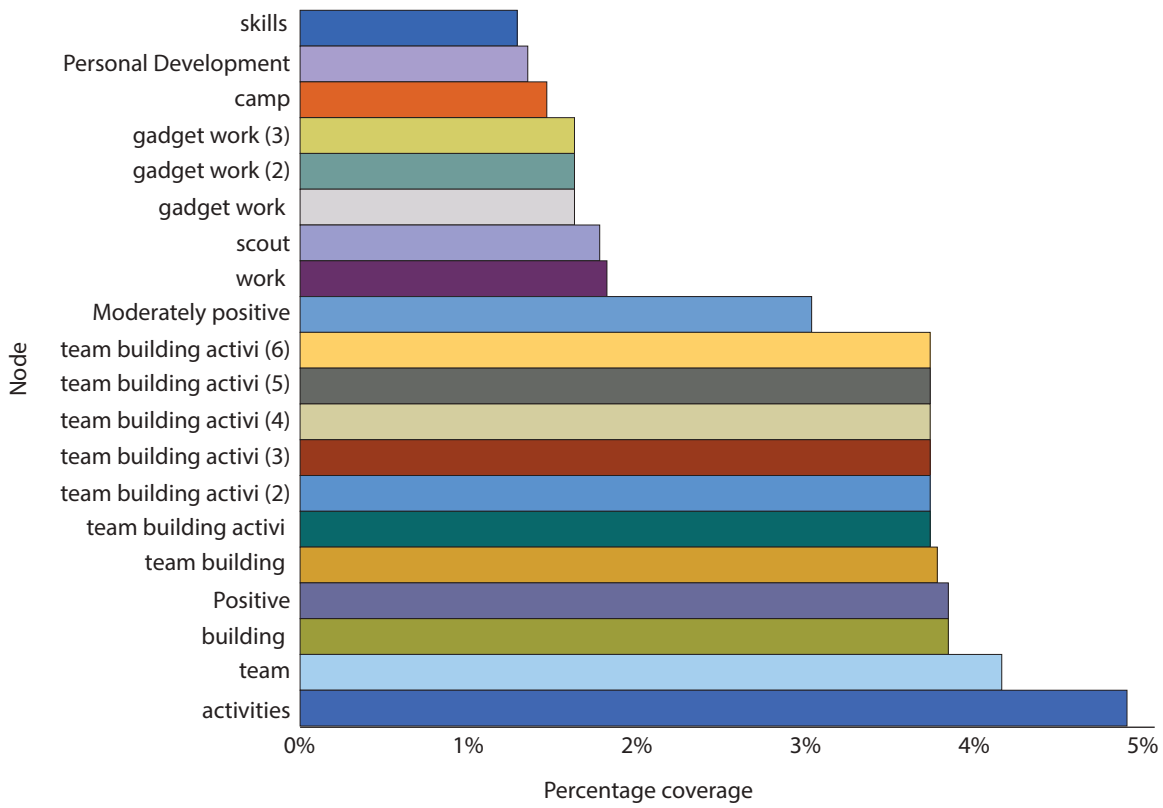


Figure 1. Themes - Coding by Node

Nodes - Coding by Survey Respondent Codes

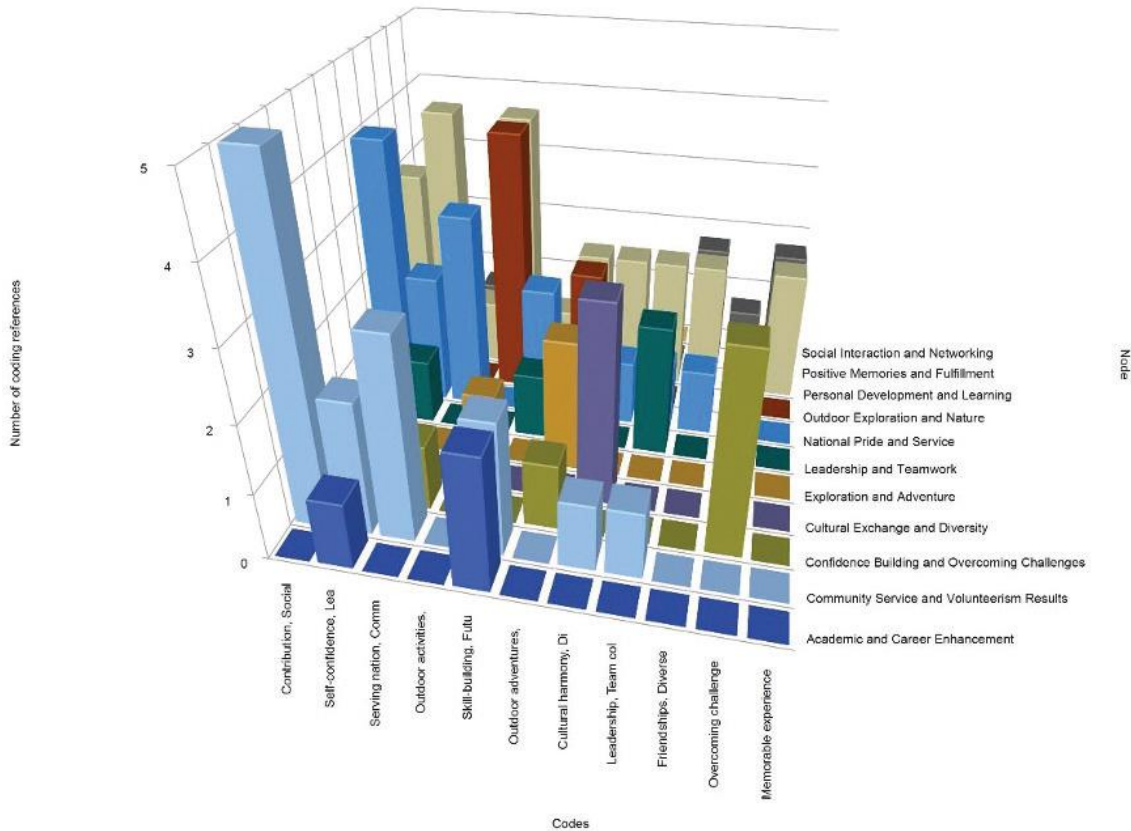


Figure 2. Nodes - Coding by Survey Respondent Codes

Nodes clustered by word similarity

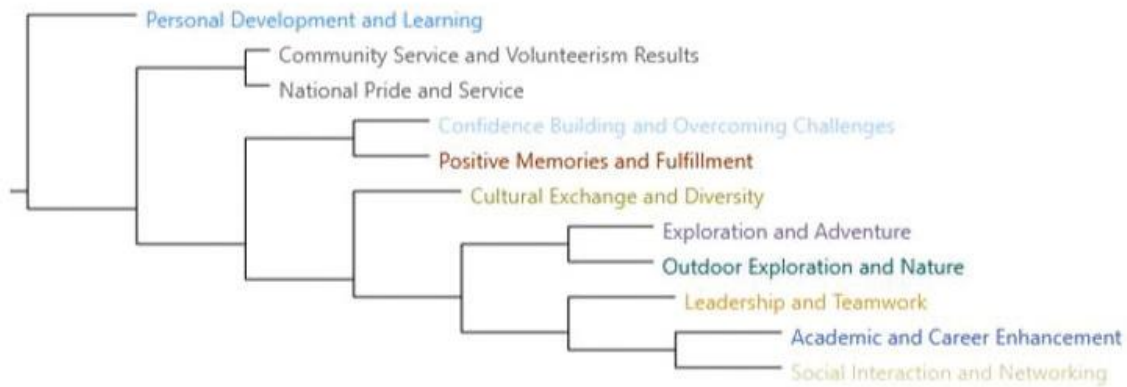


Figure 3. Nodes clustered by word similarity

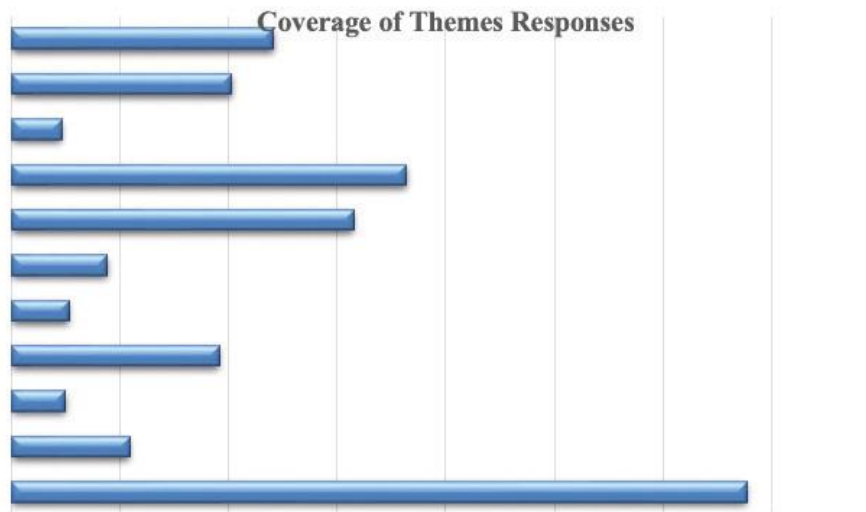


Figure 4. Coverage of Themes Responses

5. Discussion

In an era marked by rapid globalization and digital connectivity, the role of education extends beyond mere academic instruction. The evolving demands of the 21st-century workforce necessitate a comprehensive approach encompassing cognitive abilities, interpersonal skills, and cross-cultural competence. Open Distance Learning Institutes (ODLIs) are a prominent educational model, offering flexibility and accessibility to a diverse student population. However, the challenge lies in ensuring these students acquire the essential skills to succeed in a dynamic and interconnected world (Munir & Zaheer, 2021).

This research seeks to explore the potential of scouting as a co-curricular activity to address the needs of students from ODLIs in enhancing their interpersonal skills and promoting cultural harmony. Integrating scouting into the co-curricular landscape of ODLIs presents a unique opportunity to cultivate these vital proficiencies holistically. The discussion focuses on the underlying needs that make scouting a viable and impactful avenue for achieving these objectives.

The most influential way to empower university learners is by inspiring them to reason distinctly, envision the bigger picture, easily precise ideas, and learn independently and collaboratively. We have adopted a structured interview method comprising aspects of extracurricular and scouting activities from 692 registered students of VU who have shown interest in being part of scouting activities.

6. Conclusion

In conclusion, the qualitative responses indicate that scouting is instrumental in developing interpersonal skills, fostering cultural harmony, and promoting holistic growth among the Virtual University of Pakistan students. The multifaceted nature of scouting activities catalyzes personal, social, and cultural enrichment, aligning with the broader mission of nurturing well-rounded individuals prepared for academic, professional, and societal challenges.

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Best Paper Award Silver Medal

289-Problematising Technological Solutionism in Open Universities: Perspectives Drawn Using the Method of Empathy-Based Stories (MEBS)

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Abstract

It has become commonplace today to observe that, increasingly, expedited by the recent pandemic, educational institutions globally have been adopting digitally-mediated forms of teaching and learning practices, and that this has led to a significant and deepening convergence between open and conventional universities, an outcome of which is the intensifying competition between the two institutional types. Although already anticipated at the turn of the century, this digital convergence has nonetheless birthed a contemporary existential crisis for open universities in general, prompting them to question and reassess their role and place in the future landscape of higher education, to interrogate how they might manoeuvre or even reinvent themselves in the face of flux to ensure their continued relevance and existence. With the current heightened rhetoric of artificial intelligence (AI) as a game-changer, it has come to be even more widely believed that the inevitable way forward, if not the solution to the crisis of open universities, lies in the further intensification of digitalization. Against the foregoing background, this paper sets out to problematize the under-interrogated trend in thought that borders on “technological solutionism”, namely, the idea that “digital technologies offer ready solutions, correctives and fixes to existing education problems”. In the first half of the paper, digitalization is set up as the foundation on which this paper critically considers arguments for stakeholders to recognise and to be circumspect when confronted with the application of digital technologies and cultures in open, and distance, and digital education (ODDE). In the second half of the paper, we share the perspectives gained from our research on critical aspects of ODDE that may be eclipsed by the unchecked belief that “anything ‘digital’ automatically provides more efficient, effective and/or elegant ways of doing things than was previously possible”. These perspectives were drawn using the method of empathy-based stories (MEBS), “a qualitative data collection method where the informants compose short imaginary writings according to an introductory frame story provided by the researcher”. The frame stories in our research revolve around successful learning with and without the latest digital technologies. A tentative key finding of our MEBS-drawn research is that many of the enablers of educational success are non-technological in nature and that, taking cognisance of this, ODDE practitioners and OUs would do well to pay equal heed to them even as they develop “‘non-stupid’ optimism about educational technologies” in the face of the digital convergence of institutional types.

Keywords: *Digitization, digital convergence, technological solutionism, method of empathy-based stories (MEBS), open universities*

1. Introduction: The Convergence, the Digital, and the Future of OUs

The convergence of distance and conventional education – and, by extension, distance and conventional universities – that is manifest today has compelled many stakeholders to introspect, consult, and rethink sustainable forms of open universities (OUs) in the future landscape of higher education. Despite appearances

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to the contrary, the convergence we are witnessing now is not a new phenomenon but one that is at least two and a half decades in the making. Already, by the late 1990s, at a time when new OUs including Open University Malaysia (OUM) were still coming into existence, scholars including Gajaraj Dhanarajan (1997) and Alan Tait and Roger Mills (1999) had sighted on the horizon the convergence driven by forces entangled within the broader sociopolitical and economic contexts of neoliberalism and the marketization of education on the one hand, and the democratization of learning for the excluded sections of society on the other. Surging then was demand for part-time post-secondary education by adult learners, while conventional educational institutions were starting to take a keen interest in adult learners as a cohort – “an interest driven by the need to recruit larger numbers and fuelled by intermittent anxiety about the supply of school leavers” (Tait & Mills, 1999: p. 1). At the same time, distance education was moving from the margins to the centre of educational policy and practice, as more independent and less resource-intensive learning methods were gaining currency and new educational technologies (edtech) were speeding up the introduction of flexible learning programmes and learning strategies across institution-types. Over the next two decades, the convergence played out unevenly and at varying speeds across institutions, countries and geographical regions, until it was abruptly accelerated on a global scale by the COVID-19 pandemic. The pandemic, as Daniel Clark (2023) puts it, has “acted to legitimise the technical pervasion of an already technology-centric HE [higher education] landscape, culminating in unprecedented levels of investment into a new paradigm of data-driven educational technology to serve the needs of its imagined future.”

Today, post-pandemic, amidst the heightened rhetoric surrounding emerging technologies epitomized by generative artificial intelligence (AI), and driven in no small measure by the fear of missing out in the technology race, open and conventional universities continue to converge as they accelerate the rolling out of their digital-first approach, as is evident, for instance, in the ‘digital transformation’ plans they are generating and implementing at speed, in the way they are seeking to expand market share by introducing or mainstreaming digitally-mediated forms of teaching and learning and an array of fully online programmes, and in the way they are positioning themselves, belatedly or otherwise, as *de facto* providers of “open, distance, and digital education” (ODDE), a cross-spectrum term minted by Olaf Zawacki-Richter and Insung Jung to refer to:

all kinds of learning and teaching processes in which knowledge and skill base of educational technology, digital media, and tools are used to present and deliver content, as well as facilitate and support communication, interaction, collaboration, assessment, and evaluation [...] It includes various practices, from technology-enhanced education, to flipped learning and blended learning to fully online education (2022: p. 4).

Irrespective of the merits of reading the convergence as an ‘incursion’ of the conventional universities (popularly imagined as ‘properly’ tied to the in-person mode of doing education) into the domain of OUs (as the ‘rightful’ operators of alternative modes to in-person education), it would be hard to argue against the following sobering observations. First, that, in many cases, “the digital revolution along with a wider range of environmental changes for higher education have substantially eroded the [OU] first-mover advantage” (Tait, 2018: p. 13). And, second, that, due to these changes, there is no longer, if there ever was, a “guaranteed place” for OUs in the landscape of higher education (Tait, 2018: 20).

If information and communication technologies (ICT) were what gave OUs the means to scale their provision of higher education in open and distance mode before the conventional universities began to leverage on them and diminish the OU lead, they are also, as Tait and Mills (1999) argue, that which is at the centre of the solution that will determine the future success or failure of OUs (and indeed all educational institutions). Notice here the nuanced argument being made. Digital technologies, as a latter-day term for ICT, are not proffered as a standalone panacea in and of itself. Tait (2018) reiterates this crucial but easily-missed point when he writes that, to validate their continued existence, OUs will need to deliver “a substantive new proposition that once again combines vision and mission with new technology assemblages and combinations, which was essentially the brilliance of the early Open University model” (2018: p. 20). To wit, technology is but part of the formula co-created in relation to the OU’s vision and mission which have historically and culturally been to provide the underserved access to quality higher education at affordable costs. What is required, then, to put it in yet another way, is a new proposition that rethinks technology in sociotechnical terms. To think sociotechnically, as Neil Selwyn puts it, is to think of technology not as an autonomous, ahistorical, or neutrally occurring force but as “entwined with the social, economic, political, cultural and historical conditions” (Selwyn, 2021: p. 2) of its design and uptake. To think sociotechnically is also to conceive of technology as potentially useful without treating it as the overriding force of necessary good that drives history and change. To fall short of thinking

sociotechnically in this way is, we argue, to risk defaulting to the position of technological solutionism and detracting from the sustainability of OUs into the future.

Techno-solutionism (as a common abbreviation of technological solutionism) has been described as the technology version of how “everything is a nail to a person with a hammer” (Sætra, 2023: p. 2), which is itself drawn from Abraham Maslow’s (1966: pp. 15-16) aphorism: “it is tempting, if the only tool you have is a hammer, to treat everything as if it were a nail.” Put plainly in the context of education, techno-solutionism is the popular “idea that digital technologies offer ready solutions, correctives and ‘fixes’ to existing education problems” (Selwyn, 2022: p. 201). Buoyed by indefatigable optimism, it routinely overlooks how the inflated rhetoric of technology on the verge of upending education has, historically and all too often, failed to materialise, leading critics to underscore how educational technology tends to be “oversold and underused” (Cuban, 2001) and beset by “hype, hope, and disappointment” (Gouseti, 2010). Critics have also highlighted a persistent blind spot in techno-solutionist thinking: there are “many shortcomings in education that cannot be overcome by simply introducing more technology” (Selwyn, 2022: p. 33).

Critiques that problematise lines of thought that approach or fall in the domain techno-solutionism in general and in the specific context of education are amassing and gaining momentum even if they have yet to occupy the centre of mainstream western discourse in which the application of digital technology to contemporary education remains largely unproblematised (see, for e.g., Morozov, 2013; Morozov, 2022; Castaneda & Selwyn, 2018; Mertala, 2019; Teräs et al., 2020; Teräs et al., 2022; Suoranta et al., 2022). Comparatively, in the context of ODDE in Asia and especially developing Asia, critiques of techno-solutionism that challenge the status quo occupy a place that is much farther off from the centre; they are almost at the outermost reaches of thought, if they figure at all in the horizon of the thinkable. This is perhaps to be expected considering that “critical research” (Muncie, 2006; Carspecken, 2008; Macgilchrist, 2021) otherwise known as “imminent critique” (Procyshyn, 2022) – as the knowledge-problematising genre of inquiry in which critiques of techno-solutionism are typically cast – is generally incompatible with the dominant intellectual traditions in Asia that discourage open criticism.

The near absence of critiques of techno-solutionism directly applied or applicable to the provision of ODDE by OUs in developing Asia in fact makes them all the more vital today – why? Although OUs in general have had their first-mover advantage eroded by the ongoing digital convergence and are compelled to deliver a new value proposition, OUs in developing Asia are comparatively more precariously positioned on account of their more constrained resources and could thus ill afford to miscalculate in their attempt to deliver the substantive new proposition that is to be the roadmap to their reinvention. Sustained critiques of techno-solutionism applied or applicable to the Asian ODDE context have vital roles to play, especially for OUs in developing Asia as they introspect and work on reformulating their respective value propositions in the face of global digitalisation. They act as guardrails against the temptation of over-leveraging on technology amidst a technology race that seems to demand more technology rather than less. And they serve as cautionary reminder to stakeholders against overlooking or devaluing non-technological solutions to educational issues in the provision of ODDE, as ‘unsexy’ as they may be compared to buzzy technologies like AI-powered mentors, immersive virtual reality, and quantum computing.

Admittedly, it is not easy to orientate oneself or manoeuvre when one is put in the state of cognitive dissonance as a result of being hemmed in on the one side by compelling scholarly arguments against techno-solutionism and, on the other side, by the equally compelling narrative that a legion of powerful technology proponents (EdTech companies, global technology giants, governments, international lobbying organisations for multinational companies like the World Economic Forum, futurists/pundits, academics, writers, etc.) is pushing to naturalize as commonsense, namely the inevitability of emerging digital technologies transforming the future of education and, in doing so, redressing the (purported) failure of the “traditional education system” (17 Ways, 2022) to meet the needs of the (vaunted) Fourth Industrial Revolution (IR 4.0) (Moll, 2021)? As universities across types continue to converge, is it inevitable that they will need to not only extensively infuse digital technologies into all aspects of education but also undergo a more profound “digital transformation” conceived as a “series of deep and coordinated culture, workforce and technology shifts that enable new educational and operating models and transform an institution’s operations, strategic directions and value proposition” (Jisc, 2020)? What will be the consequences for universities, including OUs, if they had limited resources to match the digital transformation plans of their better-endowed competitors? Lastly, what options might be open to OUs if they wished to develop “‘non-stupid’ optimism” about educational technologies – that

is, to “look beyond the charismatic allure of the ‘techno-fix’, and instead work towards forms of technology use that can support and sustain the longstanding and hard work of addressing the social and material obstacles to educational and social equalities” (Facer & Selwyn, 2021: p. 2)? To address these research questions, we sought input from a select group of informants using the method of empathy-based stories (MEBS). MEBS here refers to the qualitative method of data collection, analysis, and interpretation that is largely aligned with the constructivist epistemology and the qualitative design of narrative research originating historically from the humanities, anthropology, and sociology (Creswell & Creswell, 2023).

2. Method: Deploying MEBS

Having set up the terms of the discussion in critical research mode, we employed the qualitative research method of empathy-based stories (MEBS) to obtain perspectival data from our informants which we then analysed and interpreted to answer the research questions set above. Data derived from the application of MEBS come in the form of stories that emerge when the informants apply empathy and imagination to respond individually in writing to the fictional situation and/or character presented to them in the frame stories serving as prompts. In our case, the frame stories we devised and the empathy-based stories we solicited revolve around future scenarios relating to learning with/without advanced digital technologies.

Conceptually, empathy-based stories capture the informants’ “perceptions, expectations, mental images, and values regarding a specific phenomenon” (Wallin et al, 2019). What they textualize is not truth that is static and external to the observer in the positivist sense but rather as shaped through interpretations, beliefs, and social interactions in the constructivist sense. Unlike other narrative methods, MEBS stories are commonly obtained without identifying informant details tagged to them, although it is possible to take a non-anonymous approach if the researcher wishes to reserve the option of comparing stories by the informants’ background variables. We decided to take the latter approach and narrow down our selection of informants to fulltime and sessional open university teachers. We decided on this to retain the comparative option for the future, and also, just as importantly, because we were particularly interested in what they had to say on the subject, especially given how, across contexts, teacher in higher education are rarely invited to give their input on matters related to digitalization in HE that, ironically, directly impact them. In this way, then, our selection of open university teachers as informants is a step towards redressing their being commonly “perceived as objects of digitalization [and] targets of professional development whose digital skills and competencies are measured and evaluated [...] rather than [as] active subjects playing a critical role in the shaping of digital futures of HE” (Teräs et al., 2022).

Procedurally, and guided by our research questions, we formulated two frame stories that were kept relatively short to avoid distracting or giving contradictory clues to the informants. The frame stories were then sent to our informants by email with information about our research and instructions to follow should they give their informed consent to participate. One frame story was sent to the first group of informants, while the other was sent to the second. We requested that our informants, should they choose to participate, read the frame story they received and respond to it individually in no more than twenty minutes by composing a short speculative narrative in any trajectory they saw fit. Our instructions also made clear that the informants could render their MEBS stories in as few or many lines or paragraphs as they chose. As mentioned earlier, the particular frame stories we presented to the two groups as a writing prompt describe future scenarios relating to learning with/without advanced digital technologies. Set in the year 2033, the two frame stories are essentially the same but with one key element altered. Neither group was made aware of the existence of the other group and was thus unaware of the other frame story with a varied element. As the two frame stories presented below in full show, the key difference between them is that the first centres on a university student who obtained straight A’s because she had full access to the advanced digital technologies used by her university to facilitate teaching and learning, while the second revolves around a student who similarly obtained straight A’s except that she had limited to no access to the advanced digital technologies used by other universities to promote teaching and learning. The university type that the students attend is unspecified on the implicit assumption that the convergence of universities has deepened to the extent that distinction by type, being no longer as pronounced, has become subordinated to distinction by level of technological advancement. Based on the frame story they received, the informants were asked to speculate how the fictional student managed to do well with either full access or little to no access to said technologies. The frame stories are reproduced below in full:

Frame Story 1 (High Tech)

The year is 2033 and digital technologies have become highly advanced.

In this future world, Afifah is a final-year university student who is about to complete her undergraduate degree. Afifah has obtained straight A's in almost all her courses. She succeeded because she had full access to the advanced digital technologies used by her university to facilitate teaching and learning.

Write a description of the specific ways in which Afifah succeeded in her studies as a result of the advanced digital technologies used by her university to facilitate teaching and learning. What advanced technologies did she use and benefit from? How have the advanced digital technologies helped her to learn differently from other students who did not have access to the same technologies?

Frame Story 2 (Low to No Tech)

The year is 2033 and digital technologies have become highly advanced.

In this future world, Aminah is a final-year university student who is about to complete her undergraduate degree. Aminah has obtained straight A's in almost all her courses. She succeeded even though she had limited to no access to the advanced digital technologies used by other universities to promote teaching and learning.

Write a description of the specific ways in which Aminah succeeded in her studies even though she had limited to no access to the advanced digital technologies used by other universities to promote teaching and learning. What resources did she have to rely on? How did she learn differently from other students who had full access to the advanced technologies?

In total, more than thirty invitations were sent out to each of the two groups consisting of fulltime and sessional open university teachers, all of whom are Malaysian citizens. We ceased soliciting responses after receiving fifteen empathy-based stories per frame story. For the purposes of analysis, the numbers we collected fell within the optimum range of fifteen to twenty per frame story. Beyond the optimum range in MEBS, underscore Wallin et al. (2019), "the stories started to resemble each other." Tentatively we have found this to be true when we compared the MEBS stories we collected from the two groups of open university teachers with the stories we are currently collecting from two groups of university students.

Having thus delineated and contextualized MEBS, we want to now address the question of why we chose MEBS as a variant of narrative research over other research designs (e.g., survey, correlational). Aside from the fact that MEBS was fit for purpose insofar as it aligned with our philosophical orientation and enabled us to shed light on our research questions with parsable data obtained in a compact and straightforward form relative to other qualitative methods such as in-depth interviews, our use of MEBS also sought to remedy the pronounced over-representation of the quantitative approach taken in empirical research and the under-representation of the narrative research design in the field of open and distance learning (Peng & Xiao, 2022). We chose MEBS, also, because it had the potential to yield novel insights, especially in view of it being relatively new outside the Finnish circle where it had been mostly employed in various research fields (Wallin et al, 2019). Lastly, our use of MEBS was also an attempt to bring the disciplinary capital (e.g., domain-specific theories, conceptual frameworks, reading protocols) accrued from our own training in the humanities and social sciences to the positivist-dominant field of ODDE research and put them to use with the aim of opening up new vistas for thinking and writing about ODDE especially as it pertained to the future of OUs.

3. Findings: "The Lack" and Other Enablers of Learning Success

Fifteen empathy-based stories were collected from open university teachers for each of the two frame stories. The shortest response to Frame Story 1 (High Tech) contains 48 words while the longest has 655 words; the latter is also the only one written in the Malay language while the rest tallying twenty-nine were produced in English. By contrast, the shortest response to Frame Story 2 (Low to No Tech) has 39 words while the longest consists of 353 words. On average, the number of words for the stories that responded to Frame Story 1 is 255, which is 101 words longer than the average of 154 for the responses to Frame Story 2. A plausible explanation for the disproportionate average word lengths is that the high-tech future of digital learning is relatively easier to imagine and narrate as compared to the low-tech future of digital learning. This may well be due to an abundance of materials to draw from the contemporary media landscape that is saturated with trending techno-optimistic imageries of the future, especially since OpenAI ignited the popular imagination of generative AI with its release of ChatGPT in late 2022.

Given the foregoing background, it is unsurprising that eleven out of the fifteen stories that responded to Frame Story 1 explicitly invoke AI as the future key enabler of learning success. AI is in fact the most frequently used term among the key terms employed in the responses to Frame Story 1 which we tagged under ‘Technologies and Other Enablers of Learning Success’ and visually represent as a word cloud in Figure 3.1 below. As in all word clouds, the more frequently a term is used, the more prominently it is visually represented.

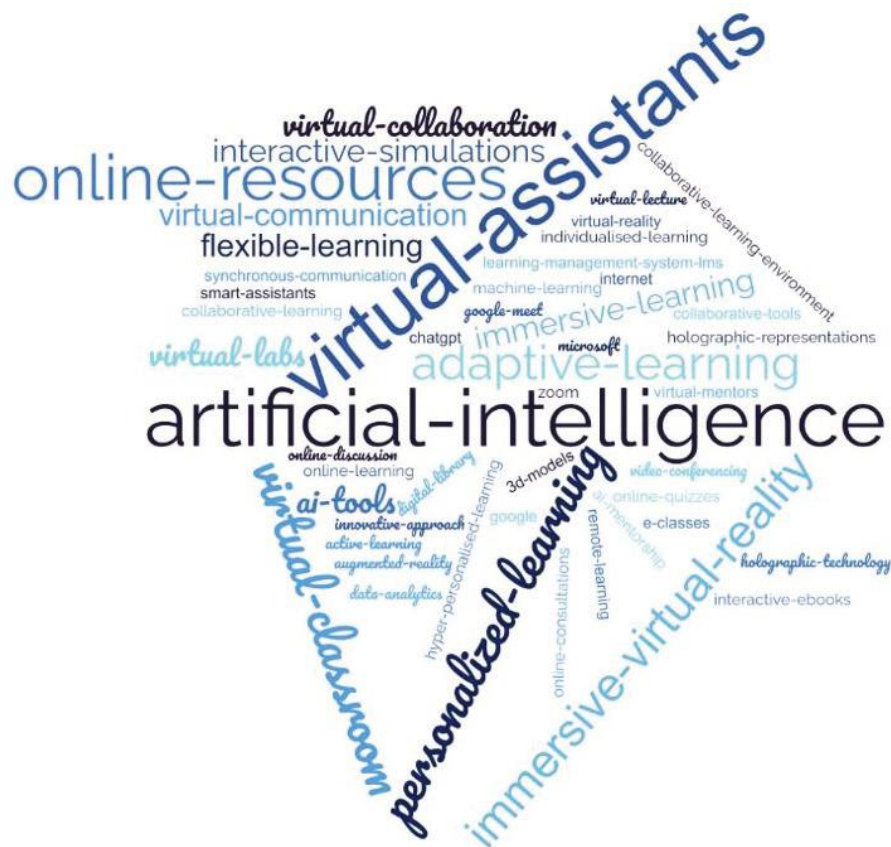


Figure 1. Word Cloud Capturing the Key Terms Used in the MEBS Responses to Frame Story 1 (High Tech) Tagged Under ‘Technologies and Other Enablers of Learning Success’

In the composite future derived from these speculative stories, AI is projected as that which powers wide-ranging smart tools and futuristic versions of personalised learning, immersive learning, active learning, adaptive learning, collaborative learning, remote learning, and the like. These digital tools and digitally mediated practices are posited as the main factors that enable Afifah, the fictional student in Frame Story 1, to attain learning success and to learn differently from students with little to no access to the same privileges. In the digitally transformed future, “AI assistants” – also variously referred to as “AI research assistants”, “AI mentors”, “virtual assistants”, and other similar terms – offer Afifah individualised help and support around the clock. Adaptive and sophisticated, they are able to track her progress in real time, provide interactive feedback on her learning activities, and “hyper-personalise” her learning paths. Using complex algorithms, they “continually challenge her on just the right level, thereby ensuring optimal learning efficiency and retention.” They assist her with her projects by conducting on her behalf online searches across databases and libraries for relevant literature, and even summarizing and combining information from multiple sources to fit her specific requirements, all in a matter of seconds. With an assemblage of intelligent technologies, Afifah is able to access a wealth of learning resources on demand, communicate virtually and easily in real time with her human and AI professors, collaborate synchronously with her global peers using holographic technology, and gain a deeply immersive understanding of her lessons more easily and effectively than students who rely solely on traditional textbooks and lectures. Saved from having to attend to tasks now automated by AI, Afifah has more time to focus on “hands-on action and taking action to achieve results”, to quote an informant, for whom action includes Afifah revisiting lecture recordings and reviewing concepts as needed.

While the majority of the responses to Frame Story 1 adhere to the frame proposition and extrapolate the future accordingly, two responses notably buck the trend to challenge it. The first response concedes that digital technologies might save students considerable time and effort, for instance, by taking over the job of searching for information more quickly and efficiently, but insists in unequivocal terms that “Advanced digital technologies are not a significant factor behind Afifah’s educational success. Students are capable of excelling in their studies even in the absence of advanced technologies.” Just as emphatically, the second response asserts against the grain that “The level of success of any individual in the digital age is not dependent on digital technology itself. It is always one’s effort in optimising one’s own time, focus, determination, and enthusiasm that will determine the success or failure of one’s studies.” This, it qualifies, does not detract from the argument that those who lack digital skills may find themselves disadvantaged in the future of work.

By contrast, none of the fifteen speculative responses to Frame Story 2 (Low to No Tech) venture to contest the frame proposition that the fictional student, Aminah, “succeeded in her studies even though she had limited to no access to the advanced digital technologies used by other universities to promote teaching and learning.” None regard Aminah’s lack of access to the latest tech to support her studies in the year 2033 as an unthinkable situation, or as meaning that she must necessarily be using the “one-size-fits-all” way of learning that futuristic AI-assistants are supposed to remedy. Against what some techno-enthusiasts might expect, none, also, perceive Aminah’s ‘low to no tech’ culture of learning as a barrier to success, although one response does question as an aside if her circumstances are due to the fact that she is “poor” and why, if she is indeed poor, her university hasn’t done anything to help her”, adding that “if the university, too, is poor, then, that’s another story.”

On the premise that learning in ‘low to no tech’ mode in 2033 is not only imaginable (to open university teachers, no less) but also productive, the fifteen responses to Frame Story 2 collectively suggest an array of mostly basic digital and analogue technologies and other enablers of learning success that Aminah likely benefitted and continue to benefit from. As visualised in the word cloud in Figure 3.2 below, the most prominent key terms used for these enablers are physical library and physical resources, the latter being synonymous with ‘traditional’ resource such as printed textbooks, photocopied learning materials, handwritten notes, audio recording of lectures, and so on. Other prominent terms used include caring human teachers, peer support, helpful friends, face-to-face interactions, and Sci-Hub.

Analysing the data, it becomes clear that Aminah actively relies on a combination of spaces, objects, and relations to help her achieve her learning goals. For Aminah, the physical library and the community centre that she visits frequently are more than buildings that house basic but adequate learning objects (e.g., printed textbooks) and services (e.g., free computer use and basic internet). They are also, more importantly, social spaces of practice in which she partakes in the acquisition of knowledge, intellectual exploration, and cultural interaction with staff and other patrons. Unlike some students in high-tech universities who “tend to spend too much time ‘communicating’ with technology at the cost of losing interest in the physical world and living human beings”, as suggested in one response, Aminah thrives on the human relations she cultivates. In person, she learns and draws support from her family, friends, teachers, elders, and other significant people. Her embodied ties with them and their care for her wellbeing buffer her from life’s turbulence and enable her to create a conducive environment to complete her studies successfully. She invests time to make friends to study with and to occasionally carry out peer teaching which she finds helpful. She taps on whatever resources that are available to her, including traditional forms of mass media such as radio, television, and newspapers. Not everything has to be high tech, she says to herself; after all, the simple pencil is still the note-taking solution for astronauts in space. Having no AI to monitor her learning progress for her, she monitors it herself, conscientiously. Without technological distractions, she manages her own learning and uses her instinct and critical judgment to solve problems relating to her studies. In this way, her learning technique is her own “because she is her own designer and decision maker” who knows how to sort out what is important from what is not.



Figure 4. Word Cloud Capturing the Key Terms Used in the MEBS Responses to Frame Story 1 (High Tech) Tagged Under 'Personal Traits and Skills Driving Learning Success'

The sparsely populated word cloud in Figure 3.4 is directly attributable to the fact that no real lack exists for Afifah to compensate for or struggle against, making her tech-rich learning experience largely predictable, smooth, and cushy in a way that Aminah's is not. Virtually all of Afifah's learning needs have been anticipated and taken care of by cutting-edge technologies like AI-assistants. With the wealth of resources tailor-provided to her by AI technologies, for instance, there is little need for her to demonstrate resourcefulness; nor is there much reason to demonstrate adaptability or self-determination when the same technologies have algorithmically adapted and determined for her the speed, sequence, and trajectory of her learning in the name of efficiency. Were it not for the two 'rebel' responses to Frame Story 2 that use rare descriptors like "ability to extract and use knowledge", "self-initiative", and "self-management" in their argument against the frame proposition that technology drives learning success, the word cloud in Figure 3.4 would be even sparser.

4. Discussion and Conclusion: Humanism Over Technological Solutionism

The empathy-based stories we solicited from open university teachers and parsed in our MEBS experiment provide us with a glimpse of the futures of education and an opportunity to better understand the present in which actions informed by wider beliefs about the future will manifest what is anticipated. Notably, the stories we collected that envision the pervasion of cutting-edge digital technologies (such as those with deep learning capabilities like the AI-assistants responsible for hyper-personalising Afifah's learning paths in 2033) as the imminent future of education are remarkably congruent with the dominant consumerist projections of educational futures that are available in the public domain. An example of the latter is found, for instance, in *Learning and Teaching Reimagined* (2020), the influential report jointly produced by Jisc (self-described on its website as "the UK digital, data and technology agency") and its high-powered partners in the HE sector to guide university leaders (Clark, 2023). In a section of the report, Lola, a fictional student in the year 2030, who is much like Afifah, is featured narrating how her studies flexibly fit around her life and how they are conveniently assisted by an "AI coach" tracking and alerting her about her progress. The congruence between the two futures tell us that belief in the salvific capabilities of digital technologies is not confined to marketing hype but, significantly, "moves across a wide range of social positions, from experts in the field, to its critics, and to a wider public that is beginning to be exposed" to them (Campolo & Crawford, 2020: p. 3). Conceivably, it circulates, also, in ODDE and OU circles even if few stakeholders within them would care to admit to holding anything close to the solutionist belief that digital technologies like AI may be the fix that OUs need to make up for the loss of their first-mover advantage.

In addition, we are able to discern from the stories we collected a certain ‘innocence’ intimated by the absence of critical ideological awareness that we argue may be symptomatic of the situation on the ground in and out of some OU circles. This lack of critical awareness pertains to the ideological workings of the discourse that pushes for the adoption of more technology as a neutral good and, at the same time, obscures the power relations and vested interests behind the push, not to mention the fundamental fact that “There is little robust evidence on digital technology’s added value in education” (UNESCO, 2023: xvi; Facer & Selwyn, 2021). Not insignificantly, the global EdTech market is projected to reach USD433.17 billion by 2030 (“EdTech”, 2023) and AI technologies are, against the utopian stories typically told about them, “built to see and intervene in the world in ways that primarily benefit the states, institutions, and corporations that they serve” for they are “expressions of power that emerge from wider economic and political forces, created to increase profits and centralize control for those who wield them” (Crawford, 2021: p. 211). As well, parsing the MEBS stories, we detect a stark disparity in their framing of personalised learning as a desirable and necessarily productive practice and in the position articulated in the recent UNESCO GEM Report (2023: p. 21) that the personalization of learning “clashes with the need to maintain the social dimension of education” and that those “urging increased individualization may be missing the point of what education is about.” This, for us, raises the question of whether the many received ideas underpinning OU practices should not be critically reexamined as OUs seek to reinvent themselves in the face of the digital convergence of universities.

If the pervasion of techno-solutionism in education is making it difficult or complicated for OUs caught up in the technology race to think circumspectively and sociotechnically about the place of technology or to think productively of non-technological ideas to address issues and problems arising from their provision of ODDE, then an exercise such as our MEBS experiment may prove useful in breaking the impasse. When we first set the two frame stories and solicited speculative responses to them, we did not have specific expectations as to the kinds of responses we would be receiving although we were open and curious about what the effort would potentially yield. We did, however, wonder, given the heightened rhetoric about the purported revolutionary powers of digital EdTech, if our informants would be able to imagine an educational future in which cutting-edge technologies do not figure prominently. To our surprise, a ‘low to no tech’ future of learning turned out to be not only thinkable but also sustainable, as we discussed in the previous section. None imagined the loss of relevance, decline, or closure of universities, open or otherwise, that are unable to match their well-endowed counterparts that offer the latest cutting-edge digital technologies and cultures. And none saw students’ lack of privileged access to frontier technologies as a barrier to learning success. That open university teachers (whose own futures were invested in the future of higher education) chose to be optimistic in this way, to us, give credence and hope to the ‘low to no tech’ future that will likely remain the global norm rather than the exception due to socioeconomic inequalities that education has perennially struggled to address (UNESCO, 2023).

Our attention has also been captured by our informants zeroing in on a range of personal traits and skills identified as the key drivers of learning success. The highlighting of these non-technological variables is, for us, especially opportune and significant because it shifts the focus away from technology to an entire world of complex causal relations that has largely been occluded by the narrative that technology or the lack of it will emerge as the overarching determiner of the success or failure of any enterprise. Drawing on Gert Biesta’s (2010) conceptualisation of education as a recursive and open social system that defies direct causal explanations, Paul Prinsloo (2023) reminds us that student success and attrition as its flipside in fact “emerge from a range of often mutually constitutive factors, human and non-human actors in the nexus between students’ habitus, dispositions and prior learning experiences, the institutional and disciplinary contexts, cultures and efficiencies and broader current and inter-generational societal structures and relations.”

Taking cognisance of causality beyond technological determinism, resource-constrained OUs in search of a new mandate in the face of the digital convergence of universities might find it worthwhile, for instance, to desist from promoting, in branding or material practice, the kind of technologically “amped-up” (Greenwood & Hougham, 2015: p. 98) culture of learning and teaching that pedestalizes the “more, faster, better” (Shaw et al., 2013: p. 320) approach to education. Instead of seeking to out-digitalize competing universities with constrained resources, OUs might find it judicious to pursue instead what Junhong Xiao (in press) terms “sustainable openness” in the digital age. For Xiao, openness in education – which has always been the *raison d’être* of OUs and tied to the provision of accessible, affordable, quality education as a human right – cannot be predicated on more and more use of technology, for technology in and by itself cannot break the iron triangle of access, cost, and quality. Prioritising sustainable openness, Xiao proposes the following guiding principles that de-romanticize technology:

If there is no significant difference in quality between technology-based education and non-technology-based education, the cheaper option will increase access. Even if technology-based education can bring greater learning gains, it cannot increase access unless it is more cost-effective than non-technology-based education. Nevertheless, if technology-based education is not as effective as non-technology-based education or even produces adverse effects on learning, it should not be advocated at all even if it is more cost-effective and accessible. In a word, there is no point in using technology for the sake of technology; quality, cost, and access are key to sustainable openness in technology-based education.

Depending on the institutional mission and vision they wish to affirm, OUs might also find it appropriate to promote “slow pedagogy” (Payne & Wattchow, 2009; Berg & Seeber, 2013; Shaw et al, 2013; Supple & Cronin, 2023), an educational approach underpinned by the belief that students learn better when they learn at an unhurried pace. Drawing inspiration from the broader “slow movement” (Honoré, 2005) that advocates a slower, more deliberate pace of life in response to fast and hectic modernity, slow pedagogy abjures the culture of cramming, testing, and standardising experience in favour of paced mindful learning. Any technology that it mobilises is always put in the service of immersion, introspection, inquiry, and dialogue – these being modes of learning that seek also to ground students in their embodied selves as they learn, as opposed to technology being used for its own sake with the inadvertent mediating effect of reducing learners to abstracted minds whose knowledge is exteriorized in the digital world (Payne, 2003).

Instead of pursuing an all-digital transformation as a response to the convergence of universities and as a market selling point, OUs might also find it more productive to introduce and integrate resourcefulness training into their curriculum and institutional branding. Resourcefulness training might not be as buzzy as AI and other hyped digital technologies but it is undoubtedly an assured way of helping students to attain higher levels of academic success while at university by learning and putting into practice the requisite knowledge and skills to delay gratification, control own impulses, persist in the face of difficulty, cognitively reframe negative events, independently seek help, solve problems effectively with available personal and social resources, and so on (Kennett & Keifer, 2006; Kennett et al., 2013; Zauszniewski, 2016; Zauszniewski et al., 2018; Li et al., 2018; Dison et al., 2019). Resourcefulness training has the added bonus of continuing to yield results long after it has been offered, for the knowledge and skills it imparts will undoubtedly remain useful in any age, including the digital. It is also arguably a more substantive way for OUs in search of a new mandate to set themselves apart from competing universities, many of which will, ironically, likely converge into an undifferentiated homogeneous mass as they pursue the path of maximum digitalization.

In conclusion, as we have argued, a viable way for OUs to address the digital convergence of universities across types may well be to remain steadfast to the principle of sustainable openness and to be constantly reminded that the many issues and challenges they face from the ongoing convergence are non-technological in nature and require no technological fixes, for digital technologies and cultures, while they may enhance learning, are no universal panacea that they are often thought to be. OUs may find it more sustainable in the long run to be led not by technological solutionism but by a hardnosed conception of the students they serve as autonomous human beings whose complexity and unpredictability are irreducible to the digital and digitized data trail they leave behind and universities collect, analyse, and use to sum them up.

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290-Results of Field Testing for the Development of Practical Courses Digital Guide by Early Childhood Education Tutors at Universitas Terbuka

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Abstract

The Early Childhood Education (ECE) study program at Universitas Terbuka (UT) has 12 practical courses that require practical assignments for students to fulfill the competency of these subjects. Practical assignments are necessary for ECE-UT students because they are ECE institutions teachers who must master pedagogical competence. The assignments in the ECE study program are implemented with face-to-face, synchronous web, or asynchronous online tutorials. This practical course tutorial activity is guided by a tutor who teaches 20-25 students in one group. So far, references for tutors in giving practical assignments have come from catalogs of faculty-level administration. However, because the information in the catalog varies widely, not only about ECE study programs, but many tutors also need to be more confident about giving practical assignments to students, from planning to assessing practical assignments. This study aims to obtain information from tutors on digital guides for web-based practice courses that are being developed. The web form was chosen to provide convenience in finding the desired information because it is clickable. The method used in this study is research and development from Borg & Gall, especially at step 8, namely operational field testing. The field testing was carried out on tutors who teach practical courses in the first semester of 2023, with 75 tutors spread across various regions of Indonesia. The results of this study indicate that (with a scale of 5), in terms of appearance, a score of 4.3 is obtained, while in terms of usability, a score of 4.4 is obtained. In general, suggestions for improvements made by the tutors regarding this digital guide are color composition to be considered again, design and layout refined, enriched with pictures and photo examples when students have practical assignments, equipped with a more detailed student assignment assessment format, and provided a link this digital guide in asynchronous tutorial e-learning application. This study concludes that the digital direction for practical courses in ECE-UT is quite good but still needs to be refined according to input from tutors.

Keywords: *Practical Course Digital Guide, Early Childhood Education*

1. Introduction

Universitas Terbuka (UT) is one of the state universities in Indonesia that has implemented a distance learning system since its inception. UT has four faculties, one of which is the Faculty of Teacher Training and Education (FKIP). One of the study programs in FKIP is the Early Childhood Education (ECE) study program. The ECE study program accepts high school graduates with additional requirements, namely, already working as teachers in ECCE institutions such as kindergartens, playgroups, or daycares. So their status is educators, but they

still need to become professional teachers. The ECE-UT study program allows them to gradually be recognized professionally by becoming ECCE graduates first, then following the certification program to be legally called teachers professionally. According to the Regulation of the Minister of Education and Culture No. 137 of 2014 concerning ECE National Standards, so-called ECE educators are professionals in charge of planning, implementing learning, assessing learning outcomes, and conducting guidance, training, nurturing, and protection. These educators' competencies include pedagogic, personality, social, and professional competencies.

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To support the achievement of these competencies, it is not only cognitive and affective aspects that need to be trained in students, but also psychomotor aspects. Therefore, course assignments that are practical based on student performance need to be designed to ensure students achieve the expected competencies. These practical tasks are spread across various courses relevant to the performance of an ECE teacher. Twelve courses in the ECE study program require practical assignments, namely: PAUD4201 Children's Play and Games, PAUD4208 Handling Children with Special Needs, PAUD4202 Physical Development Methods, PAUD4206 Art Development Methods, PAUD4204 Kindergarten Media and Learning Resources, PAUD4302 Integrated Learning, PAUD4101 Cognitive Development Methods, PAUD4106 Language Development Methods, PAUD4102 Moral Development Methods, and Religious Values, PAUD4402 Music and Dance Skills, PAUD4401 Basic Behavior and Ability Development Methods Early Childhood, and PAUD4103 Social Emotional Development Methods.

As students at UT who apply distance learning systems, ECE-UT students must learn independently. To assist students in independent study, UT provides learning services through tutorials. This tutorial is provided primarily for courses that are considered complex or challenging. According to Gordon Pask, a tutorial is the interaction process between the tutor and the learner. It involves two-way communication that allows learners to ask questions, clarify understanding, and get immediate feedback from the tutor (Zhao et al., 2021). Teachers are called tutors, while students as learners are called tutees.

The tutorial in ECE-UT was conducted eight times. Several tutorial options exist: face-to-face, synchronous webinars, and asynchronous online tutorials. Practical assignments that need to be done by students are carried out when students follow the tutorial. It means that students must follow tutorials for the twelve courses. Students who do not do practical assignments will not pass the course, even though they take the final semester exam.

So far, tutors' references for giving practical assignments are usually from tutorial kits in Tutorial Activity Plans (TAP) and Tutorial Activity Units (TAU) that they can access when going to guide tutorials. The practical assignment instructions are also available in the curriculum catalog of the Elementary School Teacher Education (ESTE) and ECE FKIP-UT programs, both printed and online. However, instructions on these practice assignments are often unknown to tutors. This happens for several reasons. First, because this catalog contains information on ECE and ESTE study programs, it needs more focus. Secondly, tutors do not get a printed catalog like students but can access the catalog on UT's official website. These web catalogs are usually rarely accessed by tutors. Third, information about practical assignments in the catalog is not collected in one particular chapter but scattered in various places in the appendix. This makes it difficult for tutors to fully understand practical assignments from planning to assessment.

This condition causes a variety of practical tasks in the ECE study program given by tutors to their students. Some are in accordance with the instructions in the catalog, and some still need to be appropriate. Therefore, it is necessary to immediately make practical assignment guidelines for the 12 courses so that the implementation of practical assignments can be measured and standardized according to the expected competencies. In order to be scientifically accountable, the guidance for this practical task is carried out through research with the RnD method. This research has been ongoing since 2021, so in 2023, it will be a year to the end of the research. Research in the previous year has produced a draft guide, followed by trials on users, namely tutors, and students, in 2023. This paper is part of the research phase in 2023. This research aims to get information from tutors about digital guidelines for practical courses at ECE-UT that are being developed.

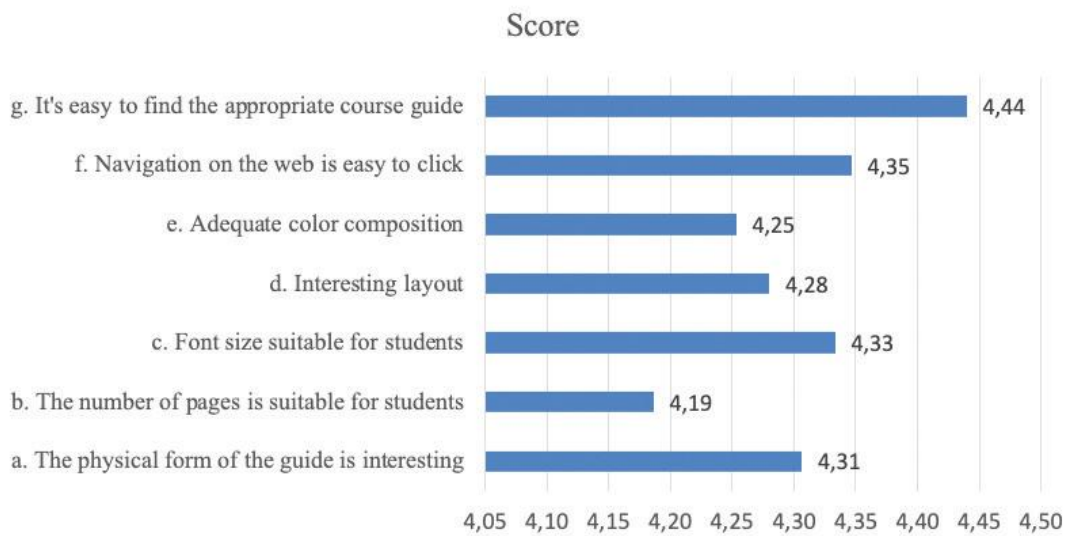
2. Method

This research uses research and development design (Gall et al., 2007), which is in the 8th step of operational tests in the field. This field test is conducted on tutors who have taught 12 practical courses in semester 1 of 2023.

The instrument used is a questionnaire using accidental sampling online. Seventy-five tutors filled out the questionnaire. The questionnaire is divided into two aspects: the appearance and usefulness of the guide.

3. Findings

The results of the questionnaire to the tutor for the display aspect are as follows.



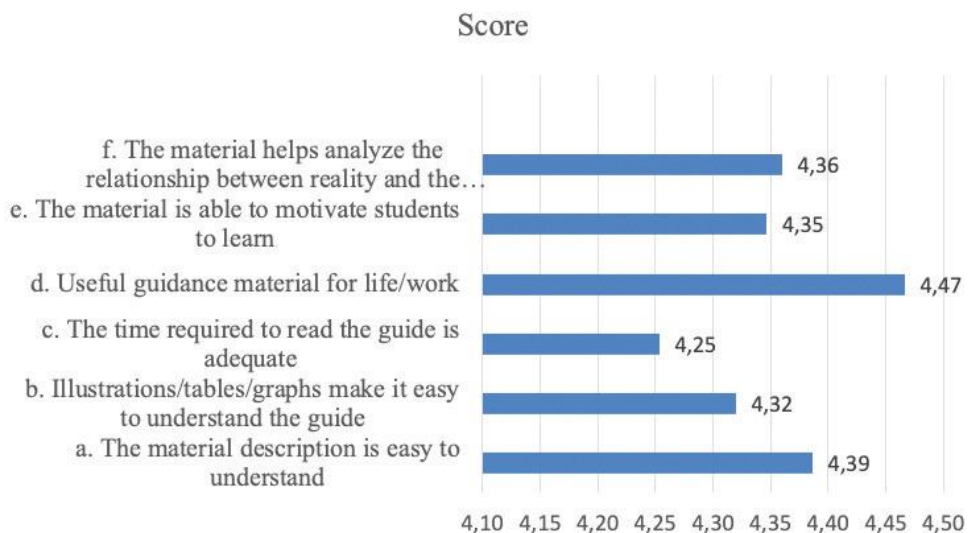
Graph 1. Tutor's Opinion on the Display of the Practice Course Guide.

Based on Graph 1, point (b) shows that the number of guide pages still needs to be considered, with a score of 4.19. The total number of pages of this practical course guide is quite significant because it consists of 12 courses put together. According to UT provisions, the number of pages for books of a humanities nature is 40 to 60 pages.

Although bold, the guide in the web format that has been developed in this study is easily accessible because it can be clicked according to the desired course. The desired sub-topics in each course have also been created to make it easier for students to learn them. This follows the questionnaire results on point (g) ease of finding course guides, getting the highest score of 4.44.

Color composition (point e) is rated 4.25, and layout (point f) is rated 4.28. The color aspect of printed books must be considered because it relates to printing costs. The greater the number of colors, the more expensive the operational costs. However, this limitation can be overcome when we use the web format. Book design can be colorful to attract interest (Nana & Roos, 2023). The color settings in this course guide still need to be varied, especially in tutorial sub-patterns and tutorial designs. The choice of colors in digital books must indeed be carefully considered. Studies on the effect of color show that white and pastel colors provide calm and comfort (Arrarte-Grau, 2021).

In addition, the guide's usability side, according to the tutor, can be seen in Graphic 2.



Graph 2. Tutors' Opinions on the Usefulness of Course Guides

Graph 2 shows that the most urgent thing to improve is the time it takes to read the digital guide (point c), with 4.25. The ability to read textbooks and other scientific reading is undoubtedly different for each person. However, in general, students can read 325 words per minute (Brysbart, 2019). Three hundred twenty-five words are more than a third of a page. This means that reading 1 page takes 3 minutes. If a person reads within 1 hour, he can read about 20 pages. In comparison, UNESCO recommends that the standard of reading books be done at least 4-6 hours per day. The period of 4 to 6 hours per day must undoubtedly be further divided into several types of reading books that students need to learn because, in one semester, they must take several courses, not just one.

4. Discussion and Conclusion

4.1. Discussion

At the beginning of each course, a cover has also been made that is made as attractive as possible by the illustrator. Students are expected to arouse their interest to learn more about the guide's contents through an attractive cover. This is the tutors' input about the importance of covers to attract reading interest.



Figure 1. Sample Cover Guide for Practical Courses

Similarly, the layout of books is instrumental in increasing interest and concentration in learning. Because this guidebook is web-based, the guide is made so that it is short so that the reader's eyes are manageable (Hummel & Lenox, 2019). If the web version of the writing is too long, the reader will get tired because they must scroll down many times, which can cause them to lose focus on the topic being studied. A person's eye resistance in reading the web version on a computer screen or gadget is usually lower than reading a printed book (Marpaung, 2019). Reading printed books is usually more comfortable for the eyes due to better lighting and soft light (Segal-Drori et al., 2012).

One of the challenges in web-based reading is how to make it easy for readers to click on the desired information and quickly return to the main menu (home) (Ivanko, 2019). Therefore, this guide avoids clickable information in the description, but all subtopics are navigated in the navigation bar. All navigation is placed on the left side of the screen. It is attempted that there are no documents that, when read, must be clicked again to be read further. Important documents consisting of many pages, such as tutorial activity units (TAU), are created in the form of attachments with only embedded links (Nakahara et al., 2015).



Figure 2. Navigation Columns to Make It Easy to Find the Information

Systematics in each practical task guide is made as easy as possible and can be seen in the navigation column: course understanding, course learning outcomes, tutorial patterns, practical assignments, tutorial kits (tutorial activity designs), and assessment systems. With the systematics navigation, it is hoped that tutors and students will be reassured about practical tasks that need to be done while taking specific courses (Caramihai et al., 2022).

Course Learning Outcomes are placed at the beginning of each course guide to serve as a basis and reminder for tutors to guide students during the implementation of tutorials (Hutchinson, 2019). The practical assignment given by the tutor should refer to these competencies.

In the appendix, there are several uniform formats for twelve courses, namely: daily learning plans at PAUD institutions, student practice assessment instruments, daily learning design assessment instruments by tutors, examples of daily lesson plans that have been filled out, examples of student practice assessment instruments that have been assessed, simulation assessment signs with video (if students take part in webinar tutorials), and format for recapitulation of practical course scores.



Figure 3. Systematics of Appendix Course Guide

The practical assignments that must be done in each course are also explained in detail, including the choice of assignments that the tutor will determine (McIntosh & Rintoul, 2022). This choice of assignment is necessary so that the tasks given by the tutor are not monotonous and are always the same every semester (Schmidt, 2019).

Another problem related to this reading time is because of the character of ECE-UT students who have taught at ECCE institutions; in terms of age, many are over 30 years old. At that age, generally, they are also married and have children. It means that ECE-UT students must have good time management so that all their obligations as students, teachers, wives, and mothers can run well. UT has realized it, so after being registered as a UT student, this new student will be equipped with distance learning activities. One of the materials in the study is time management in learning (Besbes & Mouchtaki, 2023).

Tutors are also asked to provide general advice in terms of the appearance and usefulness of the course guide. The general advice that tutors give is as follows.

Table 1. General Advice from Tutors

| Feedback from Tutors | |
|--|---|
| Display | Usage |
| 1. We need to design an even more attractive new cover. | 1. The guide is good enough, but it is just that students need to be reminded to keep reading the existing guidelines. |
| 2. Added photos of learning practices in class. | 2. The guidelines are apparent, making it easier for us as tutors to explain when asked by students. |
| 3. Illustration images are made even more varied. | 3. The guide's usefulness is very helpful for students because it takes little time to read it. |
| 4. It is good, and easy navigation will significantly help students/tutors find the material they seek. | 4. The material is easy to understand and valuable for learning needs and daily life. Keep maintaining the quality of practical course guidelines. |
| 5. It is better if assignments are in the field and a format provided so students can do well. | 5. Added cases or examples according to the existing theme of discussion. |
| 6. Color composition should be paid more attention to make it more attractive to be read by students. | 6. The material presented is very relevant to students who, on average, are studying while working in ECCE agencies, so what they learn will be easy to practice where they work immediately |
| 7. It is good. The number of pages and font size is adequate, making it easier to read. | 7. As a tutor, the guidance provided benefits to us and made it easier for us to understand the material and assess student discussions and assignments. I hope the material used as a guide can be in sync with the discussion or tasks. |
| 8. It has been already good. The better appearance can be added animations and more varied colors. | 8. The identity of illustrations/tables/graphs must be clarified for any course, considering each course has different characteristics. |
| 9. Overall, it is good, but the explanation of the contents can be detailed again. | 9. Anyone, any university, can use it. |
| 10. The suggestion for Practical Courses is to facilitate access to tutors to assess the results of student teaching practice by providing a column for videos that can be uploaded there. So, tutors do not need to open the link or copy the video link on another sheet | 10. It would be better if it were made in more detail to explain the use of course guides. |
| | 11. As a guideline in designing practical tasks, the assessment needs to be explained by the assessment rubric; for example, in the range of 1-10, there is a rubric for each indicator. |
| | 12. The usefulness of the Practical Constitutional School guide is good and helps students understand the implementation of Practical Practice Constitutional learning. |

Several important points can be seen based on the tutors' input. One of these suggestions is that the assignment submission page in the form of video documentation is directly uploaded on the assignment page 'so tutors do not need to open the link or copy the video link on another sheet.' It has been considered from the beginning regarding the storage capacity of the web, which usually for online tutorials must be uploaded on the elearning. ut.ac.id. If it is a video that usually has a large capacity memory, it will fill the memory of the page, so buffering or crashes will likely occur when it is played (Hoornweg et al., 2014). Therefore, for the e-learning page to be lighter, for practical assignments in the form of videos, it has been emphasized that students first store it in the cloud (Reber, 2018). They can upload it on YouTube or Google Drive and then send the link in the task column (Masfufa & Setiyawati, 2023).

There is also a suggestion to add an assessment rubric of the practice assignment in detail for each indicator. UT policy has directed that every tutorial assignment must be accompanied by assignment scoring guidelines so that the grades given to students are not subjective (Wood et al., 2016). However, the tutor must precisely

make these scoring guidelines in detail because each practical task's character is different. Tutors whose daily duties are lecturers or experts in their fields are considered to understand better the character of the courses they teach (Nguyen & Kember, 2023).

4.2. Conclusion

Based on the discussion above, it can be concluded that the digital guidance of practical courses at ECE-UT is good enough but still needs to be refined according to input from tutors, especially regarding color variations, illustration image variations, sample video illustrations, and assignment grading rubrics.

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294-The Opinions and Problems of the Students in the Associate Degree Program on the Compulsory Internship and Suggested Solutions: The Case of Anadolu University Open Education System

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Abstract

Internship allows learners to apply the theoretical knowledge they have acquired during their education and gives them the opportunity to recognize their aimed profession in the future. Besides, it helps the learners to adapt to the job during their education, to establish a more efficient and better communication within the institution, to solve problems and to develop their observation skills. Internship and Practice Coordinatorship at the Open Education System provides coordination and carries out studies in order to ensure that learners may have the most of internship opportunities, for the programs in Anadolu University Open Education System that have compulsory or optional internship applications. Anadolu University Open Education System has a total of six associate degree programs with compulsory internship. These programs are “Emergency and Disaster Management”, “Electric Power Generations, Transmission and Distribution”, “Disability Care and Rehabilitation”, “Laboratory and Veterinary Assistance Services”, “Tourism and Hotel Management”, and “Tourism and Travel Services”. In this study, the survey was applied to the students enrolled in these programs in the 2022-2023 academic year. The aim of this research is to detect the opinions and evaluations of the students interning about the functioning of the education and internship processes. The survey consists of five parts in total for a sample of 354 students. These sections are as follows: “Demographic Characteristics”, “Contribution of the Internship Application Process to the Personal Qualification of the Student”, “Contribution of the Internship to the Student Performance during the Internship”, “Evaluation of the University on the Internship Application Process”, and “the Importance of the Internship in terms of Employment”. Stata 15 statistical program was employed to obtain and evaluate the results of the survey. The results of the survey demonstrate that the learners commonly are in the opinion that the internship is useful for themselves and their personal development. The obtained findings from the analysis reveal that the learners are also satisfied with the services provided by Anadolu University in this process. In addition, this study also evaluates learners’ expectations from institutions and their satisfaction with their internship experiences in the context of research results.

Keywords: *Internship, Employment, Career, Open Education, Distance Education.*

1. Introduction

Education and training programs that train personnel for the business world shaped by technological developments and current needs, need to be structured in a way that provides them with different skills for the needs of the future. Internship practices, which enable individuals to put theoretical knowledge into practice, are an activity included in education programs for professions where theoretical knowledge must be supported by practical work. Internship training should be considered essential since learning by doing changes individuals’ behavior positively (Çelik & Tuna, 2012: 272). It is explicit that the education and training programs offered for professions need to be brought-up-to date for the needs of the country and the abilities of individuals. Internship, which is the building stone of the experience-based learning process, provides individuals with real-life experience while also enabling them to decide whether the field in which they are studying is suitable for

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them (Aymankey et al., 2013: 107). The internship is being carried out in programs where vocational education is provided in higher education, in order that students gain experience in the field. In this process, it should ensure effective and systematic communication among the university, which the students are affiliated to, the institution, where the students intern, and the students. Moreover, this process should be managed efficiently.

The aim of this study is to determine the opinions and assessments of the students, who are registered and completed their internship in programs including internship in Anadolu University Open Education System, on the functioning of the education and internship processes. According to the results obtained from the survey data, it is planned to realize the necessary updates in the context of learner expectations with the support of new technologies. In addition, we expect to arrange to strengthen the system in case of the weaknesses of the system..

1.1. Internship Applications

Internships enable students to apply the knowledge they acquire at university to the concrete realities of the business world. Additionally, internship allows students to complete the learning process by gaining skills and experience (Barbarash, 2016: 21). It is accepted that internship is an applied-training method that supports theoretical education in every field. Internship provides the intern students to take responsibility, develop their communication and professional skills, and comprehend the professions and concept of corporate culture. Besides, internships allow students to socialize in their career planning and professional choices (Cuyler and Hodges, 2015, p. 68). Hence, internship undertakes the mission of ensuring that students have knowledge and skills needed by the sector after they graduate and enter the working life. Achieving this mission is very essential for students, universities, and sectors. Internship has many advantages for students studying in the relevant professional field. Internship helps students remember their knowledge from their education period and allows them to observe real practices in institutions they intern. Internship also provides students the opportunity to gain experience in real working conditions and application areas (TOBB, 2007: 5; Ilgaz and Çakar, 2002: 385 as cited in Emir et al., 2010, p.114). Additionally, internships allow students to learn the competencies necessary for professional development and to gain a professional environment (TOBB, 2007: 5; Ilgaz ve Çakar, 2002: cited in Emir vd., 2010, s.114). Having the opportunity to apply the theoretical knowledge gained from university education in the sector enables students to learn more effectively, besides this opportunity reflects on students' career planning positively (Türkay ve Yağcı, 2007; Ulama vd., 2015; Üzümcü vd., 2015; Arpat, Kalfa, Akşit & Çamurdan, 2017, s.78). While internship applications offer businesses the opportunity to meet their needs for quality and highly educated intermediate staff, it also enables students i) to experience real applications in business life, ii) to obtain a certain environment related to their profession, iii) to aware of the level of competence required for professional development, iv) to harmonize the theoretical knowledge they have with practice, and v) to provide opportunities to get familiar their professions closely.

Students should be raised aware of internship before they commence the internship for achieving these gains, and awareness that internship has comprehensive benefits for them related to practice, rather than it is an obligation. Otherwise, the internship will not move beyond fulfilling an obligation (Acar ve Tuğay, 2007: 3). Reaching a young, enthusiastic, and innovative workforce with new ideas through internship programs, creating a source of permanent employment with the students they meet, and reinforcing the existing workforce are among the benefits that businesses receive from internships (Çaylan vd., 2016, s.245-246).

In this process, the duties of the enterprises are to teach the interns the difficulties and subtleties of the job during the internship, and to tell the interns the areas in which they were successful and the areas in which they were not success at the end of the internship period (Emir, Pelit & Arslan, 2010, s.145).

It is important to have positive relations with the sector and the institution where the internship is performed, for the coordination of the internship process (Sarı, 2007: 26). However, the process may be negatively affected due to constraints that may arise from different stakeholders. Considering the related literature, there are the studies gathering the views on internship in different fields, and suggesting solutions with respect to observed problems (Ruhanen et al., 2013; Li & Li, 2013; Koç et al., 2014; Güzel et al., 2014; Olcay & Düzgün, 2015; Hora, Parrott & Her, 2019; Jeske & Linehan, 2020; Zehr & Korte, 2020; Kim, Kim & Tzokas, 2022; Januszewski & Grzeszczak, 2021; Alp, Karadeniz, Çağlar & İslamoğlu, 2023). For the results of these studies, it has been observed that orientation and in-service training processes for interns are inadequate during the internship process. Moreover, it is reported that interns are exposed to degrading behavior, and businesses act as cheap labor, and interns have problems with social rights. (Gürdoğan & Atabay, 2012: 239).

1.2. Internship Application of the Associate Degree Programs in Open Education

In Turkish Higher Education, internship applications are carried out in faculties that provide formal, open and distance education, within the context of program outcomes and the needs of the field to be employed. Anadolu University firstly started to implement internships in 1993 for the Tourism and Hotel Management Associate Degree Program, which provides education through the Open Education System, in order to gain professional competence. Internship applications have also been implemented in different programs entered into service within the years. As of 2023, the Associate Degree Programs including internship in Anadolu University Open Education System are as follows:

- Emergency and Disaster Management,
- Disability Care and Rehabilitation,
- Electric Power Generations, Transmission and Distribution,
- Laboratory and Veterinary Assistance Services,
- Tourism and Hotel Management,
- Tourism and Travel Services,
- Midwifery, Nursing, and Healthcare Technician Training,
- Geographic Information Systems ,
- Medical Documentation and Secretary Training,
- Pharmacy Services,
- Food Quality Control and Analysis.

Working coordinately among the students, the university, the institutions where the student interns, and government organizations related to the internship will increase efficiency of the internship, in the internship processes of Open Education System programs. The supportive factors improving the quality of education are that automation systems used in process organization, field experts and consultants working to evaluate the internship. Open Education System Internship and Practice Courses Coordination, which was established for this purpose, carries out its activities by being responsible for the management of this entire process and communication network.

2. Method

This study obtained a survey data from 354 students interning at Anadolu University Open Education Faculty Internship and Application Coordinatorship. The aims of the study are that i) to investigate the students' assessments on the internship in the university, ii) to measure the effectiveness of the intern students, and iii) to improve the quality of the education in order to improve the internship processes. The survey consists of 5 sections and includes a 5-point Likert scale. The survey was prepared through Google form and the students were informed about the survey via SMS and the link to access the survey was shared with them. All analysis is performed by employing Stata 10. The reliability coefficient, Cronbach's Alpha, of the survey applied to the respondents is found to be 0.96.

3. Findings

This section presents the findings obtained from the participants' responses at survey. Table 1 presents the distribution of participation by gender.

Table 1. The Distribution of the Participation by Gender

| Gender | Frequency (N) | Percentage (%) |
|--------|---------------|----------------|
| Female | 200 | 56,5 |
| Male | 154 | 43,5 |
| Total | 354 | 100,0 |

Table 1 shows that the respondents are mostly women. The percentage of respondents who is women are at %56,5 while men are at %43,5.

Table 2. The Distribution of the Participation by Age

| Age | Frequency (N) | Percentage (%) |
|-------|---------------|----------------|
| 18-24 | 79 | 22,3 |
| 25-30 | 65 | 18,4 |
| 31-40 | 99 | 28,0 |
| 41-50 | 75 | 21,2 |
| 51+ | 36 | 10,2 |
| Total | 354 | 100 |

Table 2 presents the distribution of participation by age. As seen in Table 2, 28% of the participants are aged between 31-40, followed by 18-24 with 22,3%, and 41-50 with 21,2%. In the Open Education System, there are students who attend the placement exam and become university students for the first time while there are also students who are currently enrolled in a higher education program or who have graduated from a previous higher education institution and enrolled in a second university. Hence, there is a variety of distribution in the ages of students in the programs.

According to the survey results, 99.1% of the participants live in the city center. Figure 1 reveals the education level of the participants.

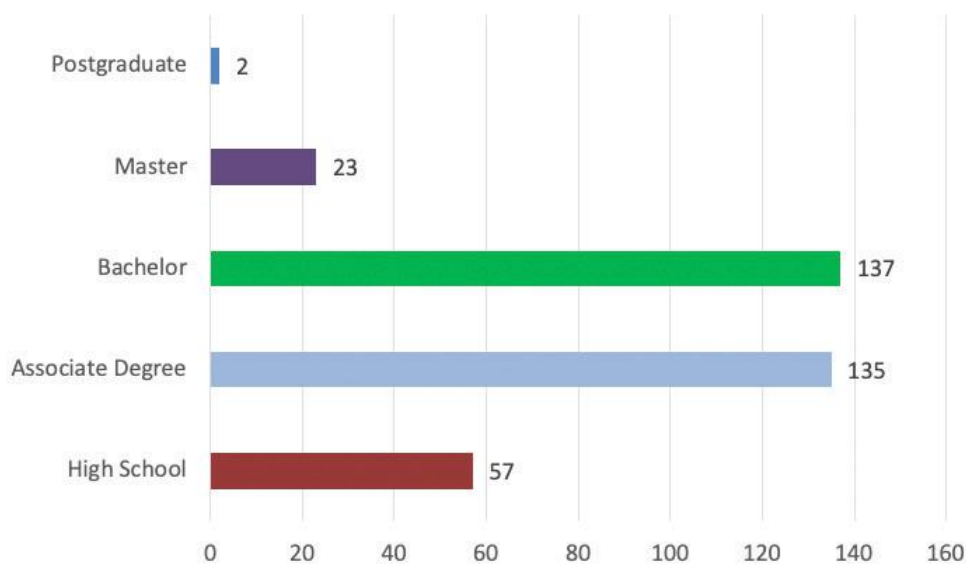
**Figure 1.** The Frequency of the Participants by Education Level

Figure 1 shows that the participants mostly have bachelor's degree and associate degree. Anadolu University Open Education System accepts students based on the results of the central placement exam. In addition, it offers individuals, who have previously graduated from an associate degree program or who are currently actively studying in an associate degree program, to enroll in a second university program without an exam. Regarding the results of the education level of the participants, it can be said that the majority of the participants are individuals who are studying at the second university.

Table 3. The Distribution of the Participants by Employment Status

| | Frequency (N) | Percentage (%) |
|-------------|---------------|----------------|
| Working | 195 | 55,1 |
| Not Working | 159 | 44,9 |
| Total | 354 | 100,0 |

Table 3 demonstrates the working status of the participants excluding their internship. Open education system courses are carried out through distance education. It also offers the opportunity to receive education independent of time and place. Therefore, students registered in the system can actively pursue their student life while practicing their profession. As seen in table 3, the respondents with 55.1% are currently working whereas 44.9% of the respondents are not working. This can be assessed that the participants receive education while working thanks to the Open Education system's opportunity.

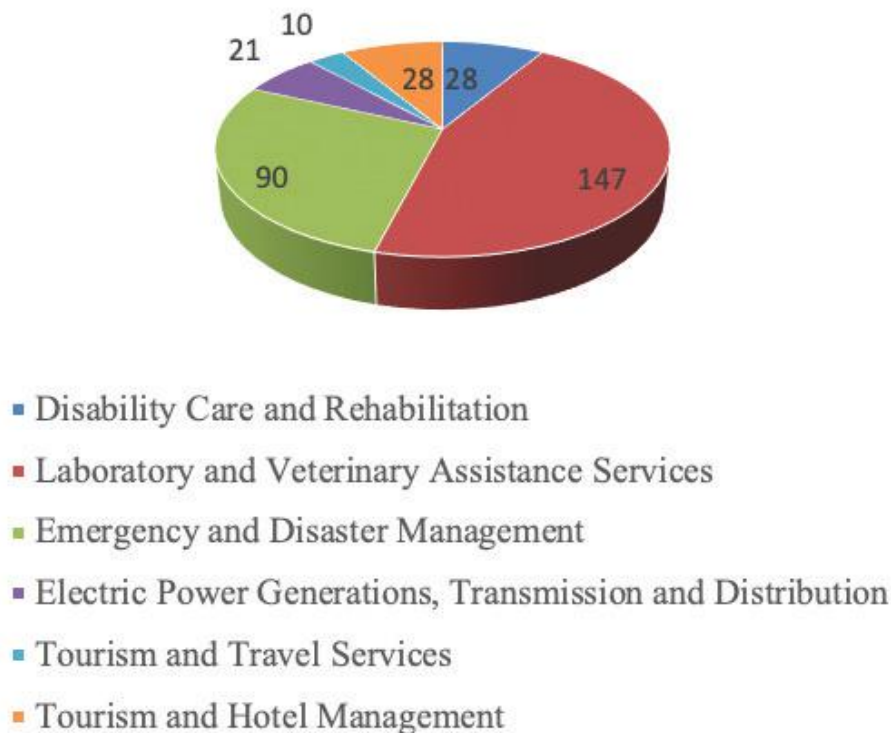


Figure 2. The Frequency of the Participants by the Program Enrolled

Figure 2 presents the frequency the programs in which participants are actively enrolled. Accordingly, the participants with 41.5% are enrolled in Laboratory and Veterinary Assistance Services, followed by 25.4% is Emergency and Disaster Management.

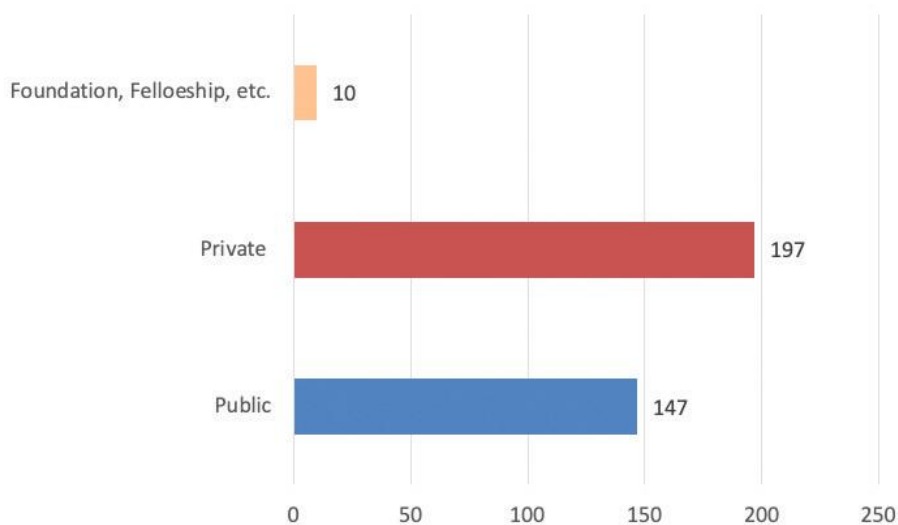


Figure 3. Sector that the Participants Intern

Figure 3 shows the sector in which the participant intern. As seen in Figure 3, the participants intern in the private sector with 55,6% while the participants interning in the public sector are at 41.5%. The Human Resources Office of the Presidency of the Republic of Turkey released the slogan of “We are Mobilized for You” in 2020, within the scope of the National Internship Program. It gives the opportunity to the students receiving higher education to have the opportunity to do internships in many state institutions. However, this union does not include Open Education system students. Thus, it can be said that Open Education students can find fewer places for internships in state institutions. In addition, the fact that Open Education students are currently working can be interpreted as indicating that they need flexible internship hours. This finding shows that the students at Open Education System use the opportunity to do internships in the private sector more.

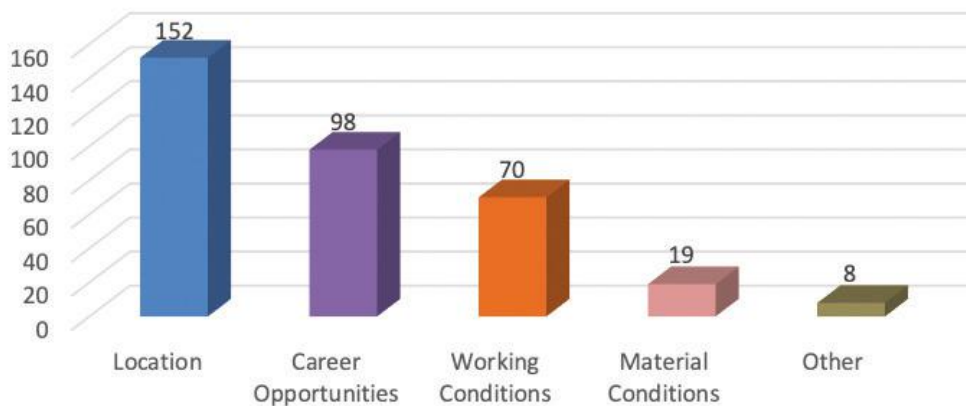


Figure 4. The Factors Affecting Area Choices of the Participants' Internship

Figure 4 reveals the results of the choices of participants regarding the internship area. As seen in Figure 4, “the location of the internship” is the most affecting factor in choosing an internship area with 42.9%. This was followed by “career opportunities” with 27.7%, “working conditions” with 19.8%, and “material conditions” with 5.4%, respectively. This results can be assessed that the participants prefer the area where they arrive conveniently while interning.

In the section where participants' evaluations of their internship processes were received, they were first asked to evaluate their internship processes in terms of their contribution to their personal abilities. The information obtained based on the answers given is given in Figure 5.

In the survey, participants' evaluations of their internship processes are also considered. Figure 5 shows the participants' assessments of the impacts of internship processes on their personal abilities.

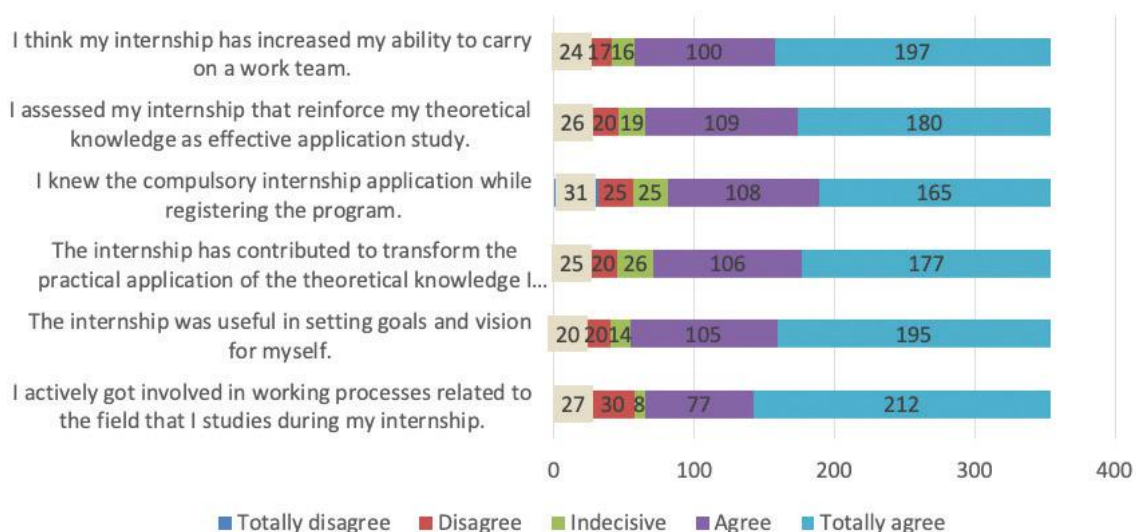


Figure 5. The Participants' Assessments of the Impacts of Internship Processes on Their Personal Abilities.

Concerning the statements of the participants' assessments on the sentences in Figure 5, the options of "Totally agree" and "Agree" were mostly chosen for the sentence "The internship was useful in setting goals and vision for myself". On the other hand, the options of "Totally disagree" and "Disagree" were mostly chosen for the sentence "I actively got involved in working processes related to the field that I studied during my internship". In light of these results, it can be suggested that the internship process has contributed to the participants' personal development.

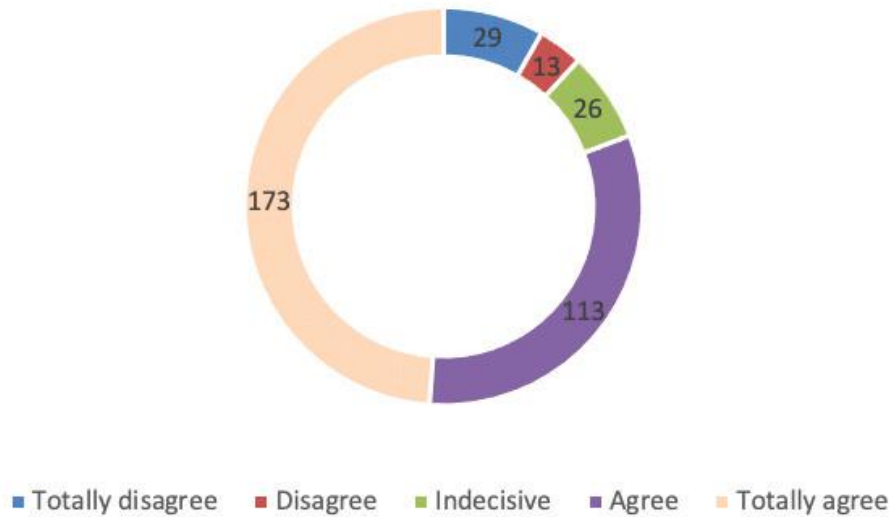


Figure 6. Whether Participants' Agreement with the Statement "I had a sense like a part of the institution during the internship."

Figure 6 shows the results of the participants' assessments on the sentence "I had a sense like a part of the institution during the internship". For this statements, 48.9% of the participants chosen the option of "Totally agree" while 32% of them chosen the option of "Agree". In conclusion, it can be suggested that intern process the participants had induced them to have a sense of belonging.

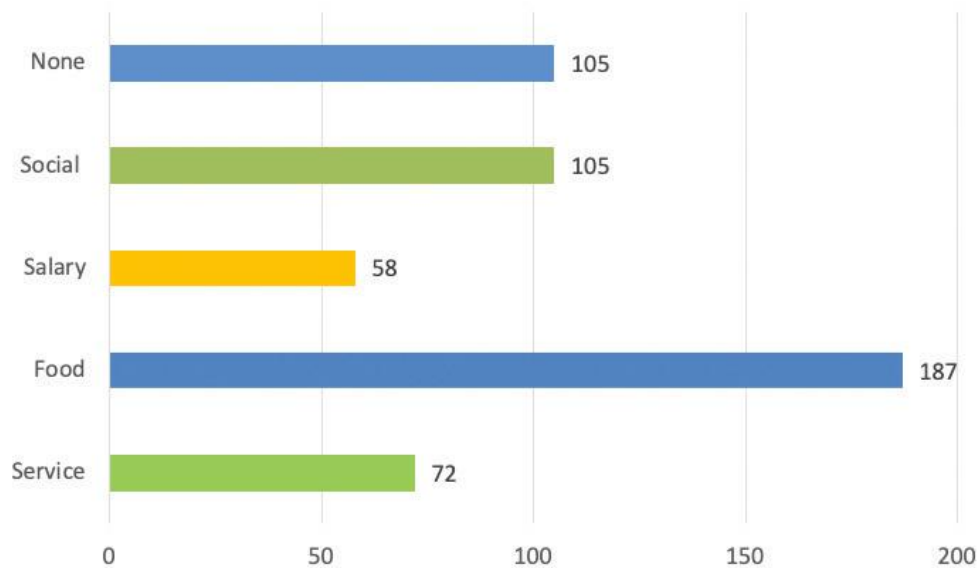


Figure 7. The Opportunities that the Participants Benefit from the Institutions where They Intern.

Figure 7 presents the data on what participants benefit from the firms where they intern. According to the results of the data obtained from the survey, the participants mostly utilized the "food opportunity" in the firm where they intern, with 52.9%. The rate of use of "social opportunity" is 30% while "the service opportunity" and "salary opportunity" are 20.4% and 16.4%, respectively. On the other hand, 30% of the participants stated that they did not benefit from any of the chances. Accordingly, the firms seems that the participants interned presents them different resources, which the participants were able to benefit from.

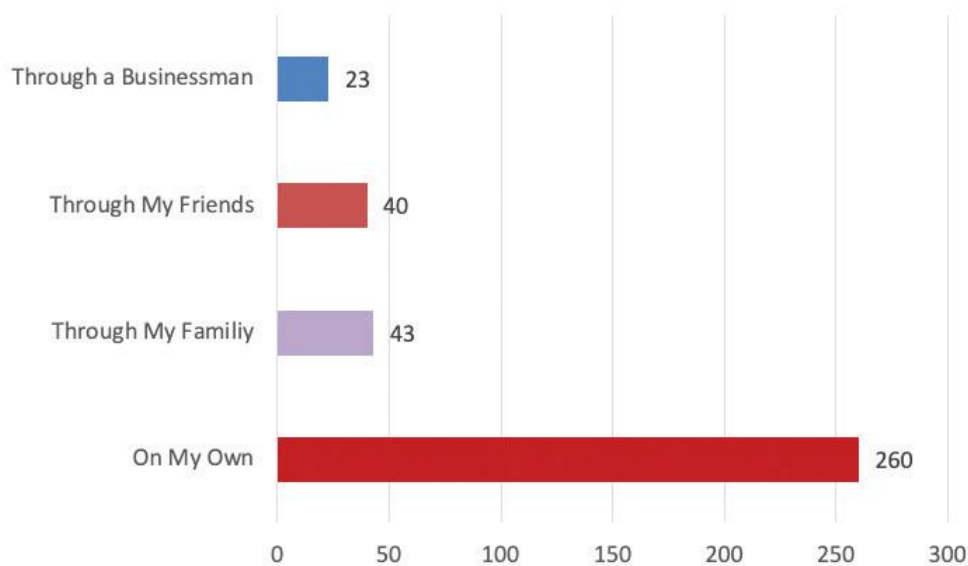


Figure 8. Participants' Answers to the Question through Whom They Found the Internship Places.

The findings on determining the internship placement of the participants are presented in Figure 8. Most of the participants' (73.4%) stated that they found the internship places on their own. The rate of the participants that detected the internship places through their family and through their friends are at 12.1% and 11.3%, respectively while they find it through a business are at 6.5%. This result indicates that the participants acted with their personal preferences in choosing an internship place and managed the process of finding an internship place with their personal connections.

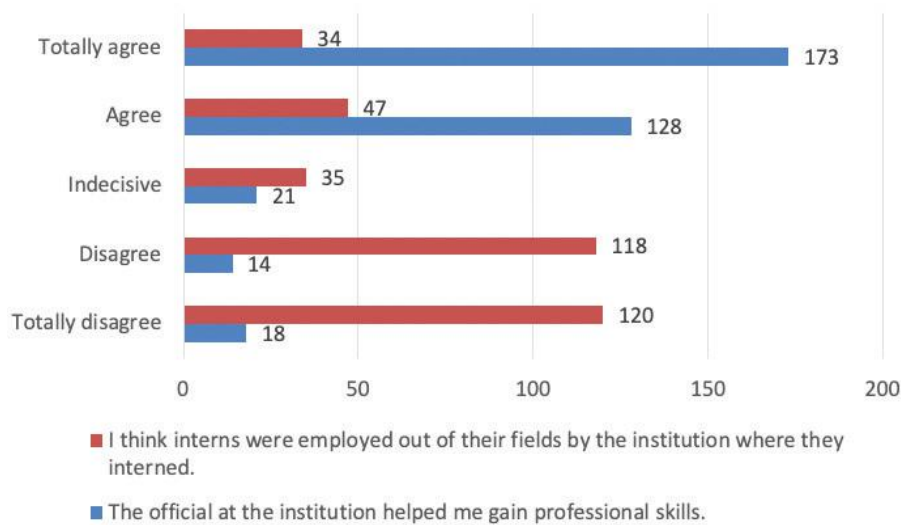


Figure 9. The Participants' Assessments on the Institution Where They Interned

Figure 9 demonstrates the assessments of the participants on the institution where they interned. Regarding Figure 9, it can be observed that 301 participants chose the option of "Totally agree" and "Agree" in total, for the sentence of "The official at the institution helped me gain professional skills". On the other hand, it is detected that 238 participants chose the option of "Totally disagree" and "Disagree" in total, for the sentence of "The official at the institution helped me gain professional skills. These findings show that the participants assessed the internship as effective for gaining professional experience.

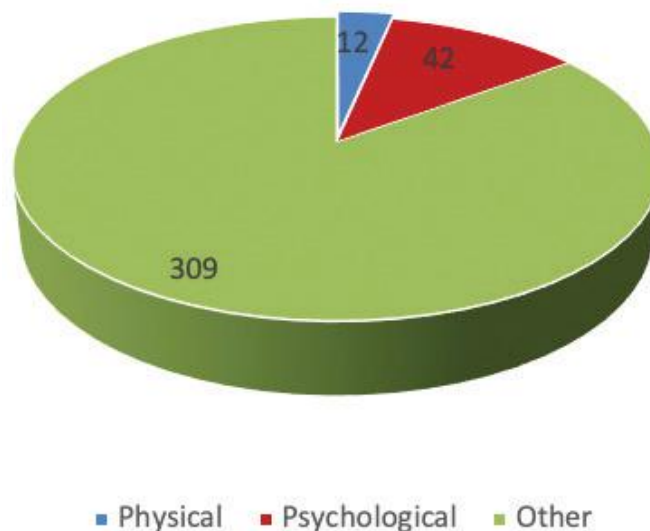


Figure 10. The Position of the Participants' Mobbing Exposure

Figure 10 presents the kind of mobbing that the participants claim to be exposed to. Accordingly, 12% of the participants stated that they were exposed to physical mobbing while 4% of them claimed that they incurred by psychological mobbing. Besides, the participants who were subjected to the other mobbing are at 87.3%. Sadly, there are no any participants that did not expose to the mobbing.

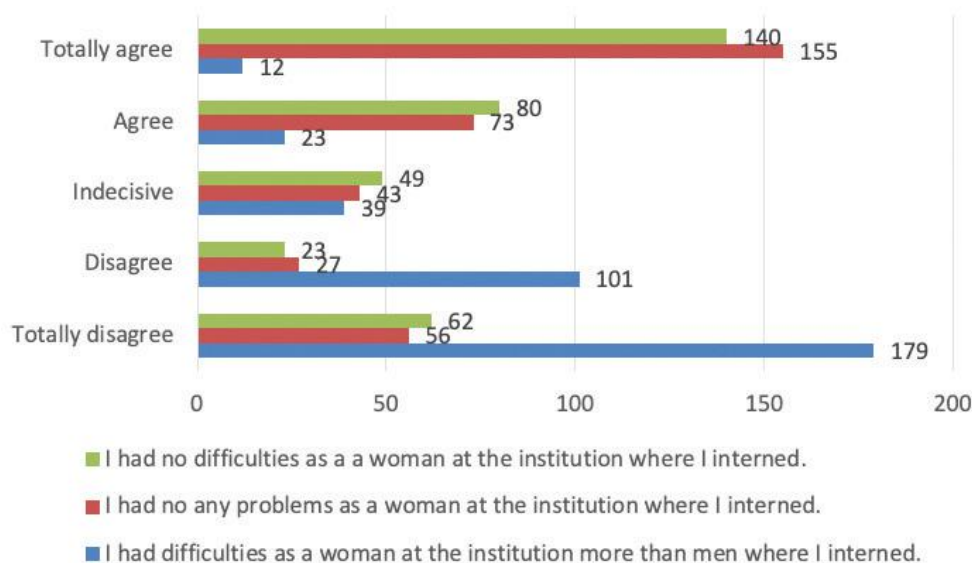


Figure 11. Participants' Difficulty Situations as Women in the Institution where They Interned

Figure 11 reveals the results of whether female interns among the participants experienced gender-related difficulties in the institution where they interned. The findings indicate that most of the women participants had no difficulties as a woman. These results can be suggested that there is no discrimination or attitude towards gender in the institutions where internship was performed.

Table 4. The Participants' Assessments on the Female Managers

| | Frequency (N) | Percentage (%) |
|--------------------------------|---------------|----------------|
| There is a female manager. | 207 | 58,5 |
| There is not a female manager. | 147 | 41,5 |
| Total | 354 | 100 |
| The attitude of female manager | | |
| Positive | 177 | 50 |
| Negative | 177 | 50 |
| Total | 354 | 100 |

The participants' answers to the questions regarding the female managers are presented in Table 4. As seen in Table 4, 58.5% of the participants had female managers in the institution they interned, and half of the participants expressed positive and half negative opinions on the attitude of the female managers. These findings stereotyped taboos against women still continue in society.

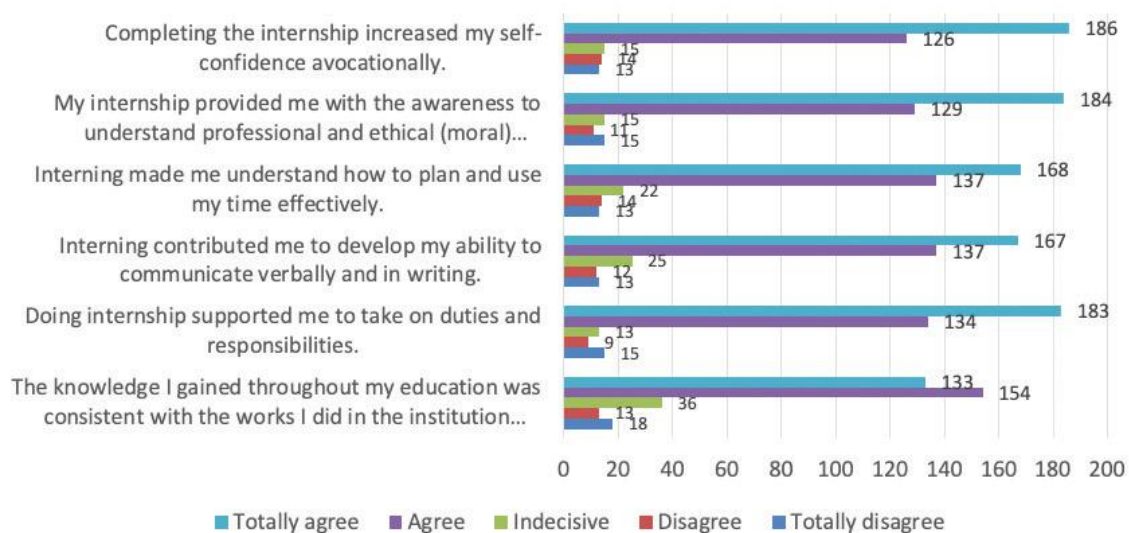


Figure 12. Participants' Assessments on the Benefits of the Internship

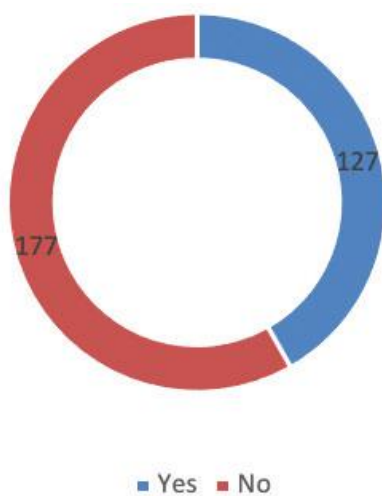


Figure 13. The Situation of the Participants' Receiving a Warning by the Institution Where They Interned

Concerning the statements of the participants' assessments on the sentences in Figure 12, the options of "Totally agree" and "Agree" were mostly chosen for the sentence "Doing internship supported me to take on duties and responsibilities. Conversely, the options of "Totally disagree" and "Disagree" were mostly chosen for the sentence "The knowledge I gained throughout my education was consistent with the works I did in the institution where I interned.". This results suggest that the participants think the internship was useful for them for gaining responsibility, yet they are in the opinion that the information they got in the school did not match the works they interned.

As seen in Figure 13, nearly 36% of the participants stated that they received a warning by the institution when they were absent from internship. Hence, this can be implied that it is essential for interns to ensure attendance and permanence in order to avoid disruption of the work carried out in institutions.

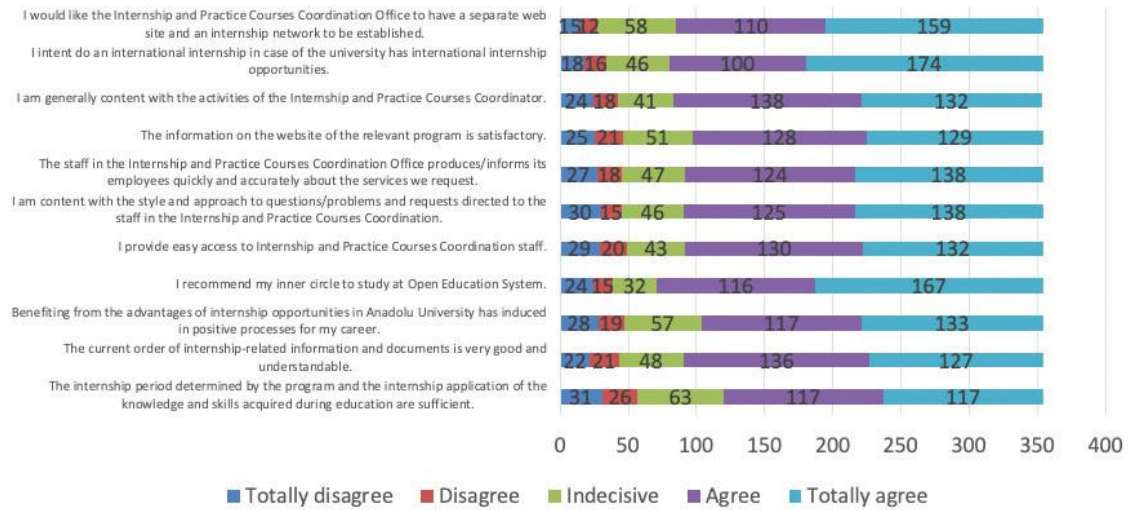


Figure 14. The Assessments of the Participants on the University Regarding the Internship Application Process

Regarding the statements of the participants’ assessments on the sentences in Figure 14, the options of “Totally agree” and “Agree” were mostly chosen for the sentence “I recommend my inner circle to study at Open Education System”. On the other hand, the options of “Totally disagree” and “Disagree” were mostly chosen for the sentence “The internship period determined by the program and the internship application of the knowledge and skills acquired during education are sufficient”. According to these findings, the participants are content with the Open Education System, while they think that the internship period is insufficient. This finding is especially remarked by Harvey (2000) that the purpose and scope of university education in the developing countries need more to focus on the employment of its graduates. It is necessary to catch the era regarding internship processes in higher education and provide education in line with employment needs.

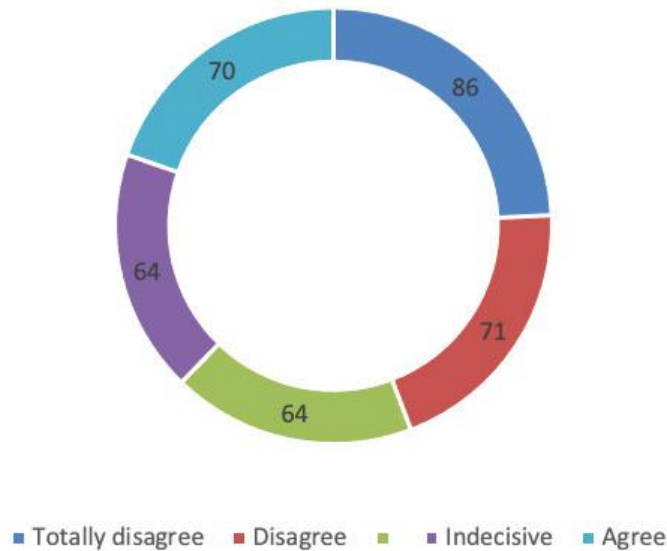


Figure 15. The Situation of the Participants’ Having Difficulty in Finding an Internship Place during the Pandemic

Figure 15 shows that the participants’ answers are not significant differences to this question. However, the option of “Totally disagree” was chosen by the participants with 24.3%. This finding can be implied as difficulties in finding an internship during the pandemic were being affected by different independent variables.

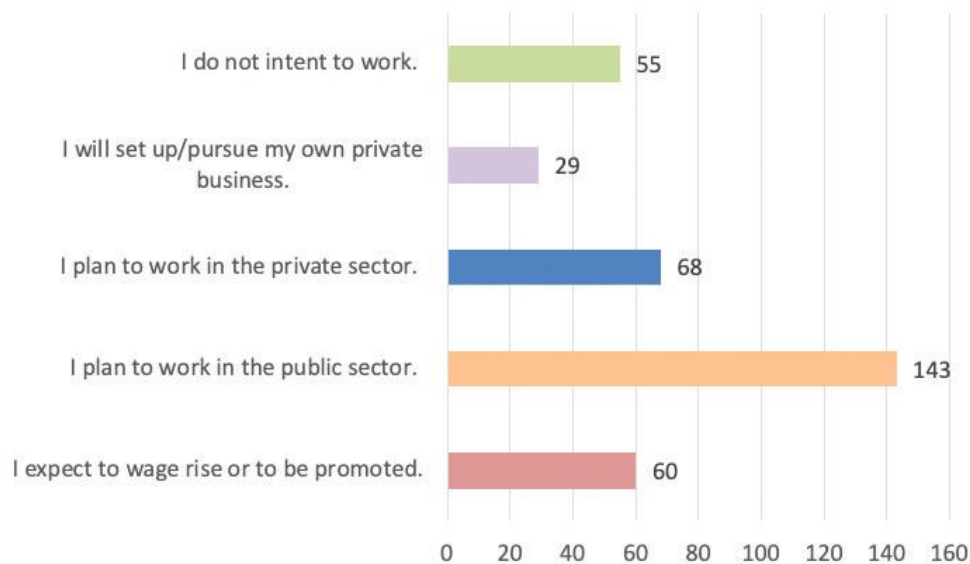


Figure 16. The Expectations of the Participants of Their Working Life regarding the Internship

Figure 16 presents the expectations of the participants on their working life. Accordingly, the rates of the participants who intend to work in the public sector and in the private sector are at 40.4%, and 19.2%, respectively. 17% of the participants expect to receive a wage raise or to be promoted while 15.5% of them do not intend to work. Lastly, 8.2% of the participants plan to set up their own business. These results show that the majority of the participants plan to make changes in their work after the training they receive.

Finally, Figure 17 presents the answers of the participants to the questions on their thoughts after graduation.

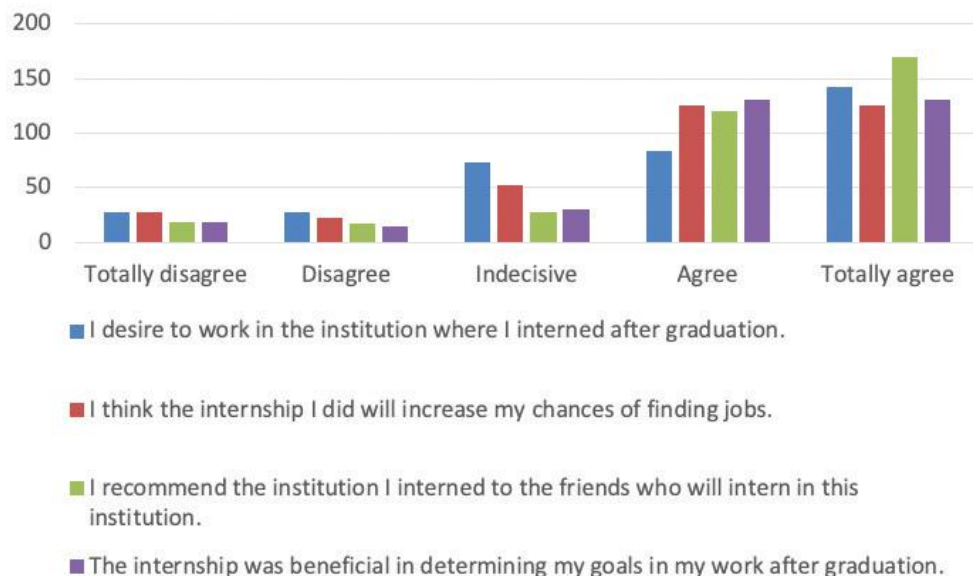


Figure 17. The Thoughts of the Participants regarding After Graduation

As seen in Figure 17, the options of “Totally agree” and “Agree” were mostly chosen for the sentence “I recommend the institution I interned to the friends who will intern in this institution” while the options of “Totally disagree” and “Disagree” were mostly chosen for the sentence “I desire to work in the institution where I interned after graduation”.

4. Discussion and Conclusion

Internship experience provides insight to students on the industry and business life and even whether they will pursue this profession in the future. For this reason, it is essential to receive students' suggestions and complaints regarding the internship and to make necessary arrangements to the programs according to this feedback. In this sense, the aim of this research is to determine the assessments of the students studying in programs offering education and vocational training in the Anadolu University Open Education System, regarding internship, which is a component of the education-training process. Within the scope of the research, a survey study was conducted to obtain the assessments of the participants. The survey consists of 5 sections, which are "Demographic Characteristics", "The Contribution of the Internship Application Process to the Student's Personal Skills", "The Contribution of the Internship Institution to the Student Performance During the Internship", "The Assessments of the University on the Internship Application Process", and "The Significance of the Internship in Terms of Employment".

According to the findings obtained from the survey conducted, the participants stated that the internship contributed to their professional skills and personal abilities. The results of the section "The Contribution of the Internship Institution to the Student Performance During the Internship" reveal that the participants were in the opinion of the internship process as a positive way in terms of the experience of working with a team, active participation in the work process and gaining vision in the field they studied. It is also observed that the internship contributes to identifying the sector and organizational culture and reinforces the sense of belonging.

In line with the assessments of the participants, the institutions attach great importance to internship training. On the other hand, all participants stated that they were exposed to mobbing which is generally one of the biggest problems of our country. This may result in switching another field from the field in which participants study. Regarding the section of sexism, most of the female participants stated that they did not have any difficulties as a woman in the institution where they interned. Besides, most of the participants stated that there were female managers in the institution where they interned, and half of the participants assessed the attitudes of these managers as positive and the other half as negative.

It is observed that the participants pay mostly attention to the location when determining an internship place. In general, the participants felt like a part of the institution where they interned and took part in business processes related to the field in which they studied. In addition, the participants mostly benefited from the food opportunities at the institution where they did their internship.

It is seen that the majority of the participants who are satisfied with the support they receive from the institution recommend studying at Anadolu University Open Education Faculty to their inner circle. It is also observed that the participants stated that they recommend the workplaces where they interned to their friends and intend to work at the institution where they interned in the future.

In brief, the results obtained from the survey data show that internship training is required in terms of career choice and training of qualified workforce to work in the sectors. In this context, it may be structured as a livingly and dynamical process by using new technologies and receiving feedback from all stakeholders, which in turn the efficiency of internship may be increased to higher levels.

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295-The Assessment of the Opinions of Students Practicing Laboratory Courses in the Associate Program of Electric Power Generations, Transmission and Distribution: The Case of Anadolu University Open Education System

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Abstract

Practice courses are conducted to improve the knowledge, skills and competencies of individuals in accordance with their educational level and to transform theoretical knowledge into practice. Practice courses are performed face-to-face in line with the National Qualifications Framework for Higher Education in Turkey (NQF-HETR). The process of conducting practice courses in undergraduate and associate degree programs in Anadolu University Open Education System involves coordination processes as within the unit, within the institution and outside the institution. Internship and Practice Coordinatorship at the Open Education System in Anadolu University coordinates practice courses conducted throughout Turkey and internship activities carried out in 38 domestic and international countries. The aim of this study is to assess students' opinions on the process and functioning of practice courses. The research was carried out through descriptive analysis for the practice courses of Electric Power Generations, Transmission and Distribution program at Anadolu University Open Education Faculty. Workshop I, Workshop II and Circuit Analysis Laboratory are the practice courses in the Electric Power Generations, Transmission and Distribution program. In this research, the survey was employed in order to evaluate the functioning and process of these courses. The survey consists of the sections for the applied laboratory courses on the week selection, the application process, and the contribution of the process to learning. The study uses Stata 15 statistical program to examine the findings obtained from 259 participants for the survey. The obtained findings from the survey show that the students think that practice courses are useful in transferring theoretical knowledge to practical experience and are effective in gaining professional experience. Besides, students state that they gained teamwork experience due to these courses and that they feel more ready for the field in which they would work.

Keywords: *Practice Courses, Professional experience, Open Education, Distance Education.*

1. Introduction

Electricity has been the most basic energy source in the last century and is used for many devices in our daily lives. Electricity and electrical services have also gained importance as energy sources in order that electronic/digital devices have been widely used, in the 21st century. There is a need for qualified workers in institutions which provide electricity supply services for operations such as establishing infrastructure and ensuring sustainability in electrical facilities used in energy production, inspecting production systems and devices, dealing with technical problems, and troubleshooting malfunctions. The Associate Program of Electrical Energy Production, Distribution and Transmission trains people who may take charge in making available and distributing electricity, which can be described as the most common energy source. The program, which has been included as a formal system in 15 Vocational Schools is available through distance education within Anadolu University Open Education Faculty.

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1.1. The Significance of Electrical Energy Production, Distribution and Transmission

The need for energy resources increases since the devices used by human beings for their daily needs vary as a result of modern life. Factors such as industrialization, technological developments, population growth and the increase in people's welfare levels drive to increase the demand for energy day by day, especially in developing countries.

Energy is one of the most important inputs for the social and economic development of a country. The demand for natural resources and energy constantly increases in virtue of the factors that are the increase in population, the needs created by industrialization, urbanization and smart cities, digital society, and digitalization processes, as well as increasing trade and production opportunities as a result of globalization (Narin, 2008). Turkey is among the countries where the demand for energy resources is intense. Turkey ranked third, among major economies with an increase rate of 55.3% in electricity demand, behind China (174.8%) and India (56.8%) (TMMOB, 2012). In the period from 2000 to 2012. Consumption of primary energy resources in Turkey decreased by 4.5% in 2009 compared to the previous year and dropped to 103 Mtoe (million tons of oil equivalent). This consumption continued to increase in the following years and reached 114.4 Mtoe in 2011. 32.2 Mtoe of this production is the energy obtained by Turkey using its own resources. The residuary 82.2 Mtoe that rested was covered by imports. In this year, the import dependency ratio of primary energy resources was 71.8% (EÜAŞ, 2012). Accordingly, it is expected that energy supply will continue to increase in parallel with economic growth in the coming years (Yılmaz, 2012).

The need for efficient use of energy resources is inevitable in order not to fall behind the developments in technology and the revolution called Industry 4.0, which is a set of systems consisting of three stages: internet, internet services and cyber-physical systems.

Considering the related literature, it is observed that various studies have been conducted on a wide range of topics from the production to consumption of electrical energy. One of them, Ağır and Kar (2010) investigate the relationship between electricity consumption and development level for Turkey and conclude that effective use of domestic energy resources decreases the cost of electricity production, in turn the intensive use of energy decreases. Dinçer (2011) examines the electricity production potential from solar energy for Turkey within the framework of economic analysis and a comparative evaluation with EU countries. His study suggests that making the necessary investments for Turkey, which has an energy potential of 110 days a year, should be considered for economic, environmental and energy density. Bilim (2016) searches for policies to reduce foreign dependency in electrical energy production for Turkey. Dulkadiroğlu (2017) investigates the electricity production in Turkey in terms of greenhouse gas emissions. Naimoğlu and Akal (2021) analyze the factors affecting demand-side energy efficiency for emerging economies in the period 1990-2018. Their findings reveal that renewable energy sources present greater opportunities for increasing effectiveness of energy and decreasing energy intensity than fossil fuel sources.

1.2. The Associate Program of Electrical Energy Production, Distribution and Transmission

Electrical Energy Production, Distribution and Transmission Associate Degree Program is a two-year program with a compulsory 20 working day internship and has its application courses. During the compulsory internship, Students in the program gain business knowledge by applying the theoretical knowledge they acquired during their education process. Electrical Energy Production, Distribution and Transmission, which includes predominantly quantitative courses, is among the programs with open education options. The program's base and ceiling scores in placement through the central system and its ranking vary every year.

Laboratory practice courses in the Electrical Energy Production, Distribution and Transmission Associate Degree Program, which is located at Anadolu University Open Education Faculty and can be also registered at the second university as it receives placement through the central system, are held in Eskişehir in the spring and summer months. Laboratory practices are compulsory courses that require attendance. There is no exemption from compulsory laboratory courses (Anadolu University, 2023).

The success grade of Workshop I, Workshop II and Circuit Analysis Laboratory courses, which are offered as a 5-day training in laboratory applications, is determined by the student's performance in the experiments. At least 70% attendance is required for each laboratory course in the program. Therefore, a student is considered

continuous when he/she participates in at least 6 out of 8 experiments in a laboratory course. The “passing grade” in laboratory courses is at least 60 and the letter grade is CC. Students who receive a score below 60 are directly evaluated with the FF letter grade.

This research, i) investigates the assessments of the students on the application courses called Workshop I, Workshop II and Circuit Analysis Laboratory of the Electrical Energy Production, Distribution and Transmission Associate Degree Program at Anadolu University Open Education Faculty, ii) considers the present stated, and iii) determines the needs according to the results.

2. Method

The purpose of this study is to evaluate students’ opinion regarding the process and functioning of applied courses. Hence, the study was designed with the descriptive analysis method, one of the quantitative research methods. Workshop I, Workshop II and Circuit Analysis Laboratory are the application courses in the Associate Program of Electric Power Generations, Transmission and Distribution associate degree program.

This study obtained survey data from 259 students who participated in the relevant courses. The survey was prepared through Google form and the students were informed about the survey via SMS and the link to access the survey was shared with them. The applied survey consists of the sections regarding the week selection of practical laboratory courses, the application process, and the contribution of the process to learning. All analysis is performed by employing Stata 10. The reliability coefficient, Cronbach’s Alpha, of the survey applied to the respondents is found to be 0.93.

3. Findings

The survey consists of 4 sections and was prepared by the Internship and Practice Courses Coordination Office. Accordingly, the demographic data of the survey are given in Tables 1, Table 2, Figure 1, Figure 2.

Table 1. The Distribution of the Participation by Gender

| Gender | Frequency (N) | Percentage (%) |
|--------|---------------|----------------|
| Female | 9 | 3.5 |
| Male | 250 | 96.5 |
| Total | 259 | 100 |

Table 1 shows that the respondents are mostly men. The percentage of respondents who are men are at %96.5 while women are at %3.5.

Table 2. The Distribution of the Participation by Age

| Age | Frequency (N) | Percentage (%) |
|-------|---------------|----------------|
| 18-24 | 37 | 14.3 |
| 25-30 | 50 | 19.3 |
| 31-40 | 118 | 45.6 |
| 41-50 | 48 | 18.5 |
| 51+ | 6 | 2.3 |
| Total | 259 | 100 |

Table 2 presents the distribution of participation by age. As seen in Table 2, 45.6% of the participants are aged between 31-40, followed by 25-30 with 19.3%, and 41-50 with 18.5%.

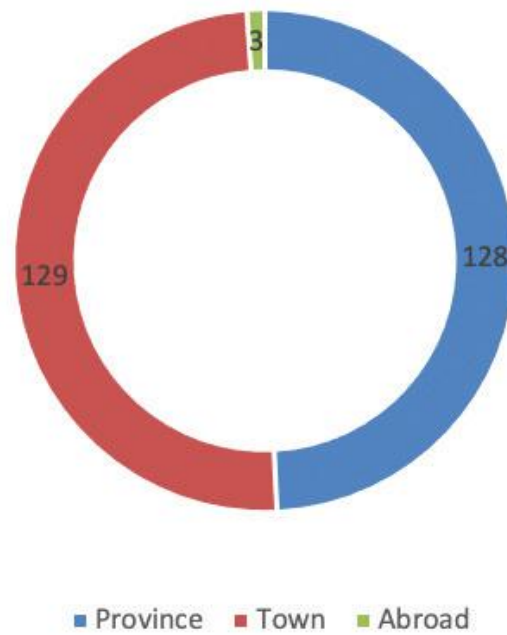


Figure 1. The Locations Where the Participants Live

Note that one participant chose both the province and abroad for his/his living place. The results in Figure 1 reveal that the number of participants living in the province and town seems approximately equal while only 1% of the participants lived abroad.

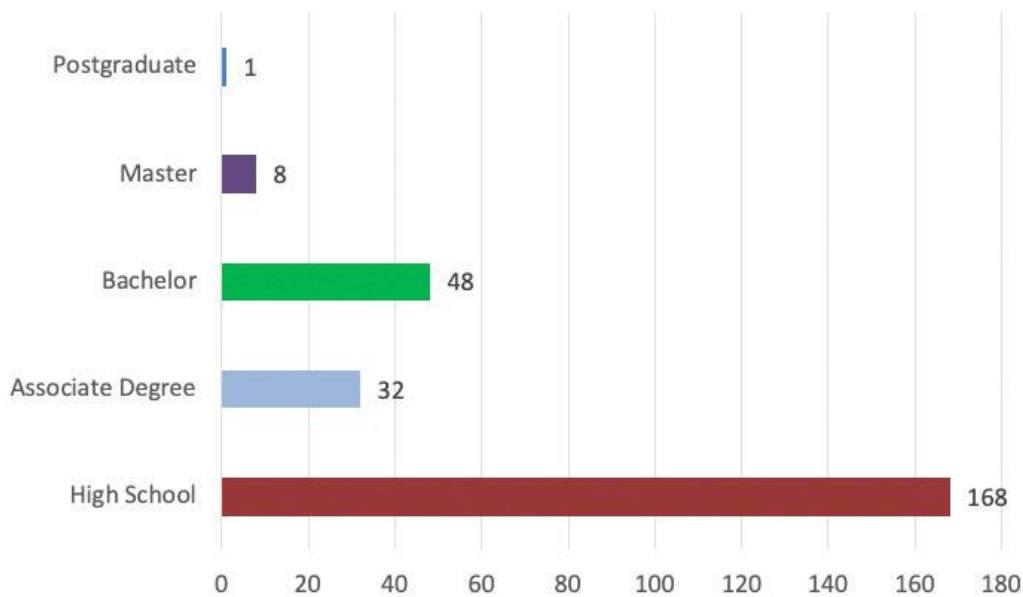


Figure 2. The Frequency of the Participants by Education Level

Note that one student did not answer this question of the survey. Figure 2 shows that 65.4% of the participants are high school graduates, followed by bachelor (18.7%) and associate degree (12.5%), respectively. Anadolu University Open Education System accepts students based on the results of the central placement exam. In addition, it offers individuals, who have previously graduated from an associate degree program or who are currently actively studying in an associate degree program, to enroll in a second university program without an exam. In light of this, it can be said that 31% of the participants are registered at the second university.

Table 3. The Distribution of the Participants by Employment Status

| | Frequency (N) | Percentage (%) |
|-------------|---------------|----------------|
| Working | 244 | 94.2 |
| Not Working | 15 | 5.8 |
| Total | 259 | 100.0 |

Table 3 demonstrates the working status of the participants excluding their internship. As seen in Table 3, the majority of the participants with 94.2% are currently working.



Figure 3. The Participants' Laboratory Course Application Week Dates in the Associate Degree Program

As seen in Figure 3, there are no significant differences between the participants' laboratory course application week dates. For laboratory courses, students are asked on which dates they can attend laboratory courses in the relevant period, and groups are formed by determining the weeks based on the students' answers. The reason for the diversity observed is that students attend classes by choosing the week they are most comfortable with during the summer.

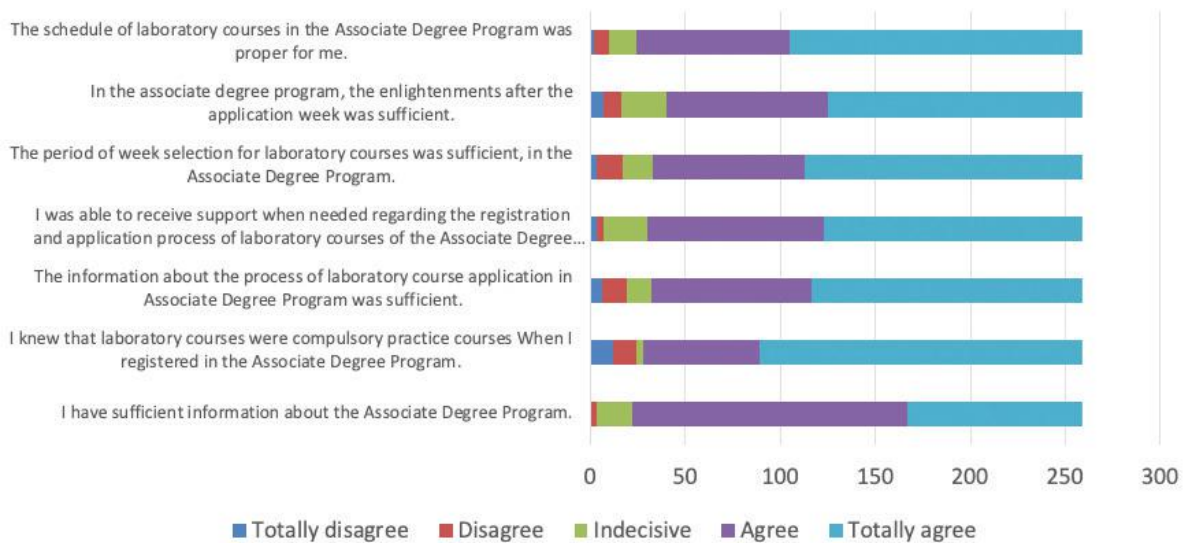


Figure 4. The Participants' Assessments on the Associate Degree Program

Concerning the statements of the participants' assessments on the sentences in Figure 4. It is observed that the participants generally agree on the positive statements presented to them with the answer "Totally Agree". Accordingly, it can be suggested that i) they were informed about the program they were students in, ii) they were aware that it was a compulsory practice course, iii) the information given to them was sufficient, and iv) they could get support from the institution when needed, during this process. In addition, the fact that the students enrolled in the program are working in a related field supports the formation of these opinions.

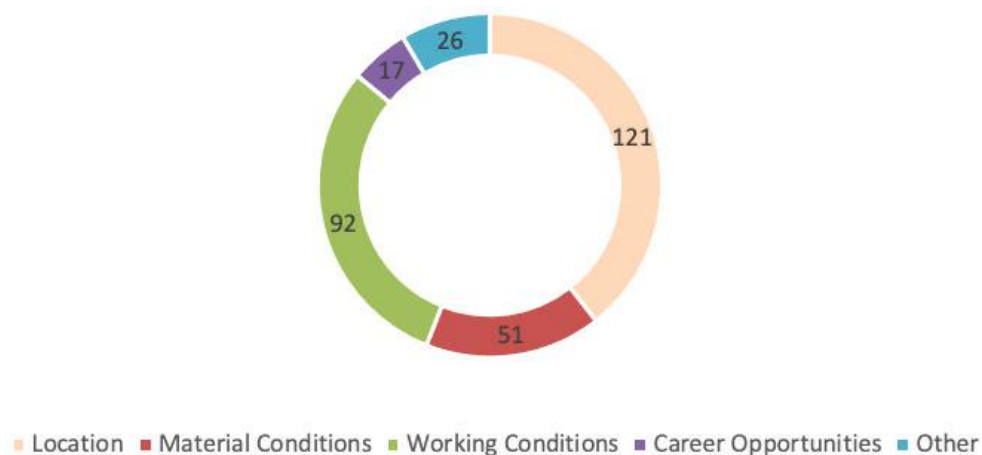


Figure 5. The Factors Affecting Choices of the Participants' Application Week

Figure 5 shows the participants' responses regarding the factors affecting their choices of application week for the courses they involved. As seen in Figure 5, "location" is the most affecting factor in choosing application week with 46.7%. This was followed by the option "working conditions" with 35.5%. It may be said that the participants arranged the application week according to their work situation, since they were currently working, and that is why they chose a place close to them.

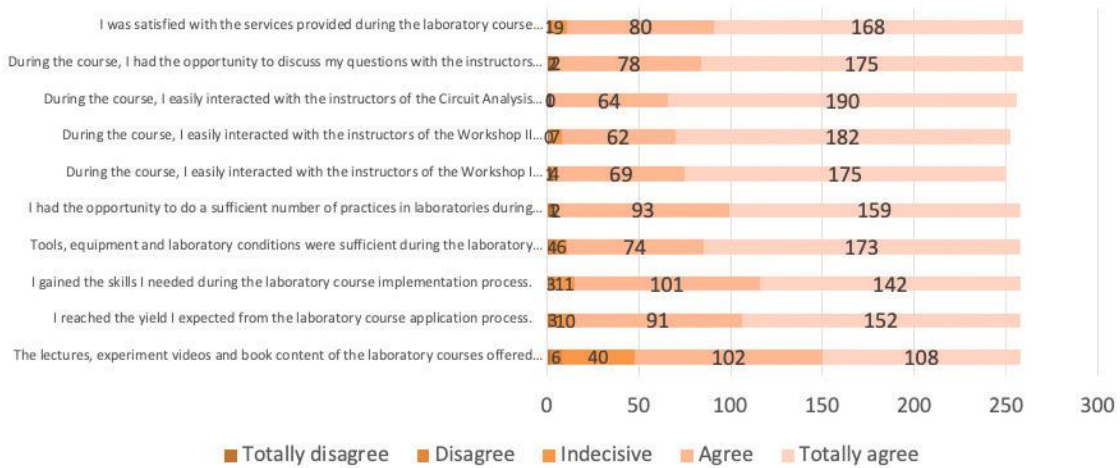
It also tested the statements of the participants on the Laboratory courses offered to them via eCampus that they can reach regardless of time and place, a platform where they can access 14 different types of course materials prepared by Anadolu University.

Table 4. Whether Participants' Agreement with the Statements on ANADOLUM eCampus

| | Statements | Percentage (%) |
|---|--|----------------|
| 1 | I watched the lecture videos of laboratory courses offered in the ANADOLUM eCampus system. | 77.22 |
| 2 | I watched the laboratory course experiment videos offered in the ANADOLUM eCampus system. | 76.83 |
| 3 | I benefited from the laboratory course textbooks offered in the ANADOLUM eCampus system. | 75.68 |

According to Table 4, the individual agreement levels in the statements given are over 75%, and the rate of participants agreeing with all three statements is 60.2%. Therefore, it can be said that the participants' ability to benefit from the resources offered to them through eCampus is high.

Table 5. The Assessments of the Participants on Laboratory Courses



As seen in Table 5, the participants generally have a positive opinion with the statements presented in the table. Also, the participants feel the need to ask the instructor during the courses and feel pleased to have this opportunity thanks to the service offered.

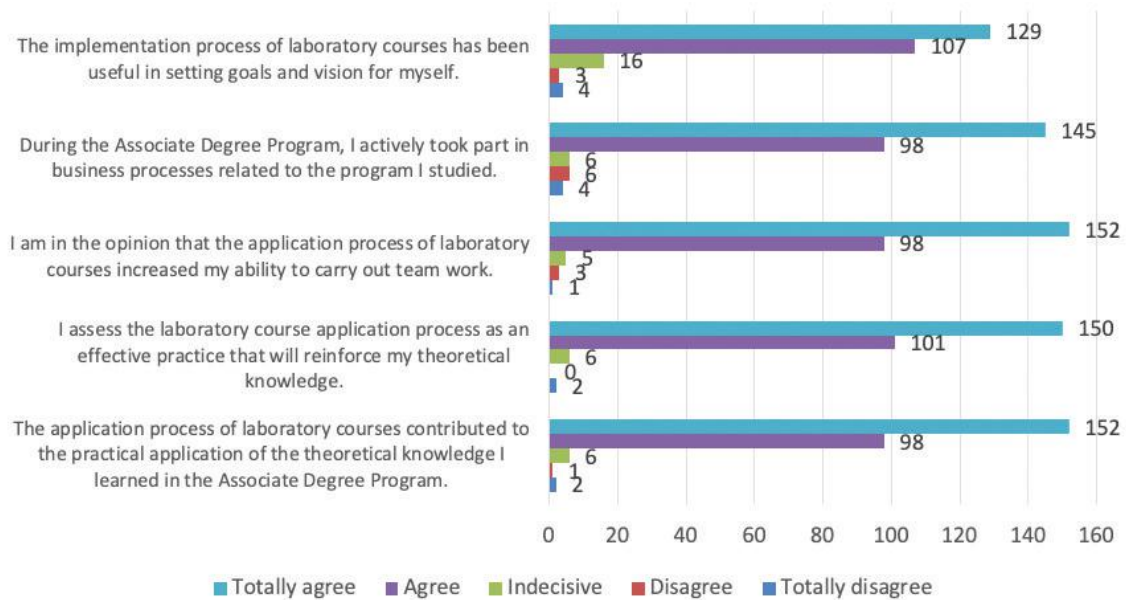


Figure 6. The Participants' Assessments about Benefits of "Laboratory Courses Application Process"

Figure 6 shows that the options "Totally Agree" and "Agree" were mostly chosen for the 3 statements given regarding teamwork experience and gaining experience in applying theoretical knowledge in the field. On the other hand, the options "Totally disagree" and "Disagree" were mostly chosen for the sentence "During the Associate degree Program, I actively took part in business processes related to the program I studied". Hence, in general, it can be stated that the participants assessed the laboratory courses as useful for themselves.

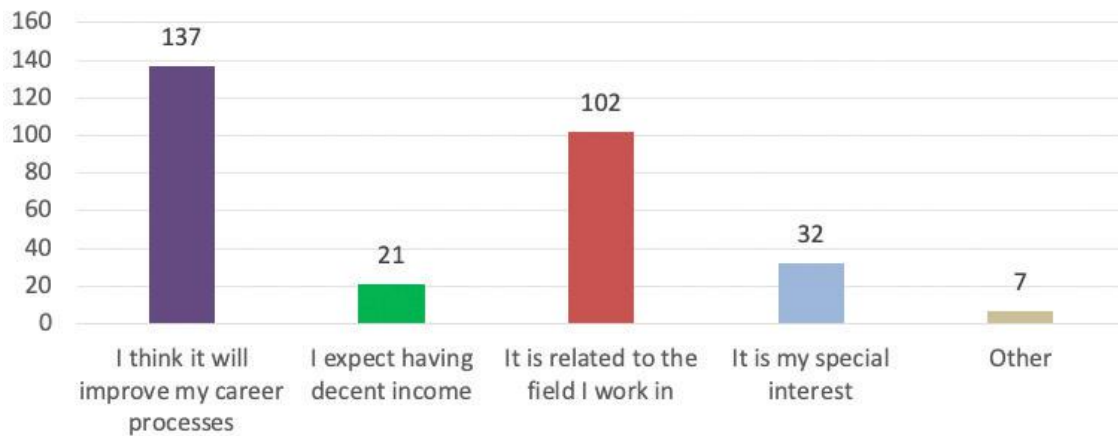


Figure 7. The Main Motivations for the Participants Enrolling in the Associate Degree Program

Figure 7 presents the answer of the participants regarding their reasons for enrolling the program. Accordingly, 52.9% of the participants chosen the option “I think it will improve my career processes”. This followed by the option “It is related to the field I work in” with 39.4%, the option “It is my special interest” with 8.1%, and the option “I expect having decent income” with 8.1%.

In addition, 78.4% of the participants stated that they consider completing the bachelor’s degree after graduating from the associate degree program This implies that the participants have knowledge and awareness on the training they will receive, in choosing the associate program.

4. Discussion and Conclusion

There are many different fields of study regarding electricity, which meets the basic energy needs for the consumer products, in terms of resource management, production, distribution and transmission, and the development of relevant policies. In Turkish Higher Education, there are the Associate Degree Programs in these fields that train personnel to work at different levels in all processes, from the production to the distribution of electrical energy. Electrical Energy Production, Distribution and Transmission Associate Degree Program in Anadolu University Open Education Faculty gives lessons through distance education with theoretical and practical courses. This research investigates the assessments of the students on the laboratory courses offered in this program. The results reveal that the participants have positive opinions on the programs.

The findings obtained from the survey analysis show that participants stated that the application courses were useful in transferring theoretical knowledge to practical experience. In addition, it is observed that the participants assessed the application courses held in the laboratory as effective in gaining professional experience. The program has a wide range of students who are already professional and studying at the second university. The participants also reported that they gained teamwork experience and felt more prepared for the field they will work in ,thanks to these courses.

According to the results, application courses are one of the main modules of the program. Renewing laboratory courses with the contribution of current technologies will increase the quality of the service provided. It will also increase satisfaction of institutions and organizations, which play a role in the employment of graduates, as well as students and graduates.

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308-Learner Perceptions on a Peer Review Assessment Activity in a Nursing Online Course During the COVID 19 Pandemic

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Abstract

This paper discusses learner perceptions on an online Peer Review Activity (PRA) introduced as a formative assessment strategy of assessment as learning, conducted for the first-time in the ‘Healthcare Informatics’ level five course of the B. Sc. Honours in Nursing degree programme of the Open University of Sri Lanka. Owing to the difficulty of conducting onsite examinations during the COVID-19 pandemic, this online activity was introduced replacing traditional onsite paper based assessment tests. The target audience was nursing undergraduates who have been in the frontline of patient care at various hospitals located across the country and were in isolation. The design of the PRA was based on a scenario-based question emphasizing on assessing the application of information governance principles in healthcare settings. The PRA used the “Workshop” activity in the Moodle Learning Management System, before submitting the final answer for grading. In the first phase of this activity, each learner had to submit the draft assignment based on the given rubric. In the second phase each learner had to review two randomly allocated peer assignments following the guidelines given in the peer review rubric. In the third phase, the teacher provided a comment to each peer review. Finally, each learner had to submit the final modified assignment considering the peer feedback and teacher comments. Vygotsky’s zone of proximal development (ZPD) (1978) and the formative assessments approach of Assessment as learning were used as the theoretical foundations of this study. The research design employed a mixed approach, combining quantitative and qualitative research methods. Quantitative data collection was done by administering a questionnaire among all learners, and interviews were conducted to gather qualitative data. Findings revealed that PRA has provided opportunity for learners to learn through valuing different perspectives, sharing peers’ experiences, fostering reflective learning while expanding their learning spheres. Learners’ cognitive development was influenced through social interactions by the involvement of peers and the teachers in an online learning environment, enabling the learners to gradually move into the ZPD. In conclusion online PRA was well perceived by learners and had served as a catalyst to learn during the pandemic breaking the social isolation, which can even be used to foster learner engagement in learning even after the pandemic.

Keywords: *Zone of Proximal Development, Assessment as learning, Peer review, Moodle Workshop, Nursing online course, COVID 19 pandemic,*

1. Introduction

Bachelor of Science Honours in Nursing is a degree programme offered by the Department of Nursing of the OUSL, for the nurses who completed their Diploma in Nursing and working in the Sri Lankan health sector. ‘NGU5208 Healthcare Informatics’ is a 02-credit optional course offered in this programme, with the aim of enhancing nurses’ capacity to work integrating nursing science, information science and computer science, to manage patient care in the contemporary health care setting. This course was first offered in the 2018/2019 academic year, and learners were assessed using 02 Continuous Assessment Tests (CATs) and a Final Examination (FE). Both these formative (CATs) and summative (FE) assessments were conducted as onsite paper based tests. Due to the difficulty of physical gatherings due to COVID-19 pandemic, in the academic year 2019/2020, one CAT was replaced by a take home assignment which consisted of scenario-based questions, focusing more on the application of theory. However, as these are nursing undergraduates

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who had to struggle with patients at hospitals due to COVID 19 pandemic, their engagement in learning was observed very low and online learning was limited only to uploading the assignment in the online course. They were struggling with fear and anxiety, and disadvantaged by the solitary learning situations, without having teachers and peers to support in their learning process.

This situation provoked the faculty to take supportive measures to help learners learn, by creating a peer assisted online learning situation. Hence in order to enhance learning, an online Peer Review Activity (PRA) was introduced as a formative assessment approach of *assessment as learning* that interplays the assessment and learning. This PRA was introduced using the Moodle ‘Workshop’ in the academic year 2020/2021.

Therefore the aim of this study was to investigate how learners perceive the PRA which was introduced for the first time in the ‘Healthcare informatics’ blended online course offered for the nursing undergraduates. In that, the following research question was explored.

1. What are learners’ perceptions on engaging in the peer review activity conducted as a formative assessment of assessment *as learning*?

2. Theoretical Framework

Theoretical framework used in this study was mainly based on two fundamental concepts: the Zone of Proximal Development (ZPD) and Assessment as Learning (AaL).

ZPD is the central concept of Vygotsky’s (1978) sociocultural theory. In sociocultural theory Vygotsky states that learners’ cognitive development takes place via social interactions. In that he states, effective learning takes place with the interaction of peers, where the less competent learner will develop with the help of a more knowledgeable other or skillful peer. Vygotsky’s concept of ‘more knowledgeable other’ led to the development of the theory of Zone of Proximal Development (ZPD). ZPD refers to the difference between what a learner can do without any support and what he can do with the support of a skillful peer (Figure 1). The zone of proximal development (ZPD) has been defined as:

“the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem-solving under adult guidance, or in collaboration with more capable peers” (Vygotsky, 1978, p. 86).

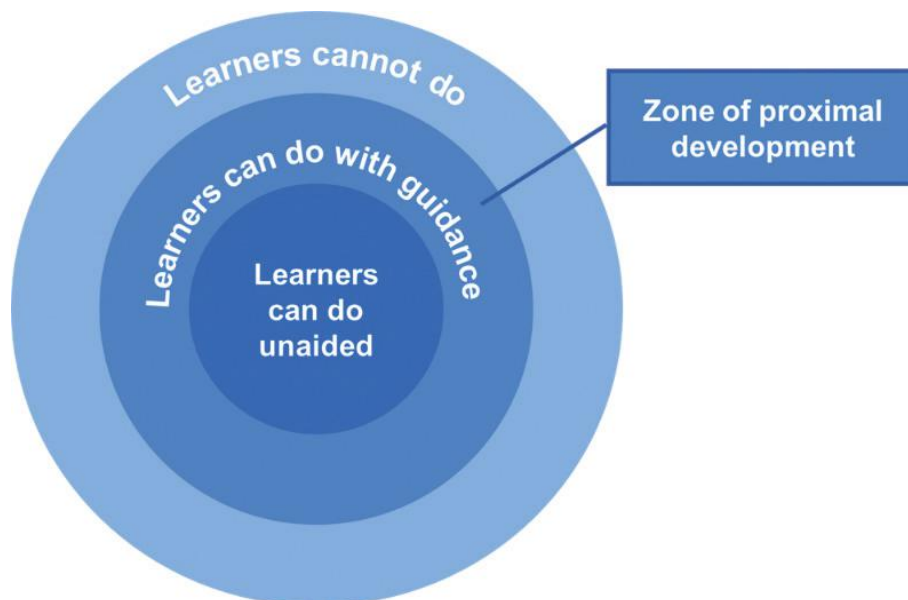


Figure 1- Zone of Proximal Development

To assist learners to move through the ZPD, educators were encouraged to focus on three important concepts: 1) presence of someone who is knowledgeable and skillful beyond that of the learner (a more knowledgeable other), 2) Social interactions with a skillful tutor or peer that allow the learner to observe and practice their skills, 3) Scaffolding activities provided by the educator, or more competent peer, to support the student to move through the ZPD.

Sadler (1989) claims that recognizing the gap between what a learner currently knows and what s/he needs to know, forms the focus of formative assessment. In this study too, the PRA was used with a formative assessment approach of Assessment as Learning (AaL). AaL builds upon the philosophy of Assessment *for* Learning (AfL), but with greater emphasis placed on feedback and metacognition of learners.

For the purpose of this study we define ‘peer review’ as a process of two or more learners evaluating a piece of work of another learner, with the hope of providing constructive feedback to improve the work of the learner.

3. Methodology

3.1. Designing and delivery of the PAA

In order to reverse the remote, passive and disengaged learning situation observed among nursing undergraduates due to the COVID 19 pandemic, the ‘Healthcare Informatics’ course was converted to a blended online course, conducting CATs online, expecting more engagement of learners in their learning process. Hence the online activity 3 was designed as a PAA, carrying 20 marks for the Overall Continuous Assessment Mark (OCAM).

The basic principles of constructive alignment (Biggs, 1996; Biggs, 2003) was followed while designing this activity. Hence, the PRA was designed based on lesson 4 of the course with the hope of assessing the learning outcome: ‘apply principles of information governance in healthcare settings’. The activity was designed based on a real world scenario; a case reported in Florida Healthy Kids Corporation (Florida Healthy Kids, 2022), which is one of the biggest healthcare data breaches in 2021 that affected 3.5 million individuals. Based on this case, learners were supposed to identify the information governance principles violated in this incident and then to apply their knowledge on information governance in a similar situation.

The PRA was delivered using Moodle ‘Workshop’ activity, followed by an online assignment submission. This activity consisted of several steps.

1. Introduction of PRA to the learners
2. Practice session with learners on how to assess and provide feedback according to a rubric
3. Learners submit the draft answer (first submission as an individual activity)
4. Learners review two other drafts submissions and provide feedback (review process)
5. Instructor checks each feedback and provide necessary comments to the peer reviewers
6. Learners reflect on peer feedback received, comments on peer review by the instructor and revise their work
7. Submission of the final answer
8. Final answer are graded by the instructor

Practice Session - Since the activity is delivered for the first time, learners were informed regarding the PRA at a Day School (DS) and a practice PRA was conducted by the instructor during the same DS. In this practice session learners got exposed to the Moodle ‘Workshop’ and learnt the process of activity. At the same time, they had a chance to clarify any difficulties/problems they faced during this activity.

Submission Phase - Learners were required to submit their answers to the given scenario during this phase. They were supposed to answer the questions using the analytical rubric provided. For the timely submission of draft answers, two (02) marks were allocated, while one (01) mark was allocated for late submissions.

Assessment Phase – Peer review process happened during this phase. For each submission, two peer reviewers were allocated randomly using the ‘Workshop’. Hence, each learner was required to provide feedback to two of their peers following the guidelines in the peer review rubric. Learners were instructed to take enough time to read through and give constructive feedback to their peer’s work. Feedback should consist of 03 parts: Feedback for Question 01, Feedback for Question 02 and an Overall Feedback.

Grading Evaluation Phase - Instructor evaluation of peer feedback occurred during this phase. For each peer feedback a maximum of four (04) marks were allocated by the instructor, while providing comments to each peer feedback.

Closing of the Workshop - In this phase, the ‘Workshop’ was closed, and thereafter each learner could see the feedback given by their peers for their submission, comments provided by the instructor for their reviews to the two peers. They could also see the grades received for their submission and for the peer assessment.

After closing this phase, learners were asked to modify their answer based on the feedback received from peers and comments given by the teacher.

Submission of assignment for grading – Finally learners were asked to submit their modified answer to the assignment drop-box for grading and the instructor assessed the modified assignments allocating ten (10) marks for each learner.

The final mark is out of 20 (02 for submission + 08 for peer review +10 for final modified answer)

3.2. Research Methods

The study required gathering and analysing information related learners' perceptions in engaging in the PRA.

A mixed approach of explanatory sequential design method (Creswell & Clark, 2011) was used to collect quantitative and qualitative data related to learners' perceptions in the PRA. In this method quantitative data were collected and analysed first, followed up by a qualitative study to study more on specific quantitative results that needed additional explanation.

For the quantitative study, a Google questionnaire was administered first, among all learners (38), to gather quantitative data, including questions related to 1) learners' background information, 2) participation in the peer review activity, 3) providing feedback to peers, 4) receiving peer feedback, and 5) perceptions regarding the peer review activity. The details regarding the study were provided to the participants at the beginning of the questionnaire and consent was taken from them to ensure voluntary participation. After analysing these quantitative data, an in-depth interview was conducted to gather qualitative data, with some volunteered sixteen (16) learners, through zoom video conferencing. The interview schedule consisted of standardized open-ended questions with some probing questions. Each zoom interview was recorded for reference.

A combination of results were interpreted after analysing both quantitative and qualitative data.

4. Results and Discussion

Out of 38 learners who followed the course, 29 learners participated in the peer review activity, and only 25 learners responded to the questionnaire.

4.1. Learners' background information

Out of the 25 learners who responded, the majority (92%) were female nurses. A great majority of them (96%) were working in hospitals across the country and only one learner (4%) was working at an office of a Medical Officer of Health (MOH). More than 50% of the learners were in 30-40 years of age (Table 1), and 72% learners have worked as a nurse for more than five years (Table 2). It is interesting to note that 16% of them were well experienced nurses having work experience of more than 16 years.

Table 1. Age groups of the learners

| Age Group | Number | Percentage |
|-----------|--------|------------|
| 25 - 30 | 5 | 20% |
| 31 - 35 | 10 | 40% |
| 36 - 40 | 4 | 16% |
| 41 - 45 | 4 | 16% |
| 46 - 50 | 2 | 08% |

Table 2. Learners work experience as a nurse

| Work experience in years | Number | Percentage |
|--------------------------|--------|------------|
| 01 - 05 | 7 | 28% |
| 06 - 10 | 9 | 36% |
| 11 - 15 | 5 | 20% |
| 16 - 20 | 4 | 16% |

These results show that the learners engaged in the peer review process were experienced adult nurses, who are capable of participating in a peer review process. According to the ZPD a 'more knowledgeable other' is more suitable to be engaged in the scaffolding process. Although all learners are still in the same level of learning, having more experienced nurses in their profession would have added positive influence in providing feedback in the peer review process.

As far as the use of computers for learning in the online course is considered, learners have used mobile phones, desktop computers and laptops (Figure 2). Majority of them have used mobile phones to engage in the learning process. Lot of students in the higher education institutions in Sri Lanka have used mobile phones (smart phones) in learning online during the pandemic, though not very conducive for reading course material, writing assignments, and engaging in quizzes in the learning management system (Hayashi et. al. 2020)

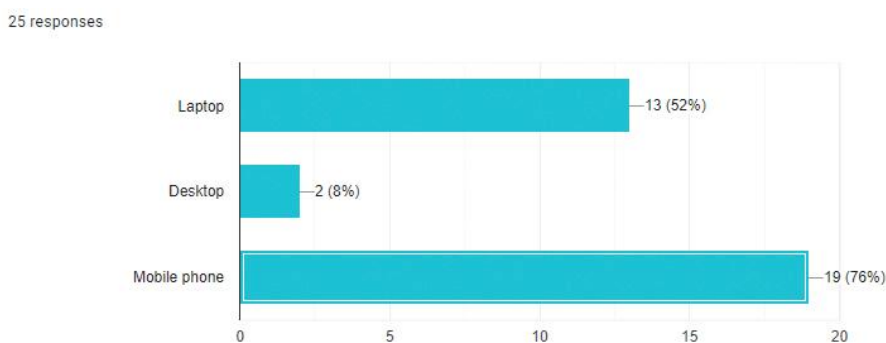


Figure 2 . Use of computer, mobile phone or laptop in learning online.

4.2. Participation in the peer review activity

Out of the 25 learners who responded, only 23 (92%) learners had participated in the online peer review activity. The two learners who could not engage in the peer review activity had stated that it was due to the connection problem of the mobile phone, and time restriction due to the clinical work at hospitals, that they could not complete the activity. It was also revealed during the interviews that learners had faced many challenges in providing nursing services at hospitals due to the pandemic, while complying with safety and protection instructions.

A great majority of learners (92%) stated that this was their first time participating in an online peer review activity. During interviews learners said that the peer review practice session conducted in the online course became very useful in engaging in the peer review activity. This means that the practice session conducted before beginning the PRA served as a scaffolding activity that enabled the learners to engage in the task easily.

4.3. Providing feedback to peers

Questionnaire results also indicated the status of learners providing feedback to their peers (Figure 3).

4. Did you give feedback to your peers?

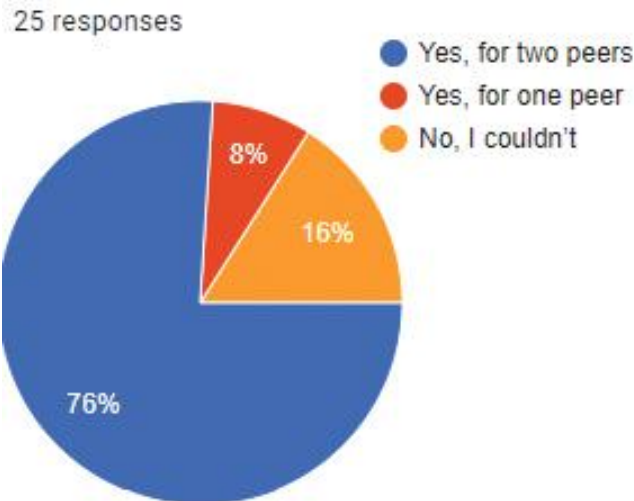


Figure 3. Status of giving feedback

According to Figure 3, 76% of learners have successfully reviewed two of the peer submissions, while only 8% have reviewed only one peer submission. Sixteen percent (16%) have not given any feedback.

During interviews, learners expressed how they prepared themselves to provide feedback.

‘Although I have submitted my draft answer, before providing my feedback to others, I read the course material again. I carefully checked the peer review rubric, because I felt providing a proper feedback is a great responsibility to guide others in their learning’ (S15/F)

‘I wrote the review reports, but my English was not so good. Therefore I showed my handwritten reviews to one of my friends who is an English teacher, and got my English and grammar mistakes corrected before submitting.’ (S14/F)

‘I felt so serious when writing reviews, rather than writing my own answer. Reading others’ answers made me feel where I am.’ (S7/M).

These responses show how learners became accountable for others’ learning. It had become a reflective exercise for them to take responsibility for their own learning as well as for the others’ learning. English being the medium of instruction and being the second language of the learners, some learners have sought assistance from a ‘more knowledgeable peer’ as described in ZPD, to provide reviews with greater clarity. Hence in the process of providing feedback itself, learners have encroached the ZPD by engaging in reflective learning, by means of reading others’ answers, going through the learning resources more meaningfully before giving feedback, reflecting on their own answers while comparing with others, and seeking assistance in providing clarity feedback.

4.4. Receiving peer feedback

As far as receiving feedback is considered, 64% have received two peer reviews while only 8% of learners have received only one peer review (Figure 4).

5. Did you receive feedback from your peers?

25 responses

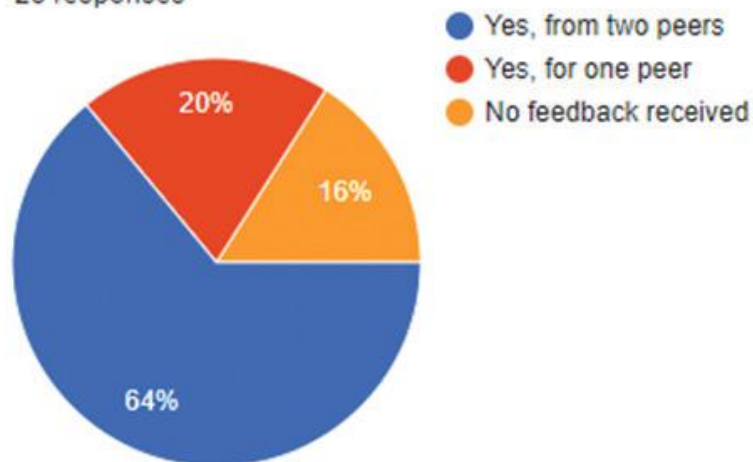


Figure 4. Status of receiving peer feedback

Interview results indicated learners' motivation in receiving constructive feedback to improve their answers.

'I received excellent feedback. It made me think from different angles, which I could not do when I was writing my original answer'. (S3/F)

'I realised my answer was incorrect only when I received feedback from my colleagues. But I could submit a correct answer finally, thankful to the review comments provided by them' (S6/F)

From these responses, it is apparent that learners could take corrective measures by engaging in the PRA. It had enabled them to co-construct knowledge even though they were in isolation. In addition, the PRA had made them re-visit their learning exercise and get a solid understanding of their work, by valuing others perspectives, without overestimating or underestimating their own work. Therefore this activity has enabled learners to expand their spheres of learning through social interactions.

After receiving feedback, 80% of learners have modified their original submissions, while 20% of learners have not modified their original answers (Figure 5).

6. Did you modify the answer based on your peers' comments?

25 responses

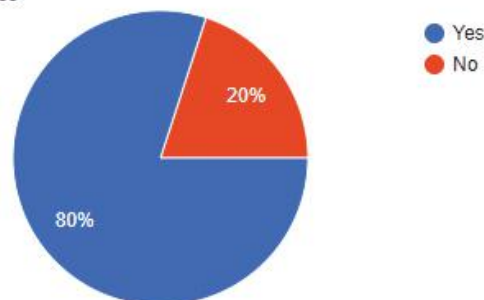


Figure 5. Status of learners modifying their original answer after receiving feedback from peers.

Interview data indicated learners' enthusiasm having a second chance to improve their answers.

'Having a second chance to improve my answer is great. I think we should have more peer review activities, so that we get a thorough knowledge on what we are expected to learn. (S3/F).

Those who did not modify their original submissions, indicated that they were confident of their original submission, and thought that they had provided a complete answer.

'I knew my original answer was correct and that was affirmed by the teacher's comments on my reviews to others' (S2/F)

'It made me critically analyse my answer again, by receiving two different view points on my submission from the two peers, and comments from the teacher regarding my reviews to others. Finally I did not change my answer'. (S10/F)

These results indicate that learners had developed metacognitive skills to think more critically about their own work, having several chances to look back on their learning. In addition, learners had relied on the 'teacher' when they encounter an ambiguous situation. Therefore it is crucial having a 'more knowledgeable other' in the scaffolding process to internalise explicit knowledge.

4.5. Perceptions regarding the peer review activity

Table 3 indicates learners' overall perceptions regarding the PRA.

Table 3. Learners' perceptions on the peer review activity

| Statement | Strongly agree | Agree | Neutral | Disagree | Strongly disagree |
|--|----------------|-------|---------|----------|-------------------|
| | % | % | % | % | % |
| I learned how to give feedback to peers in this activity | 40% | 48% | 12% | 0% | 0% |
| I had the chance to interact with other without being solitary in my learning | 36% | 48% | 8% | 4% | 0% |
| The allocated time to complete the peer review activity was adequate | 28% | 64% | 8% | 0% | 0% |
| Peer review activity made me more engaged in learning | 32% | 56% | 12% | 0% | 0% |
| Peer review activity made me submit a better answer than in an individual submission | 32% | 60% | 12% | 0% | 0% |
| I felt comfortable in using technology in this activity | 20% | 56% | 24% | 0% | 0% |
| I appreciate introducing a novel technology based assessment compared to traditional onsite assessment | 32% | 56% | 8% | 0% | 0% |
| This activity gave me a different approach that motivate me to learn | 36% | 52% | 12% | 0% | 0% |
| I propose more of peer review activities in the other courses of the nursing degree programme | 32% | 52% | 16% | 0% | 0% |

All these questionnaire results skewed towards agreeing or strongly agreeing, indicating: learners' motivation and appreciations towards the PRA, how they have developed various skills in the learning process, while proposing more PRA activities in the Nursing degree programme. It has made learners' to interact with their peers breaking the social isolation due to COVID 19 pandemic in achieving the learning goals. Although a technology based PRA was introduced for the first time in this course, learners have positively reacted towards it, and have proposed continuing it, even though with limited facilities available to access the Internet.

5. Conclusion

In this study, the PRA was used as an AaL where the learners are involved in the assessment task as a part of learning, giving more emphasis on feedback and reflections. By and large, the PRA was well perceived by the learners, having five opportunities to critically analyze their learning, i.e., reading two peer answers before giving feedback, receiving two peer reviews on their draft submission, and receiving teacher's comments on the reviews given by them. Hence learners had a greater chance to read, reflect and think more widely on his/her own learning.

Learner's cognitive development was influenced through social interactions by the involvement of peers and the teacher in a technology enabled environment, enabling learners to gradually move into the ZPD. The in-

volvement of a ‘more knowledgeable other’ in the process of moving into the ZPD, was represented by various means in this study, i.e., by the teacher, the capable peers among other peers, and also the inanimate analytical rubric provided to build the answer. These provisions were exposed as scaffolding agents especially when the task became challenging and ambiguous for the learners.

In addition the PRA had served as a catalyst to learning during the COVID 19 pandemic, breaking the social isolation of learners. Especially, these learners being the nursing undergraduates who were working under tremendous pressure, and having little time to spare on their learning due to pandemic, had immensely benefited to continue their studies, by interacting with peers in an online learning environment. Hence this study throws lights to continue such learning opportunities even after the pandemic, strengthening distance education.

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311-Authenticating the Direct-Indirect Impacts of Learning Materials Quality on Students' Experiences in ODL Outlooks

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Abstract

The central attention of this inquiry was to investigate the associations between learning materials quality and students' experiences in open-distance learning (ODL) perspectives. The study predominantly aimed at authenticating and exploring both the direct and indirect impacts of learning materials quality on student satisfaction, persistence, and loyalty. Additionally, other related objectives, in the ODL context, were to: (1) Examine the direct impacts of cognitive presence, teaching presence, social presence, pedagogical presence, and interactivity presence on student satisfaction, persistence, and loyalty, (2) Investigate the mediating role of learning material quality in the relationship between independent variables and student experiences, (3) Authenticate the importance of learning material quality in fostering positive student experiences and behaviors, and (4) Address potential research gaps in the existing literature and contribute new insights to the field. These objectives were substantially interrelated to the following three main queries, in the ODL framework, they were: (1) What role did learning materials quality play in shaping students' perceptions of the overall educational program and institution? (2) Was there any moderating variable that influences the relationships between learning materials quality and students' satisfaction, persistence, and loyalty? (3) What implications did the findings have for the design and development of learning materials and how can they be improved to enhance student satisfaction, persistence, and loyalty? Methodologically, this study applied a mixed method, i.e., an exploratory study. This approach essentially investigated the direct and indirect impacts of learning materials quality on students' satisfaction, persistence, and loyalty in ODL settings. Having executed serial focus group discussions and the survey then the qualitative and quantitative data were harmoniously gathered by involving ODL faculty and students. The study was implemented at Universitas Terbuka. Through the qualitative procedure, the study decisively established nine prime variables. They are categorized as independent, moderating, and dependent variables. Then the study examines quantitatively the nine variables, consisting of five independent variables (the presence of cognitive, teaching, social, pedagogical, and interactivity), with a moderating variable (learning material quality), and three dependent variables (student satisfaction, persistence, and loyalty). By inclusive consideration through both qualitative and quantitative approaches, the study predominantly indicated that student satisfaction, persistence, and loyalty were hypothetically and provincially originated and authenticated by those five presences and moderated by learning materials quality. Furthermore, the study ominously signified that interactivity presence was conditionally the most influential factor leading to a confirmed student experience, i.e., student persistence.

Keywords: ODL, educational experience, interactivity presence, student persistence, exploratory design.

1. Introduction

The main focus of the study is to investigate the relationships between learning materials quality and students' satisfaction, persistence, and loyalty in open-distance learning outlooks (ODL). Correspondingly, the study aspires to authenticate and explore both the direct and indirect impacts of learning materials quality on these important student outcomes.

The main focus and aspiration mentioned above are closely related to an effort of anticipating several open and continual questions on this topic. It is recognized that there remain queries on how learning materials quality is defined and measured in an ODL setting. It is also applicable to searching for an answer on what are the key dimensions and components of learning materials quality that influence students' satisfaction, persistence,

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and loyalty (Sembiring, 2014). The next query related to the answer on what is the direct impact of learning materials quality on students' satisfaction from an ODL perspective. Additionally, how does learning materials quality directly influence students' persistence and their decision to continue their studies? (Sembiring, 2017).

Moreover, it is relatable to find responses towards doubt on what are the mediating factors or processes that explain the indirect impacts of learning materials quality on students' satisfaction, persistence, and loyalty. Besides, it needs to find appropriate reactions to how students perceive the quality of learning materials and their relevance to their learning experiences and outcomes in ODL (Sembiring, 2018). Similarly, suitable responses are needed to disclose practical elucidation on what role learning materials quality plays in shaping students' perceptions of the overall educational program and institution in ODL.

Having reflected on the previous probes, the following three inquiries become critical, namely: (1) Are there any moderating variables that influence the relationships between learning materials quality and students' satisfaction, persistence, and loyalty in the ODL milieu? (2) How do individual characteristics, such as prior experience, self-regulation, and learning preferences, interact with the impact of learning material quality on student outcomes? (3) What implications do the findings have for the design and development of learning materials in ODL and how can they be improved to conclusively enhance student satisfaction, persistence, and loyalty? These inquiries to a certain extent were detected by Song, Singleton, Hill, and Koh (2004), Taylor (2001), and Tinto (1993).

All queries and doubts mentioned above actually arise as there are several gaps that must be satiated in this field. It should be suspected that there are several gaps that occur in this field of study, among others: (1) Limited research on the direct and indirect impacts of learning materials quality on student satisfaction, persistence, and loyalty in ODL outlooks, (2) Insufficient exploration of the mediating role of learning material quality in the relationship between independent variables and student outcomes, (3) Lack of comprehensive studies examining the combined influence of cognitive presence, teaching presence, social presence, pedagogical presence, and interactivity presence on student satisfaction, persistence, and loyalty in open-distance learning, and (4) Inadequate attention to the specific aspects of learning materials that contribute to quality and enhance student experiences in open-distance learning (Bolliger & Wasilik, 2009; Darling-Hammond, Flook, Cook-Harvey, Barron & Osher, 2020; Karagul, Seker & Aykut, 2021; Kuo, Walker, Belland & Schroder, 2013).

It is therefore significant to concisely explore related concepts as the theoretical background to find answers and then mend the existing gaps. In general, here are some key areas to consider, namely: (1) The ODL theories and frameworks, (2) Research on learning materials quality and its impact on student outcomes, (3) Studies focusing on student satisfaction, persistence, and loyalty in open-distance learning, (4) Literature related to cognitive presence, teaching presence, social presence, pedagogical presence, and interactivity presence in online learning environments, (5) Mediation models and theories in educational research, and (6) Relevant studies on mixed-methods research designs and exploratory approaches especially in education field (McTee, 2010; Picciano, 2002; Richardson & Swan, 2003; Shea & Bidjerano, 2010). Rossi, 2018; Schwab, 2016; Creswell & Plano Clark, 2018; Stroud, Green & Cronje, 2020).

In a more specific expression, here are the nine preferred and selected theoretical concepts that were adapted and incorporated as the conceptual framework of the inquiry. The first is the Community of Inquiry Framework. This framework emphasizes the importance of three types of presence in the online learning environment: cognitive presence, teaching presence, and social presence. It aligns well with the independent variables, i.e., cognitive presence, teaching presence, social presence (Garrison, Anderson & Archer, 2000; Garrison, 2009), and interactivity presence (Sembiring, 2021).

The second is the Technology Acceptance Model (TAM). TAM explores how users perceive and accept technology. In this inquiry, it could be recognized how students' perceptions of interactivity presence influence their satisfaction, persistence, and loyalty toward the learning materials and the overall learning experience (Scherer, Siddiq & Tondeur, 2019; Granić & Marangunić, 2019). The third is Expectancy-value Theory. This theory focuses on how individual beliefs about the outcomes of activity and the value they place on those outcomes impact their engagement and persistence. This view evidently relates to student satisfaction, persistence, and loyalty in the context of open-distance learning (Eccles & Wigfield, 2002; Wigfield & Cambria, 2010). The fourth is Self-determination Theory (SDT). SDT explores the role of intrinsic and extrinsic motivation in driving behavior. This is obviously relatable to understanding how different types of presences and learning material quality contribute to students' autonomous motivation, which in turn affects their satisfaction, persistence, and loyalty (Hui & Tsang, 2012).

The fifth is Flow Theory. Flow refers to a state of optimal engagement and immersion in an activity. It can be applied to understand how the presence of interactivity and the quality of learning materials contribute to creating a flow experience for students. This is in turn ultimately influencing their satisfaction and persistence (Nakamura & Csikszentmihalyi, 2014). The sixth is Social Cognitive Theory. This theory emphasizes the role of observational learning and social interactions in shaping behavior. It could be relevant to the social presence aspect to comprehend how interactions with peers and instructors influence student satisfaction, persistence, and loyalty (Middleton, Hall & Raeside, 2019). The seventh is Cognitive Load Theory. This theory focuses on the cognitive demands placed on learners during the learning process. This truly relates to the cognitive presence and pedagogical presence variables, exploring how the design of learning materials affects cognitive load, and then subsequently impacts student outcomes (Paas & van Merriënboer, 2020).

The eighth is the Theory of Planned Behavior. This theory examines the relationship between attitudes, subjective norms, perceived behavioral control, and behavior. This is an exceptionally proper framework to explore how students' attitudes toward different presences and learning material quality influence their intentions to persist and remain loyal to the ODL environment (Ajzen, 2011). The ninth is Loyalty Models from Marketing: Concepts from customer loyalty models, such as the Loyalty Ladder or the Customer Lifetime Value obviously can provide insights into understanding how student loyalty develops over time and how it is influenced by their satisfaction and persistence (Boudet, Huang, Rothschild & von Difloe, 2020; Shalvi, 2022; Kopp, 2023).

All of those brief descriptions, of each theoretical concept, explain its relevance to the research and how it informs the relationships between the variables involved. Incorporating these theoretical backgrounds enhances the theoretical foundation of the inquiry and provides a robust framework for interpreting the findings through valid and reliable methods.

After paying close attention and considering the previous description comprehensively, this inquiry is expected to achieve and fulfill the main and additional objectives. In general, this inquiry mainly aims at authenticating and exploring both the direct and indirect impacts of learning materials quality on student outcomes. In particular, this inquiry specifically aims to: (1) Examine the direct impacts of cognitive presence, teaching presence, social presence, pedagogical presence, and interactivity presence on student satisfaction, persistence, and loyalty in ODL settings, (2) Investigate the mediating role of learning material quality in the relationship between independent variables and student outcomes, (3) Authenticate the importance of learning material quality in fostering positive student experiences and behaviors in ODL, and (4) Address the research gaps in the existing literature and contribute new insights to the field of ODL.

2. Methods

Methodically, for simplicity reasons, this inquiry focuses on the following main aim and questions that will guide the study to select a robust approach and orientation to find the ultimate answer for both the objectives and for mending the gaps. Referring to the focus and objectives to be achieved formerly elaborated, this inquiry employs an exploratory design that integrates qualitative and quantitative methods to gain a comprehensive understanding of the relationships between variables and explore the experiences and perceptions of students in an ODL milieu (Creswell, 2015).

To achieve that, this inquiry establishes a 12-Syntax Procedure by reflecting a qualitative method as inspired by and modified from Whittmore and Knafelz (2005), Williams, (2018), Onwuegbuzie and Frels (2015), and Snyder (2019). This inquiry subsequently comes to the following techniques and syntaxes.

1. Define the research questions and objectives.
2. Conduct a comprehensive literature review to establish theoretical foundations.
3. Design a mixed-method research approach, combining qualitative and quantitative data collection methods.
4. Select an appropriate population and sample size of students in ODL programs.
5. Collect quantitative data through surveys (assessments) to measure variables consisting of foundational literacies, core competencies, and character qualities.
6. Collect qualitative data through interviews, focus groups, or open-ended questionnaires to gain insights into student experiences and achievements.

7. Analyze the quantitative data using statistical techniques, i.e., PLS-SEM, to identify and validate hypotheses on analyzing the relationships among variables involved.
8. Analyze the qualitative data using thematic analysis to identify recurring patterns and themes.
9. Integrate the qualitative and quantitative findings to comprehensively understand and answer the stated research questions.
10. Use mediation analysis techniques to examine the role of the 21st-century great human beings.
11. Discuss the findings, draw connections between variables, and address the research gaps identified.
12. Establish concluding remarks by summarizing the main findings, suggesting practical recommendations, stating limitations, and proposing future research directions.

Having been defined by reflecting on the research questions and objectives as well as conducting a comprehensive literature review, including a series of focus group discussions, the study identifies nine nominated variables that are engaged. Conceptually, it includes cognitive presence, teaching presence, social presence, pedagogical presence, and interactivity presence. These first five variables are referred to as independent variables. The second variable, learning material quality, is referred to as a mediating variable. The third three variables, i.e., student satisfaction, student persistence, and student loyalty, are referred to as the dependent variables.

Each variable involved has its own specific attribute. Each variable has three attributes accordingly. Having processed collecting qualitative data through interviews, a series of focus group discussions, including open-ended questionnaires, and analyzing the qualitative data using thematic analysis in accordance with the patterns, the inquiry comes to the conceptual and operational framework as illustrated in Figure 1.

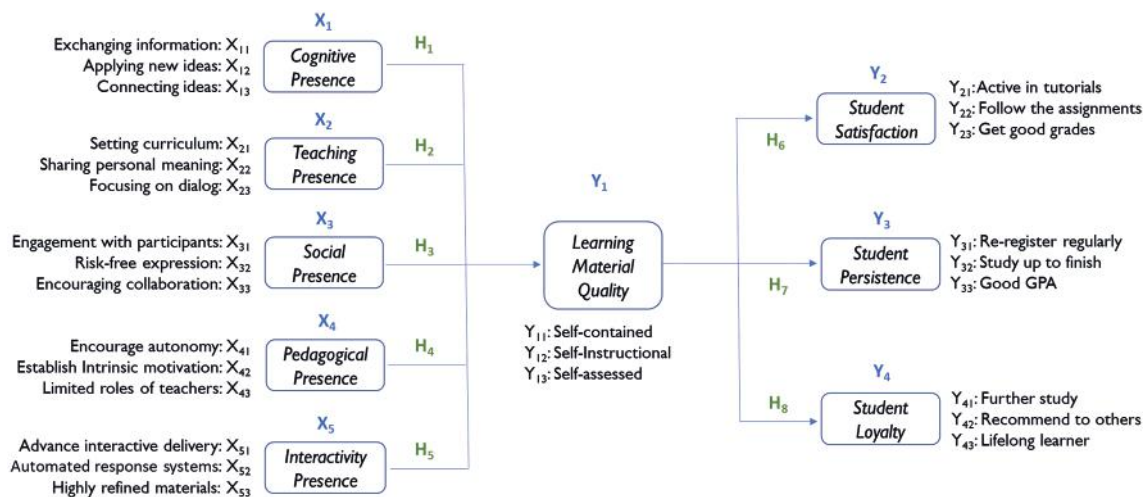


Figure 1. The Conceptual Framework of the Study

3. Findings

Refer to Figure 1. Operationally, Cognitive Presence (X₁), as the first independent variable out of five, includes: Exchanging Information (X₁₁), Applying New Ideas (X₁₂), and Connecting Ideas (X₁₃). Besides, Teaching Presence (X₂), as the second independent variable out of five, includes: Setting Curriculum (X₂₁), Sharing Personal Meaning (X₂₂), and Focusing on Dialog (X₂₃). In addition, Social Presence (X₃), as the third independent variable out of five, includes: Engagement with Participants (X₃₁), Risk-free Expression (X₃₂), and Encouraging Collaboration (X₃₃). Correspondingly, Pedagogical Presence (X₄), as the fourth independent variable out of five, includes: Encourage Autonomy, (X₄₁), Establish Intrinsic Motivation (X₄₂), and Limited Roles of Teacher (X₄₃). Moreover, Interactivity Presence (X₅), as the fifth independent variable out of five, includes: Advance Interaction Delivery (X₅₁), Automatic Response System (X₅₂), and Highly Refined Materials (X₅₃).

Respectively, Learning Material Quality (Y₁), as a moderating variable, includes: Self-contained (Y₁₁), Self-instructional (Y₁₂), and Self-assessed (Y₁₃).

In contrast, Student Satisfaction (Y₂), as the first dependent variable out of three, includes: Active in Tutorials (Y₂₁), Following the assignments (Y₂₂), and Getting Good Grades. Likewise, Student Persistence (Y₃), as the

second dependent variable out of three, includes: Re-register Regularly (Y_{31}), Studying up to Finish (Y_{32}), and Getting a Good GPA (Y_{33}). Equally, Student Loyalty (Y_4), as the third dependent variable out of three, includes: Further study (Y_{41}), Recommending to Others (Y_{42}), and Lifelong Learner (Y_{43}).

Operationally, this inquiry establishes eight hypotheses. The hypotheses, based on the methods remodeled, are analyzed and validated statistically with the help of PLS-SEM (Hair, Hult, Ringle & Sarstedt, 2022; Batista-Toledo & Gavilan, 2023). The established hypotheses, again, can be better comprehended by perceiving Figure 1. It was methodically hypothesized that Learning Material Quality (Y_1) is influenced by: (1) Cognitive Presence (H_1), (2) Teaching Presence (H_2), (3) Social Presence (H_3), (4) Pedagogical Presence (H_4), and (5) Interactivity Presence (H_5). Simultaneously, (6) Student Satisfaction (H_6), (7) Student Persistence (H_7), and (8) Student Loyalty (H_8) are influenced by Learning Material Quality (Y_1).

Under this process and approach, the study hypothetically discovers the impact of those variables on students' ultimate outcomes and their achievements as active students in a digital and disruptive global society. Through a comprehensive analysis in the *initiation* stage of qualitative and quantitative attempts, this study principally and *for the time being* unveils that student satisfaction, persistence, and loyalty in ODL settings are influenced by cognitive, teaching, social, pedagogical, and interactivity presence mediated by learning material quality variable.

The results also suggest that students predominantly were able to experience the implications of learning material quality for their future success in the ODL systems. The *interim* findings mentioned above are largely viewed from the following standpoints. They are ODL outlooks, the community inquiry framework, the technology acceptance model, the expectancy-value theory, self-determination theory, flow theory, social cognitive theory, cognitive load theory, the theory of planned behavior, and loyalty models from the field of marketing (Belawati, 2019; Sembiring, 2021; Garrison, 2009; Scherer, Siddiq & Tondeur, 2019; Wigfield & Cambria, 2010; Hui & Tsang, 2012; Nakamura & Csikszentmihalyi, 2014; Middleton, Hall & Raeside, 2019; Paas & van Merriënboer, 2020; Ajzen, 2011; Boudet, Huang, Rothschild & von Difloe, 2020).

4. Discussions and Conclusions

Consult again to Figure 1. Predictive interim results and arguments for the established eight hypotheses can be elaboratively rationalized as follows.

1. Cognitive Presence (H_1) and Learning Material Quality (Y_1): The results indicate a statistically significant positive relationship between cognitive presence and learning material quality. This implies that when students perceive higher cognitive engagement and depth in their learning materials, it positively impacts the quality of their learning experience.
2. Teaching Presence (H_2) and Learning Material Quality (Y_1): The analysis demonstrates a significant positive association between teaching presence and learning material quality. This suggests that effective instructor involvement and guidance in the learning materials contribute to improved material quality and subsequently better student experiences.
3. Social Presence (H_3) and Learning Material Quality (Y_1): The findings reveal a meaningful positive correlation between social presence and learning material quality. This implies that learning materials designed to foster social interactions and connections positively influence the perceived quality of the materials and, consequently, student experiences.
4. Pedagogical Presence (H_4) and Learning Material Quality (Y_1): The study establishes a significant positive connection between pedagogical presence and learning material quality. This suggests that well-structured and pedagogically sound learning materials contribute to their overall quality and enhance student experiences.
5. Interactivity Presence (H_5) and Learning Material Quality (Y_1): The results indicate a statistically significant positive relationship between interactivity presence and learning material quality. This implies that interactive elements within the learning materials positively contribute to their quality and subsequently impact student experiences.
6. Learning Material Quality (Y_1) and Student Satisfaction (H_6): The analysis reveals a significant positive influence of learning material quality on student satisfaction. This suggests that higher-quality learning materials lead to increased student satisfaction with their learning experiences.
7. Learning Material Quality (Y_1) and Student Persistence (H_7): The findings demonstrate a significant positive impact of learning material quality on student persistence. This implies that better learning materials contribute to higher levels of student engagement and motivation to persist in their studies.

8. Learning Material Quality (Y_1) and Student Loyalty (H_8): The study establishes a significant positive relationship between learning material quality and student loyalty. This suggests that quality learning materials contribute to fostering a sense of attachment and loyalty among students towards the educational institution or program.

Specifically, it is conjectured the inquiry ominously signified that interactivity presence was conditionally the most influential factor leading to a confirmed student experience, i.e., student persistence. It means the study proposes the level of interactivity presence is a crucial determinant in shaping students' experiences and persistence in ODL environments. The inquiry then suggests that higher interactivity presence significantly contributes to enhanced student engagement and, consequently, greater persistence. By examining the direct and indirect effects of learning materials quality, the inquiry establishes a strong link between interactivity, student experiences, and persistence, highlighting the pivotal role of interactive elements in fostering positive and sustainable good experiences within the ODL outlook.

Critical Remarks, Limitations, and Future Directions:

The study's findings could be limited by the specific demographics and characteristics of the sampled participants. Future research could aim for a more diverse and representative sample to enhance the generalizability of the results. It is then important to cautiously consider an issue of sample bias and generalizability. The study's reliance on self-reported data might introduce response bias and social desirability effects. Combining self-report data with objective measures or behavioral data could provide a more comprehensive understanding of the relationships. It is then appropriate to prudently avoid misleading on the use of self-report measures.

The study may not have considered all potential contextual factors that could influence the relationships under investigation. As highlighted by Anderson and Dron (2011), future studies could explore additional variables that might interact with or moderate the examined associations. This means paying close attention to contextual factors is required. There might be additional variables not included in the study that could impact student experiences. Exploring novel factors or potential mediating variables could enrich the understanding of complex relationships (Valladares, 2021). Delving into unexplored variables is then essential to responding to the six megatrends viewed from the educational anticipation movement (Vielmetter & Sell, 2014).

The current study offers a snapshot of relationships. Conducting longitudinal research could provide insights into how these relationships evolve over time and how learning material quality influences student experiences across different stages of their education. Planning and conducting longitudinal studies is then a necessity.

Complementing quantitative findings with qualitative insights could offer a richer understanding of the mechanisms underlying the relationships and provide deeper insights into student experiences. Qualitative exploration is, again, a necessity. Additionally, Consideration of the specific context in ODL is crucial. Future research could compare these findings with other educational modalities to assess the generalizability of the results. It implies that an external validity expert is indispensable.

Practical Implications: Future research could delve into practical strategies and interventions that institutions can implement to enhance learning material quality, thereby positively influencing student experiences and outcomes. By addressing these limitations and pursuing these future directions, this study can contribute even more comprehensively to the understanding of the direct and indirect impacts of learning material quality on student experiences in the context of ODL.

To sum up, this inquiry conditionally offers a comprehensive exploration of the intricate relationships between learning material quality and key dimensions of student experiences in the context of ODL. By systematically investigating direct and indirect influences, as well as the mediating role of learning material quality, the study sheds light on the pivotal role that well-designed and engaging learning materials play in shaping student satisfaction, persistence, and loyalty.

The findings tentatively underscore the significance of cognitive presence, teaching presence, social presence, pedagogical presence, and interactivity presence as crucial contributors to learning material quality. Furthermore, the study to a certain extent authenticates the essential role of learning material quality in fostering positive student behaviors and experiences. Through meticulous statistical analysis, the study provides empirical evidence that supports the established hypotheses and contributes to the existing literature by addressing research gaps and introducing new insights.

As educational landscapes continue to evolve, the implications of this research extend beyond academia. Institutions and educators can leverage the findings to enhance instructional design practices, cultivate supportive online learning environments, and bolster student engagement and success. By acknowledging the intricate interplay between learning material quality and student experiences, this study contributes to the ongoing advancement of effective ODL methodologies. It also offers a valuable resource for future researchers and practitioners seeking to optimize the learning journey for students in ODL outlooks with respect and to precede 21st-century demands (Wordu, 2022).

“You can teach a student a lesson for a day. But if you can teach him to learn by creating curiosity, he will continue the learning process as long as he lives. That is genuinely an educational experience. Be wise and alert, a man without education is like a bird without wings!”

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317-Interactive Learning Material in ODE: Its Development and Implementation in Management Information System Course

Durri Andriani¹

Abstract

This paper describes the development of interactive learning materials (ILMs) used in Management Information Systems (MIS) course offered in the Economics Education Study Program, Faculty of Education and Teacher Training, Universitas Terbuka (UT), Indonesia. The development of information and communication technology (ICT) as well as the increasing mobility of students require distance education institutions to develop ways of delivering learning materials to be more in line with the students' needs. For this reason, since 2019, UT has developed ILMs which allow students to interact with learning materials by utilizing increasingly advanced ICT. At the same time, UT has to take into account the differences in students' abilities to operate ICT and the availability of Internet in student residences. AR is used to provide a richer learning experience to students. With AR, students can learn material more freely because they can interact directly with the topics being studied. They can enter the AR program and try different approaches to studying the topic according to their needs. Meanwhile Audio and video are included in ILMs to cater the needs of students whose areas of residence do not or lack adequate internet facilities so they cannot access AR. Through audio and video, students are expected to be able to learn the materials. One of the courses equipped with ILM is SIM. The SIM course was chosen for two reasons, first, as the name implies, this course consists of heavy information technology and secondly, students who take this course are teachers who are required to have the ability to utilize ICT in their role as teachers. ILM in the SIM course is translated into a module which is equipped with audio, video and augmented reality (AR) programs for relevant materials selected based on targeted learning objective(s). This paper describes the development of ILM in one topic ("Big Data") which is complemented by four video programs and four AR programs. The pilot project results show that it is easier for students to understand this topic because AR allows students to interact directly with AR programs. It is hoped that this delivery mode could increase students' success in their study.

Keywords: *Augmented Reality Program, Interactive Learning Material, Management Information System course, Universitas Terbuka.*

1. Introduction

In the realm of education, the pursuit of effective instructional methods to accommodate diverse learning styles and engage students is a constant endeavor. In this context, the integration of interactive learning materials in Open and Distance Education (ODE) systems emerges as a promising avenue to address the challenges faced by educators and learners alike. The significance of leveraging interactive learning materials is recognized to enhance the educational experience, particularly in courses such as the Management Information System (MIS) Course.

The need for interactive learning materials (ILMs) stems from the understanding that traditional, passive learning approaches may not cater to the individual needs and preferences of all students. Studies from the Colorado Brookings Institute reveal that active student engagement fosters motivation and interest, as learners find the content more relatable. Interactive learning empowers students to take an active role in their education, instilling confidence and promoting a sense of self-efficacy. Moreover, conventional lecture-based learning often limits opportunities for practice, leading to gaps in comprehension. ILMs, on the other hand, provide ample opportunities for regular practice, reinforcing comprehension and retention (Abykanova et al., 2016; Anouk, 2023).

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In the context of ODE, the advantages of ILMs are even more pronounced. The flexible nature of ODE allows learners to study at their own pace and in their preferred environment, fostering personalized learning experiences (Broadworks, 2022). Furthermore, interactive materials offer scalable and cost-effective training options, making it feasible to cater to a diverse range of learners, including those with varying levels of prior knowledge. By incorporating interactive learning resources in the ODE system, educators can prepare students for subsequent in-person sessions, facilitate consolidation and revision, and bridge potential time-table clashes, enabling a seamless learning experience.

With these advantages in mind, Universitas Terbuka (UT) envisions a comprehensive plan for implementing ILMs, with a specific focus on utilizing augmented reality (AR) technology in the Management Information System (MIS) course offered in Educational Economics (EdEc) Study Program. AR, unlike virtual reality, blends digital information with the user's real-world environment, providing an enriched and interactive learning experience (Carmigniani & Furht, 2011; Gillis, 2022). By leveraging AR, UT aims to further stimulate students' cognitive processes, foster creative abilities, and develop professionally oriented skills under close-to-real conditions. Through AR applications, students will be able to access visual elements, audio, and other sensory information, creating an interwoven experience where digital information overlays and enhances their perception of the subject matter (University of Bristol, 2023).

This paper delves into the development and implementation of interactive learning materials in ODE, with a specific focus on the integration of AR within the MIS course. It explores the various advantages of ILMs in the ODE system and presents a comprehensive plan for leveraging AR technology to elevate the educational experience. The goal is to contribute to the ongoing endeavors to establish an engaging and effective learning environment that fosters academic excellence and student achievement.

1.1. Interactive Learning Materials at Universitas Terbuka

UT defines ILM as the main learning material of each subject designed as a self-contained module and capable of triggering meaningful interactions both in mental and physical learning activities. ILMs is also a self-instructional material which should be able to stimulate students to be actively and totally involved in learning. ILMs is packaged in printed and digital forms (Panduan Pengembangan Bahan Ajar Interaktif, 2019).

The Manual mentions that UT develops ILMs because UT, as a pioneer in the use of Information and Communication Technology (ICT) in distance education, must continuously innovate. Other reasons for the development of ILMs are that it is important to update learning materials and to increase the effectiveness of the student learning process.

Notwithstanding, there are eleven characteristics of UT ILMs, as follows.

- 1) Development Process
Using a systemic and systematic approach
- 2) Engagement Intensity
Integrate user and substance interaction strategies by using in-text questions in the form of prior knowledge tests, assignments and reflections, to intensify students' cognitive involvement and interaction when studying ILM
- 3) Feedback
Provide feedback on each activity provided instantaneously (pop-ups)
- 4) Interaction with learning material
Provides access to interact with the learning material
- 5) Multimedia Integration: Using a layout that integrates multimedia, such as text, illustrations and videos, with a creative and attractive appearance
- 6) Variety of learning resources
Utilize a variety of available learning resources in the form of visual or audio materials, such as journals, OER, and/or your own creations
- 7) Fun learning
Introducing the concept of fun learning by using the principle of 'edutainment' in the form of pictures, illustrations, and/or videos
- 8) Learning material navigation
Provide navigation in teaching materials that provide flexibility to choose the desired topic/section
- 9) Ease of use
Providing convenience in using devices and accessing applications

10) Language

Using popular, informal, and communicative standard Indonesian

11) It can be used in digital or printed form, without any difference in substance

(Panduan Pengembangan Bahan Ajar Interaktif, 2019)

Currently UT has a facility (<https://pustaka.ut.ac.id/lib/ruangbaca/>) where students can access modules by log in using the password assigned to each student (see Figure)

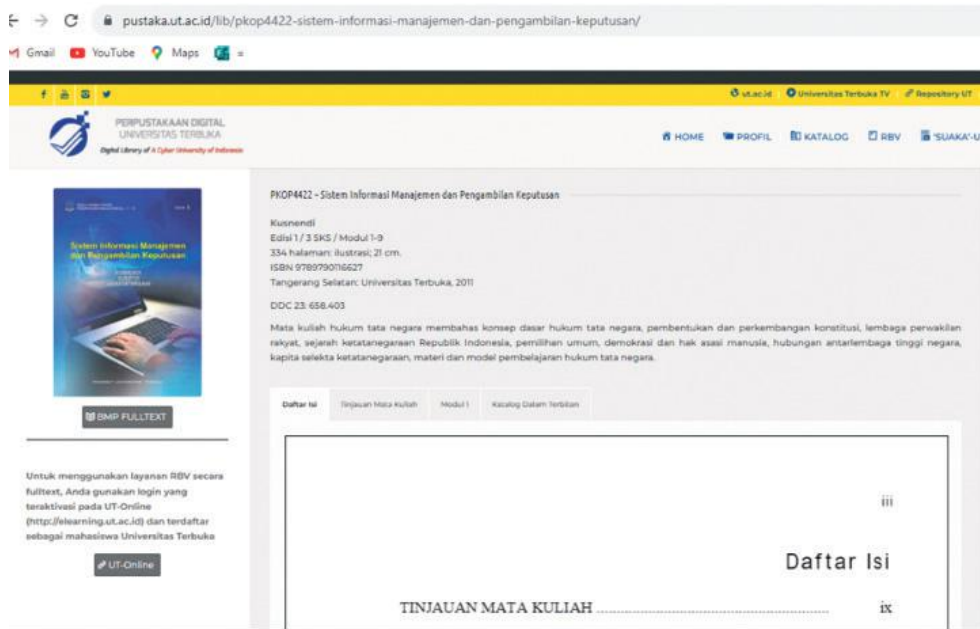


Figure 1. Modul in Ruang Baca Virtual Universitas Terbuka

2. Method

The ILM developed is one topic from the MIS course. The course was chosen for two reasons, namely (1) this course is offered in several study programs and (2) this course utilizes IC. There are four steps in the development of MIS ILM. The first three steps were carried out by the researcher involving MIS experts while the fourth step was carried out by Center for Multimedia Learning Materials Production, UT. Step 1 to Step 3 lasted for 18 months (July 2021- February 2023) and Step 4 is still in progress. The method is presented in Table 1.

Table 1. Method Used in Developing ILM in SIM Course

| No. | Steps | Targeted Output | Method | Implementation time |
|-----|---|---|---|----------------------------|
| 1 | Determine the topic to be developed | One topic is selected to be developed as ILM | Invite three experts to suggest topics to be selected through Delphy Technique | July – August 2021 |
| 2 | Develop ILM design for the selected topic | A set of ILM drafts for the selected topic | Solicit input from three experts to design a ILM of the selected topic through Delphy Technique | September – November 2021 |
| 3 | Develop all parts of ILM | A set of complete parts of ILM for the selected topic | <ul style="list-style-type: none"> • Develop ILM in these aspects • Learning materials • Engagement Intensity • Feedback • Interaction with the LM • Multimedia integration • Variety of learning resources • Learning material navigation • Ease of use • Language | April 2022 – February 2023 |
| 4 | Develop ILM | A complete ILM for one selected topic | Technical production for Final ILM for one selected topic conducted by Center for Multimedia Learning Materials Production - UT | April 2023 - Present |

In steps 1 and 2, three experts from well-known universities in Indonesia were invited to provide input on the alternative topics to be developed for the ILM as well as the completeness of the ILM. Input for the completeness of ILM is carried out taking into account the requirements set by UT. Meanwhile, in Step 3, especially in multi-media development, trials involving students were carried out to see the effectiveness of the media.

2.1. Learning Materials for MIS Course

The learning materials used in the development of this MIS ILM are written as printed learning materials, in UT called as module, written by experts based on the set of blue-print of the MIS course priorly determined by the EdEc Study Program. Modules, although good in content, are not interactive enough for students. The form and content of printed teaching materials for MIS course can be seen in Figure



Figure 2. Printed Learning Material for MIS Course

MIS course has nine modules. Each module consists of one topic and each topic has two to three sub-topics (see Table 2.)

Table 2. Content of MIS course

| Module | Topic | Sub-topics |
|--------|---|--|
| 1 | Basic concept of System and Information Management | 1. Definition of MIS
2. Types and Users of MIS
3. MIS components |
| 2 | Management Decision Making | 1. Definition of Decision Making
2. Steps in Decision Making
3. Decision Making Techniques |
| 3 | Decision Making based on MIS | 1. Decision Category
2. Decision Making Based on MIS |
| 4 | MIS Development | 1. Information System Development
2. Information System Application Development |
| 5 | MIS Control | 1. Disruption to Information Systems
2. Information Control techniques |
| 6 | Ethical and Social Impacts of Using Information Systems | 1. Behavior, morals, and the concept of ethics
2. Ethics in the Information Society |
| 7 | MIS Development in Schools | 1. School Management
2. School MIS Components |
| 8 | Utilization of MIS in Learning | 1. Learning Management
2. Components of MIS in Learning |
| 9 | Utilization of MIS in School Activities | 1. School Profile Information System
2. School Resource Information System |

4. Summary

The essence of the material studied is written in short and concise sentences

5. Formative Test

Open questions to evaluate students' mastery of the learning material using Mentimeter to provide instant feedback on student results

The language chosen for use is good and correct Indonesian with a semi-formal approach. Communication in PSAs is sought in such a way that it is easy for students to understand while at the same time being able to convey the target material in learning

To facilitate ILM development, these five aspects are put together into a table as can be seen in Table 3.

Table 3. ILM for Selected Topic

| Sub-topic | Multimedia Integration | In-Text Activities | Summary | Formative Test |
|--|------------------------|--|--|--|
| (Subject matter explained in the module)
(Fig/Table/Video/ Augmented Reality) | | (in-text questions in the form of prior knowledge tests, assignments or reflections) | (Pointers are given and students are asked to complete them) | (Mentimeter to provide instant feedback) |
| (1) | (2) | (3) | (4) | (5) |
| | | | | |
| | | | | |
| | | | | |

3.3. ILM for MIS Control

Based on the currently available modules, inputs from experts, and the ILM blue-print format, a set of ILM was developed for the topic of "MIS control" which will be used as part of the learning materials for MIS courses. Some figures and tables in the ILM use figures and tables that already exist in the module. However, in the ILM, there are several figures and tables from existing module that are not used and replaced by videos. Meanwhile, new material, "big data", was added. The "big data" material was initially presented in the form of AR programs but during the trial, students voiced their unfamiliarity with the AR program and asked that "big data" also developed videos. Therefore, for the topic "Big Data" videos and AR programs were made. The complete blue-print for ILM in MIS Control is depicted in Table 4.

Table 4. ILM for topic "MIS control" in MIS course

| Sub-topic | Multimedia Integration | In-Text Activities | Summary | Formative Test |
|---|--|---|--|---|
| (Subject matters explained in the Module) | (Figure/Table/Video/ Augmented Reality) | (In-text questions in the form of prior knowledge tests, assignments or reflections) | (Pointers are given in the Module and students are asked to complete them) | (in the form of Mentimeter to provide instant feedback) |
| (1) | (2) | (3) | (4) | (5) |
| A. Disturbances to information systems. | | | | |
| 1. Vulnerabilities and Threats to Information Systems | Figure 5.1 Vulnerabilities and Threats to Information System Security
(Source: Loudon & Loudon, 2018: 324) | <ul style="list-style-type: none"> • What are possible threats to information systems in your school? • Disturbance from within? Outside interference? Intentional interruption? Accidental Interruption? | <ul style="list-style-type: none"> • Disturbance to information based on its nature and source • Computer abuse: definition and consequences • Computer crime: Definition and forms • Electronic Information and Transaction Law | 10 items
Multiple choice |
| | Table 5.1. Threats and Disturbances from within the Organization against Information Systems
(Source: Winarno (2017: 321) | | | |
| | Table 5.2. Threats and Disturbance from outside the Organization to the Information System Winarno (2017: 321) | | | |
| 2. Disruption to Information Systems | Video 5.1. 5Vs in Big Data | <ul style="list-style-type: none"> • How do hackers or crackers interfere with information systems? Explain and give an example. | <ul style="list-style-type: none"> • Electronic Information and Transaction Law • Electronic Information and Transaction Law | |
| | AR 5..1. 5Vs in Big Data | | | |
| 3. Law on Information and Electronic Transactions (ITE) | | <ul style="list-style-type: none"> • Is eavesdropping possible for you in your role as teacher?? | | |

| B. Explain information system control techniques | | | | |
|--|--|---|--|-----------------------------|
| 1. Information system control techniques. | Figure 5.4 General Information System Control (Source: Loudon & Loudon, 2018: 338) | <ul style="list-style-type: none"> What are the main objectives of information security | <ul style="list-style-type: none"> Information system security: definition and use | 10 items
Multiple choice |
| 2. Information System Security | Figure 5.5 Information System Security | <ul style="list-style-type: none"> Find and explain various forms of information system control <p>Try these web:</p> <ul style="list-style-type: none"> http://www.findexamples.com-types-of-captchas http://www.kriptography.science/2017 | <ul style="list-style-type: none"> Information system control: definition, types, and uses Application controls: definitions, categories, flavors and benefits | |
| 3. Information System Control | Video 5.2. Risk in Big data | <ul style="list-style-type: none"> What are the similarities and differences between general controls and application controls in information system controls? | | |
| | AR 5.2. Risk in Big data | | | |
| 4. Information System Control Techniques | | | | |

Integration of the use of multi-media in various forms initially did not use video, only figures, tables, and AR. However, during the trial of utilizing ILM in mid July 2022 (Figure 4.), students voiced their difficulties in accessing AR and asked that videos be provided for material explained through AR. Even though with videos the freedom to surf material is limited, but students state that it is still better than they can't open AR at all. from the results of this trial, a video was developed using the same material as the material presented in the AR.



Figure 4. Piloting the ILM with Students

After the revision, final blue-print for the ILM of e “MIS Control” module in the MIS course are as follows

1. Sub-topic
 - 2 sub-topik
 - 7 subject matters
2. Multimedia
 - 5 Figures
 - 2 Tables
 - 2 Videos
 - 2 AR Programs
3. 7 Intext-activities
4. 2 Set of Summaries
5. 2 Set of Formative test each consists of 10 items

Figure 5. presents examples of multimedia used in the ILM for “MIS Control”

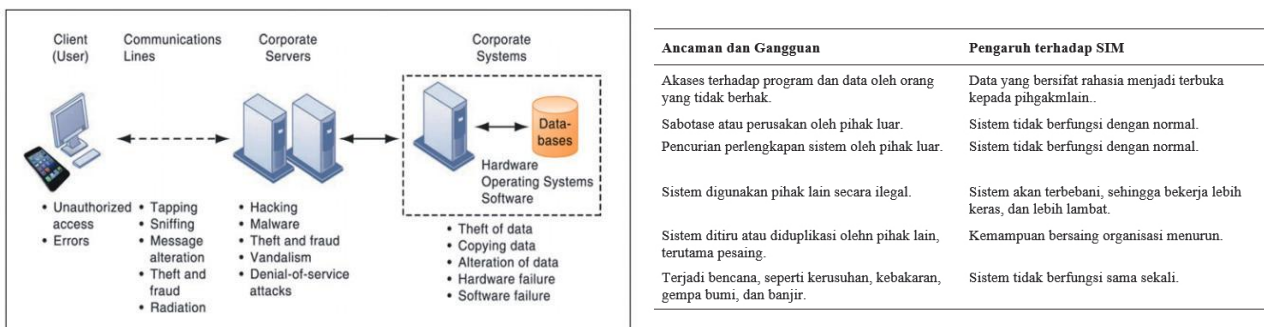


Figure 5. Examples of Multimedia Used in ILM of “MIS Control”

Meanwhile, Table 5. depicted two examples of Formative Test used in the ILM for “MIS Control”. In the interactive module, the Formative Test is delivered with a Mentimeter with the aim of providing immediate feedback for students from the answers given.

Table 5. Example of Formative Tests (in Indonesian Language)

| | |
|--|--|
| 1. Menyebarkan virus atau program ilegal lainnya, merupakan kegiatan yang tergolong ...
A. Computer abuse
B. Computer crime
C. Computer-related crime
D. Computer trade
E. Computer error | 3. Pembatasan akses penghancuran atau pengendalian sampah dokumen, adalah bentuk ...
A. Pengendalian output
B. Pengendalian aplikasi
C. Pengendalian keamanan data
D. Pengendalian pemrosesan
E. Pengendalian input |
|--|--|

4. Discussion and Conclusion

The lesson learned from the ILM development process is that it is necessary to fulfill certain prerequisites in the ILM development process, including:

1. Involvement of many parties, both in material development, multi-media production, and also in production of ILM itself
2. Expertise in the field of science, in educational technology, and in multimedia
2. Understanding of the characteristics of students with different background, abilities of students in utilizing technology, and accessibility of students to the Internet
3. Discipline in following the rules set by the institution, in this case UT
4. Daring to try new things
5. Takes time

However, developing ILM with all its challenges is expected to facilitate students to be more easily and quickly master the learning material.

4.1. Topic Selected to be Developed as ILM

Of the nine topics in the MIS module, with input from experts, it was determined to choose the topic “MIS Control” as the topic to be developed for the ILM. The competency target set for this topic (“Student mastery of situation related to information systems”) requires EdEc Study Program to deliver learning materials in such a way where students have the widest possible opportunity to surf into real situations in controlling and maintaining information systems. This competency requires high interactivity between students and subject matter. By providing a variety of integrated multi-media equipped with in-text activities, and instant feedback from the exercises carried out, the targeted competencies will be more easily achieved. This can be fulfilled by providing AR Programs as one of the media used.

4.2. ILM Design for the Selected Topic

The development of ILM is not yet complete, its effectiveness cannot be evaluated in facilitating student learning. However, from the trials conducted, students expressed satisfaction with the level of interactivity provided by ILM. The simplification of the requirements that must be met in the development of ILM into 5 aspects (sub-topic and subject-matter; multimedia integration in the form of figure, table, video, AR program; in-text activities; summary; and formative test) is expected to motivate others to develop ILMs for other topics and courses.

From the ILM development process, one important lesson is the importance of paying attention to students’ skills in operating computers and their accessibility to the Internet. No matter how perfect and comprehensive the ILMs developed, if students are unable to use them, then the ILMs will be useless.

The way that can be done to overcome this uselessness of ILMs is to provide training for students early in their involvement in ODE institutions on the use of technology. Hence the effort expended to develop ILMs is worth the benefits obtained by students

4.3. ILM for MIS Control

Final materials for the ILM of e “MIS Control” module in the MIS course are developed, consist of 2 sub-topic with 7 subject matters, completed with a set of multimedia comprise of 5 figures, 2 tables, 2 videos, and 2 AR Programs. The ILM also has 7 Intext-activities, 2 sets of summaries, and 2 sets of formative tests developed using Mentimeter.

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318-Open and Distance Learners' Perception Towards Mobile Technology Adoption among Technical and Non-Technical Students in Malaysia

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Abstract

Open and Distance Learning (ODL) is a mode of flexible education that can be implemented through a variety of media that strives to reduce or eliminate barriers to learning which include but are not limited to prior learning, age, social and financial status, job, family responsibility, disability, imprisonment, or other similar impediments. Several higher education institutions have increasingly offered Distance Education (DE) courses and programmes to account for students' diverse learning needs and to keep pace with evolving advanced technology worldwide. These courses and programmes often occur in a virtual learning environment using an online platform which provides access to acquire knowledge and skills and can be implemented via mobile devices such as laptops, tablets, smart phones, and even using metaverse technologies. The success of ODL via mobile technology adoption implemented in higher educational institutions could be different between technical and non-technical students. Hence, the purpose of this study was to examine Open and Distance Learners (ODL) perception towards mobile technology adoption among technical and non-technical students in Malaysia. Transactional distance theory and UTAUT model were selected as the underlying theoretical framework in this study where several pertinent variables have been derived. This study employed a case study design because only limited universities were selected as the research sites. A random sample of 120 students enrolled in distance learning courses taking technical and non-technical courses in several universities was selected. To collect the empirical data, a set of questionnaires and open-ended items were developed and validated in a pilot study. The quantitative data were analysed using descriptive and inferential statistics such as frequency, percentage, mean, standard deviation, and Pearson correlation and the qualitative data were analysed using thematic analysis. The main findings show significant differences between technical and non-technical students in several domains of the study. Based on the findings and the limitations of the study, several implications and the different findings of the study will be discussed and presented.

Keywords: *Open and distance learners (ODL), mobile technology adoption, technical and non-technical students, Malaysia*

1. Introduction

Recently, mobile technology has been used for a variety of purposes, ranging from communication to education. Many educators think that mobile technology has enormous potential to not only improve our educational practices but also to transform traditional learning platforms and classroom learning settings. Indeed, the 2020 Coronavirus pandemic has compelled many of us to try something new and join in the often-confusing process of distance learning. Initially, distance learning entails far more than simply using Zoom, Gmeet, or another online communication tool. Furthermore, it turns without saying that many individuals are turning to and utilising evident types of wireless or mobile technology such as laptops, smartphones and tablets. However, if we take the time to grasp some of the fascinating technologies that are easily available, we begin to realise the high-quality prospects that are open to every one of us. Teaching using new technology necessitates skills that are distinct from those occupied by the majority of ODL instructors. Competencies are descriptive tools that indicate the abilities, knowledge, and behaviour required to execute a position effectively. So far, nothing is known about the competencies that may be required to successfully enable teaching and learning using mobile

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devices. The most complicated task for Open Distance Learning (ODL) institutions is to devise methods for equipping teachers with the essential abilities to properly utilise the affordances of mobile technology to engage students in the learning processes. Mobile devices cannot be used for teaching and learning if the instructors are not qualified and competent to utilise the technology in their work. Alternatively, mobile learning is attributes to the student-centered approach, which focuses on the individual student's experiences, interests, and requirements. The educational method, as the name indicates, places the student at the centre of the learning process. So, it provides more interactive education while also encouraging critical thinking, communication skills, and adaptability in students. This study focuses on the application of mobile technology as a learning approach for open and distance learners (ODL). In the next section, several studies discussed the prospect of incorporating mobile technology adoption into open and distance learning.

2. Literature Review

2.1. Open and Distance Learning in Malaysia

The 'open' nature of distance learning refers to aspects such as policies of open admissions, and freedom of selection of what, when and where to learn (UNESCO, 2003). The development of new technologies has promoted an astounding growth in distance education, both in the number of students enrolling and in the number of universities adding education at a distance to their curriculum (Garrison, 1990). Transactional distance theory encompasses the distance that exists in all educational relationships. The distance is influenced by the amount of dialogue that occurs between the learner and the instructor, and the amount of structure that exists in the design of the course (Moore, 1990). The open learning and distance education system concept emphasises open access to education and training to make the learners free from time and location limitations, as well as delivers flexible learning options to individuals and groups of learners. Offering ODL courses and programmes is consistent with the mission of Malaysia Ministry of Higher Education is a critical effort for the survival of higher learning institutions (Dzakiria & Idrus, 2003). The first local university in Malaysia that conducted distance learning was University of Science, Malaysia (USM). It was started in 1971 and known as the off-campus programme. Then, it was followed by Open University Malaysia (OUM) officially established in 2000.

In response to the pandemic's new normal, Malaysia's higher learning institutions have accelerated their efforts to implement e-learning methodologies, often known as Open and Distance Learning (ODL) practices. ODL is a growing trend for young school leavers, university communities, and the working population to get access to excellent education, provide lifelong learning possibilities, flexible modes of learning techniques, and a conducive learning environment. Online lectures, tutorials, and self-directed online learning are all available to students. Unlike physical examinations, online tests and assignments may even allow students to quickly evaluate their results and receive comments to help them better their next session. A total of nine higher education institutions have been operating primarily as ODL Universities which include Open University Malaysia (OUM) Wawasan Open University (WOU), GlobalNxt University, Asia E-University, Veritas University College, UNITAR International University, Universiti Tun Abdul Razak (UNIRAZAK), Al-Madinah International University (MEDIU) and Genovasi University College. In addition, five premier public universities in Malaysia such as Universiti Sains Malaysia (USM), Universiti Utara Malaysia (UUM), Universiti Malaya (UM), Universiti Teknologi Malaysia (UTM) and Universiti Teknologi MARA (UiTM). Distance learning also plays an important role in promoting lifelong learning. In short, in order to encourage lifelong learning, distance learning is equally crucial. In Malaysia, lifelong learning is associated with employability and productivity. Malaysia believes that it must leverage ICT to further possibilities for lifelong learning should be encouraged and offered nationally.

2.2. Mobile Learning in Malaysia

Mobile learning is the new millennium's learning approach, and it enables learning at the point of need, allowing users to access the material whenever and wherever it is convenient for them. Mobile learning is described as learning utilising gadgets and technology as a learning medium, such as laptops and mobile phones. Mobile learning is available both online and offline. Online mobile learning necessitates the use of an internet connection to obtain educational information and participate in learning activities. Offline mobile learning, on

the other hand, entails accessing instructional information and learning activities without an internet connection, utilising pre-downloaded resources. The optimal strategy may be determined by the learner's learning requirements and preferences, as well as the availability of internet access. According to Traxler (2007), mobile learning is a type of knowledge that incorporates remote, modern gadgets and technology. Lan and Sie (2010) defined mobile learning as a type of learning paradigm that allows students to access learning materials from anywhere and at any time by utilising mobile technology and the Internet. Indicating to previous research, the development of mobile phone usage in higher education has shown great potential in Malaysia. Abas et al. (2009) stated that the formative assessment using mobile was mostly incorporated by Open University Malaysia (OUM) students. The potential of mobile technologies has been investigated and the benefits of mobile learning were shown to be more appealing to university students and they were satisfied with it (Amin et al., 2009; Ismail et al., 2010).

The Malaysian Government has employed some efforts through the Ministry of Education Malaysia and the Ministry of Higher Education Malaysia to develop different actions and programmes to assist schools in integrating the m-learning culture. The most recent research in mobile learning indicates that ODL learners in Malaysia showed positive attitudes and acceptance towards the mobile technology approach during the Covid-19 pandemic (Karim & Mustapha, 2023). Omar et al. (2021) claimed that mobile learning is highly significant today, especially in education. Moreover, instructors, parents, and ODL learners are required to connect and learn virtually via mobile technology and an internet connection, regardless of location, whether urban or rural during the period of the Covid-19 pandemic. Past research indicated that the students in MTUN institutions had good prospects towards the implementation of mobile learning and that the year of study at the university had no effect on student's attitudes toward the mobile learning environment (Rohainai et al., 2022). In higher education institutions, mobile learning has become an integral component of instructional technology. Many higher institutions across the world have used mobile devices to offer learning in a variety of methods at any time and from any location.

2.3. Purpose and Objectives of the Study

The study aimed to examine Open and Distance Learners (ODL) perception towards mobile technology adoption among technical and non-technical students in Malaysia. The following were the specific objectives:

- i. To identify the open and distance learners' perceptions of the Open Distance Learning (ODL) among technical and non-technical students in Malaysia.
- ii. To identify the open and distance learners' perceptions on mobile technology adoption among technical and non-technical students in Malaysia.
- iii. To examine the relationship between the open and distance learners' perceptions of the Open Distance Learning (ODL) and open and distance learners' perceptions on the mobile technology adoption among technical and non-technical students.

2.4. Conceptual Framework

Figure 1 depicts the study's conceptual framework and the three primary variables. In this framework, the first variable was Open and Distance Learning which was determined as the independent variable based on Moore model (1997). This variable involved three sub-concepts which were (a) course structure, (b) learner autonomy, and (c) dialogue. The second variable was the mobile technology adoption was designed as the dependent variable. For this variable, we reformed four sub-concepts from two models: (i) Venkatesh & Davis (2000) model and Kolb (1984) model which are (a) perceived usefulness (PU), (b) perceived ease of use (PEU), (c) perceived satisfaction (PS), and (c) acquisition of hands-on skills. We also included the moderator variables consisting of four students' demographics which were gender, age, experience of mobile devices adoption and technical and non-technical fields. The conceptual framework proposed that the mobile technology adoption would foster Open and Distance Learning (ODL) among technical and non-technical students based on the adapted models applied. Based on the theories used, the conceptual framework hypothesised that mobile technology adoption was expected to support Open and Distance Learning (ODL) among technical and non-technical students.

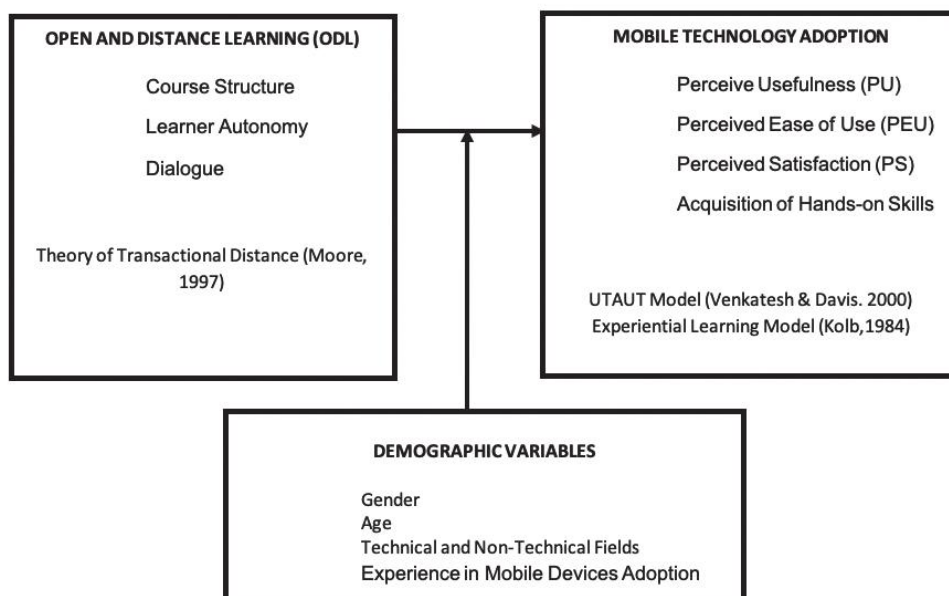


Figure 1. Conceptual framework for Open and Distance Learners (ODL) for Mobile Technology Adoption among Technical and Non-Technical Students

3. Method

3.1. Research Design

This study used a survey design to examine open and distance learners' perceptions towards mobile technology adoption among technical and non-technical students in Malaysia. The study employed a descriptive quantitative method of research.

3.2. Participants

The study's population consisted of undergraduate and postgraduate students from selected Malaysian public universities. A total of 120 students were chosen at random from this demographic, which is supposed significant to provide useful responses on ODL learners' perceptions towards mobile technology adoption among technical and non-technical students.

3.3. Instrument

In this study, we used an online survey created by Google Forms. The online survey was designed based on three models: (i) Theory of Transactional Distance (Moore, 1997) and (ii) UTAUT Model (Venkatesh & Davis, 2000) and Experiential Learning Model (Kolb, 1984). We adapted the questionnaire items based on the first model which included course structure, learner autonomy and dialogue sub-concepts to measure the perceptions of the open and distance learning among technical and non-technical students. Next, we used three sub-concepts based on the second and third model: perceived usefulness (PU), perceived ease of use (PEU), perceived satisfaction (PS), and acquisition of hands-on skills. The open-ended items were also included in this online survey. The online questionnaire items were developed to measure open and distance learners' (ODL) perception towards mobile technology adoption among technical and non-technical students. The questionnaire was divided into five parts: (A) student profile (9 items), (B) perception of open and distance learning (18 items) and (C) perception of mobile technology adoption (23 items), and (D) three open-ended items. A total of 53 items of the questionnaire were distributed to the students. For the open-ended items, the students were asked about the most important benefits to use mobile devices for learning (Item A), the main factors that suppress or inhibit mobile technology adoption in open and distance learning (Item B) and the suggestions to enhance mobile technology adoption in open and distance learning (Item C). For Section B and Section C, the items were measured by using a 5-point Likert scale: strongly agree (5), agree (4), uncertain (3), disagree (2) and strongly disagree (1). The online questionnaire was developed and validated by three experts in the field. The results of reliability for the instrument were the Cronbach Alpha coefficient, $\alpha = 0.975$.

3.4. Data Analysis Tools

Descriptive and inferential statistics were used to analyse the data. SPSS version 27 was used to analyse Part A, Part B and Part C. Thematic analysis was used to assess open-ended items (Part D) using the Miles and Huberman (1994) technique.

4. Findings and Discussion

This section presents the findings, analysis and discussions of the data gathered from the study. The results of the study are as the following:

4.1. Student Profile

Table 1 illustrates the student profile of the study. The total number of respondents involved in this study is 120. The table shows there are 38 male (31.7%) and 82 female (68.3%) students who answered the questionnaire. There are five categories of age groups in this study. The highest category of age group is 20-29 years which is 51.7% followed by the age group of 17-19 years old which is 39.2% of respondents. The respondents also come from the age group 30-39 years which is 6.7% and 2.5% from the age group of 40-49 years. No respondents from the age group of 50 years and above. Given the location of respondents' hometowns, they mostly come from the city (43.3%). Next, the respondents live in the suburban area (32.5%) and 24.2% live in rural areas. In this profile, we also discover the ODL learners' main course and their experience with mobile technology adoption. The results show that 60% of the respondents are from the technical course. Similarly, 60% of the respondents also come from the non-technical course. From the table, it displays that the majority of the respondents (96.7%) use mobile devices for open and distance learning. Only 3.3% did not use mobile devices for open and distance learning. Regarding the type of mobile device the ODL learners usually use for open and distance learning, the majority of respondents use a smartphone (55.0%) followed by a tablet (23.3%). Other devices that the respondents often use for open and distance learning are mobile phones (14.2%) and 7.5% is a laptop. No one uses an e-reader for their learning. Finally, the ODL learners mostly agreed that (88.3%) they like to use mobile devices for open and distance learning whereas only 11.7% do not like to use mobile devices for open and distance learning.

Table 1. Characteristics of the Respondents (n=120)

| Characteristics | Frequency | % |
|--|-----------|------|
| Gender | 38 | 31.7 |
| Male | 82 | 68.3 |
| Female | | |
| Age | 47 | 39.2 |
| 17-19 years | 62 | 51.7 |
| 20-29 years | 8 | 6.7 |
| 30-39 years | 3 | 2.5 |
| 40 -49 years | 0 | 0 |
| 50 years and above | 0 | 0 |
| Location of Hometown | | |
| City | 52 | 43.3 |
| Suburban | 29 | 32.5 |
| Rural | 39 | 24.2 |
| Type of Course | | |
| Technical | 60 | 50.0 |
| Non-Technical | 60 | 50.0 |
| Do you use mobile devices for open and distance learning? | | |
| Yes | 116 | 96.7 |
| No | 4 | 3.3 |

| What type of mobile device do you usually use for open and distance learning? | | |
|---|-----|------|
| Laptop | 9 | 7.5 |
| Mobile phone | 17 | 14.2 |
| Smartphone | 66 | 55.0 |
| Tablet | 28 | 23.3 |
| eReader | 0 | 0 |
| Do you like to use mobile devices for open and distance learning (ODL)? | | |
| Yes | 106 | 88.3 |
| No | 14 | 14.0 |

To achieve the research objectives, the responses reported in Tables 3.2 and 3.3 highlighted ODL learners' perceptions of open and distance learning and the perceptions of mobile technology adoption. The mean values in this study were classified into five categories: strongly agree (4.21-5.00), agree (3.41- 4.20), uncertain (2.61- 3.40), disagree (1.81-2.60), and strongly disagree (1.00-1.80). The three greatest and three lowest means of the items based on the findings were described in this section.

4.2. Open and Distance Learners' Perception of Open and Distance Learning

For the first objective, the current study identifies the ODL learners' perception of open distance learning among technical and non-technical students (see Table 2). The analysis showed that the items were divided into three sub-concepts which are course structure, learner autonomy, and dialogue. Table 2 showed the results of the three highest and the lowest mean for technical and technical students' perceptions of open and distance learning. Based on the analysis of the highest mean from the technical students, the ODL learners mainly strongly agreed ($M=4.57$; $S.D=0.65$) that they often use social media such as WhatsApp, Telegram and Facebook Messenger to discuss their assignments and projects with their classmates for open and distance learning (item 26). The second highest mean revealed that they also strongly agreed ($M=4.50$; $S.D=0.68$) that they regularly use mobile phones to communicate and discuss their assignments and projects with their instructors and classmates for their learning (item 27). These findings are in line with the study done by Asrizal (2021) that highlighted the possibility of paired interactions between instructor and student or between teacher, student, and learning material.

Both items were from the dialogue sub-concept. Given the course structure sub-concept (item 11), the students also strongly agreed ($M=4.43$; $S.D=0.87$) that open and distance learning (ODL) offers the flexibility of studying from anywhere and at any time over the Internet. Conversely, the lowest mean from the dialogue sub-concept showed that the ODL learners barely agreed ($M=3.60$; $S.D=1.27$) that they frequently use emails to communicate with the instructors and classmates in open and distance learning (item 23). The second lowest and the third lowest mean from the learning autonomy sub-concept revealed that the ODL learner only agreed ($M=3.87$; $S.D=1.11$) that they are more creative than in a normal classroom (item 19). Likewise, the technical learners just agreed they know their learning strategies in ODL ($M=4.02$; $S.D=0.98$) in item 20.

Table 2. ODL Learners' Perception of Open and Distance Learning

| Item | Construct | Technical | | | Non-Technical | | |
|------|---|-----------|------|----------------|---------------|------|----------------|
| | | M | SD | Interpretation | M | SD | Interpretation |
| | Course Structure | | | | | | |
| 10. | As ODL learner, I study my courses anytime and anywhere. | 4.37 | 0.88 | Strongly agree | 3.95 | 0.93 | Agree |
| 11. | Open and distance learning offers me the flexibility of studying from anywhere and at any time over the Internet. | 4.43 | 0.87 | Strongly agree | 4.17 | 0.85 | Agree |
| 12. | I know what my learning goals as ODL learners in the class | 4.33 | 0.86 | Strongly agree | 4.02 | 0.85 | Agree |
| 13. | My instructors teach and help me to understand the study courses online. | 4.30 | 0.89 | Strongly agree | 4.20 | 0.82 | Agree |
| 14. | My instructors give me online practices, hands-on practices and tests to assess my achievements | 4.40 | 0.72 | Strongly agree | 4.18 | 0.77 | Agree |
| 15. | The digital technologies help me meet my learning activities with my learning goals as an open distance learner. | 4.42 | 0.76 | Strongly agree | 4.15 | 0.84 | Agree |

| Learner Autonomy | | | | | | | |
|-------------------------|---|-------------|-------------|-----------------------|-------------|-------------|-----------------------|
| 16. | I have high motivation to learn in open and distance learning | 4.03 | 1.09 | Agree | 3.75 | 1.07 | Agree |
| 17. | In Open and Distance Learning (ODL), I develop analytical and critical thinking skills for my learning | 4.12 | 1.01 | Agree | 3.70 | 1.03 | Agree |
| 18. | I am satisfied with my work done in open and distance learning | 4.28 | 0.87 | Strongly agree | 3.68 | 0.98 | Agree |
| 19. | In Open and Distance Learning (ODL), I am more creative than in my regular classroom | 3.87 | 1.11 | Agree | 3.47 | 1.07 | Agree |
| 20. | As an ODL learner, I recognise my learning strategies | 4.02 | 0.98 | Agree | 3.78 | 0.90 | Agree |
| 21. | As an ODL learner, I recognise my learning styles | 4.13 | 0.91 | Agree | 3.90 | 0.82 | Agree |
| 22. | As an ODL learner, my instructor give flexibility to choose how to complete online projects and assignments | 4.30 | 0.91 | Strongly agree | 4.05 | 0.79 | Agree |
| Dialogue | | | | | | | |
| 23. | As an ODL learner, I often use emails to communicate with my instructors and classmates in open and distance learning | 3.60 | 1.27 | Agree | 3.37 | 1.30 | Agree |
| 24. | As an ODL learner, I often discuss my assignments with my lecturer through online | 4.13 | 0.87 | Agree | 3.78 | 1.03 | Agree |
| 25. | As an ODL learner, I often access interactive videos to learn by using my mobile devices | 4.17 | 0.85 | Agree | 3.95 | 0.93 | Agree |
| 26. | As an ODL learner, I often use social media such as WhatsApp, Telegram and Facebook Messenger to discuss my assignments and projects with my classmates | 4.57 | 0.65 | Strongly agree | 4.30 | 0.81 | Strongly agree |
| 27. | As an ODL learner, I often use my mobile phone to communicate and discuss my assignments and projects with my instructors and classmates | 4.50 | 0.68 | Strongly agree | 4.30 | 0.81 | Strongly agree |
| | Total average | 4.22 | 0.60 | Strongly agree | 4.28 | 0.80 | Strongly agree |

From the table, the analysis showed the non-technical students' findings. Remarkably, the two items (item 26 and item 27) for the highest mean had comparable results with the technical students' findings. Similarly, the ODL learners strongly agreed ($M=4.30; S.D=0.81$) that they often use social media such as WhatsApp, Telegram and Facebook Messenger to discuss assignments and projects with their classmates. For item 27, they also strongly agreed ($M=4.28; S.D=0.80$) that they constantly use mobile phones to communicate and discuss my assignments and projects with the instructors and classmates. The final highest mean from the course structure sub-concept showed that the ODL learners agreed ($M=4.20; S.D=0.82$) that the instructors teach and help them to understand the study courses online (item 13). Based on the lowest mean, ODL learners responded uncertain ($M=3.37; S.D=1.30$) that they often use emails to communicate with their instructors and classmates in open and distance learning (item 23) in the dialogue sub-concept. This finding is reliable with the lowest mean for the technical student reported above. With regards to learning autonomy, the ODL learners just agreed ($M=3.68; S.D=0.98$) that they were satisfied with the work done in open and distance learning (item 18). Likewise, item 20 showed the related results for both technical and non-technical students. The ODL learners agreed ($M=3.47; S.D=1.07$) that they are more creative than in my regular classroom (item 19). Overall, the study discovered that both technical and non-technical students agreed on the importance of Open and Distance Learning (ODL). However, the analysis revealed that both technical and non-technical people agreed that they prefer to use social media as a medium of communication compared to emails. Moreover, both technical and non-technical students believe that the conventional classroom promotes more creativity than open and distance learning.

3.3. Open and Distance Learners' Perception of Mobile Technology Adoption

The third part of the survey questionnaire was on the ODL learners' perceptions of mobile technology adoption among technical and non-technical students (see Table 3). Based on Table 3, the items of the questionnaire were grouped into four sub-concepts which are (a) perceived usefulness, perceived ease of use, perceived satisfaction, and acquisition of hands-on skills. In this part, the analysis of responses was depicted based on the three highest means and the three lowest means for technical and non-technical students. First, the three highest means for technical students are from the Perceived Usefulness (PU) sub-concept. The highest mean for mobile technology adoption was that the ODL learners strongly agreed ($M=4.52, SD=0.73$) that mobile devices are useful for open and distance learning (item 29). They also strongly believed ($M=4.48, SD=0.70$) that mobile devices are easy to

use for open and distance learning (item 33) in Perceived Ease of Use (PE) construct. Moreover, the ODL learners largely agreed ($M=4.47$, $SD=0.65$) that the use of mobile devices is flexible for their learning (item 34). With regards to the acquisition of hands-on skills, the analysis showed that the lowest means for the technical students are item 44, item 45 and item 50. For item 44, the ODL learners scarcely agreed ($M=3.67$, $SD=1.15$) that they easily learn and understand the concepts in my workshop by using mobile devices. The findings also revealed that the ODL learners just agreed ($M=3.63$, $SD=1.25$) that they acquire real-world knowledge and skills in practical classes by using mobile devices (item 45). Finally, the lowest mean in item 50 showed that the ODL learners only agreed ($M=3.63$; $S.D=1.13$) that they find it is easy to practice what they are learning in the form of hands-on training in my practical classes by using my mobile devices.

The study's analysis for non-technical students is illustrated in the same table. Similarly, the highest mean (item 29) for the Perceived of Usefulness (PU) sub-concept has the same results as the technical students believe mobile devices are useful for open and distance learning. The ODL learners strongly agreed ($M=4.27$; $S.D=0.82$) for item 29. They also strongly agreed ($M=4.15$; $S.D=0.90$) that they find the use of mobile devices saves time for their learning (item 37). The ODL learners also strongly agreed ($M=4.27$; $S.D=0.82$) that mobile devices are useful for open and distance learning. In item 43 for Perceived of Satisfaction (PS) sub-concept, the second highest mean revealed that the ODL learners strongly believed ($M=4.22$; $S.D=0.87$) that they were satisfied to collaborate with classmates on social media such as Telegram and WhatsApp for online discussions using mobile devices. Corresponding to the lowest means, the ODL learners barely agreed ($M=3.55$; $S.D=1.19$) that they find it is easier to comprehend the study courses using the mobile device than in the conventional classroom (item 35). With regards to Perceived Satisfaction (PS) sub-concept, item 40 and item 41 also had the lowest means. The ODL learners just agreed ($M=3.60$; $S.D=1.17$) that they were satisfied with the speed of the internet when learning through the mobile device (item 40). Next, they also agreed ($M=3.72$; $S.D=1.06$) that they were satisfied when they used mobile devices online even though they were using heavy streaming such as video conferencing (item 41). The entire analysis of this part indicated that both the technical and non-technical students strongly believed that mobile devices are needed and practical for ODL learners. The analysis also highlights that technical students did not consider that using mobile devices for hands-on skills training and workshops is appropriate. Nevertheless, with the advent of new technologies, AR and VR approaches have the potential to adjust how students learn in the classroom, particularly when incorporating a mobile learning environment that intently imitates face-to-face communication (Karim, 2022).

Table 3. ODL learners' Perception of Mobile Technology Adoption

| Item | Construct | Technical | | | Non-Technical | | |
|-----------------------------------|---|-----------|------|----------------|---------------|------|----------------|
| | | M | SD | Interpretation | M | SD | Interpretation |
| Perceived Usefulness (PU) | | | | | | | |
| 28. | Mobile devices help me to study better in open and distance learning | 4.42 | 0.74 | Strongly agree | 4.12 | 0.98 | Agree |
| 29. | I believe mobile devices are useful for open and distance learning | 4.52 | 0.73 | Strongly agree | 4.27 | 0.82 | Strongly agree |
| 30. | I believe my mobile devices improve my studies in open and distance learning | 4.43 | 0.70 | Strongly agree | 3.93 | 1.00 | Agree |
| 31. | As an ODL learner, I find my mobile devices enable me to complete my tasks and assignments more quickly | 4.35 | 0.80 | Strongly agree | 4.02 | 0.98 | Agree |
| 32. | My mobile devices help me to be creative in open and distance learning | 4.22 | 1.01 | Strongly agree | 3.88 | 1.01 | Agree |
| Perceived Ease of Use (PE) | | | | | | | |
| 33. | My mobile devices are easy to use for open and distance learning | 4.48 | 0.70 | Agree | 4.07 | 0.84 | Agree |

| | | | | | | | |
|---------------------------------------|--|------|------|----------------|------|------|----------------|
| 34. | My mobile devices are flexible to use for open and distance learning | 4.47 | 0.65 | Agree | 4.10 | 0.80 | Agree |
| 35. | As an ODL learner, I find it is easier to comprehend my study courses using a mobile device than in my conventional classroom | 3.90 | 1.15 | Agree | 3.55 | 1.99 | Agree |
| 36. | I find my mobile devices make my open and distance learning more flexible | 4.33 | 0.75 | Agree | 4.05 | 1.03 | Agree |
| 37. | I find the use of mobile devices saves my time for open and distance learning | 4.42 | 0.67 | Agree | 4.15 | 0.90 | Agree |
| Perceived Satisfaction (PS) | | | | | | | |
| 38. | I become more independent in open and distance learning when I use the mobile device | 4.32 | 0.87 | Agree | 4.00 | 0.92 | Agree |
| 39. | I am satisfied with the use of my mobile devices for open and distance learning | 4.33 | 0.75 | Agree | 4.02 | 0.97 | Agree |
| 40. | As ODL learner, I am satisfied with the speed of the internet when learning through the mobile device | 3.97 | 1.07 | Agree | 3.60 | 1.17 | Agree |
| 41. | I am satisfied when I use my mobile devices online even though they are using heavy streaming such as video conferencing | 4.07 | 0.88 | Agree | 3.72 | 1.06 | Agree |
| 42. | I am satisfied when I use my mobile devices to complete my assignments and projects | 4.37 | 0.66 | Strongly agree | 4.00 | 0.97 | Agree |
| 43. | As an ODL learner, I am satisfied to collaborate with my classmates on social media (e.g Telegram, WhatsApp) for online discussions using mobile devices | 4.30 | 0.85 | Strongly agree | | 0.87 | Strongly agree |
| Acquisition of Hands-on Skills | | | | | | | |
| 44. | As an ODL learner, I easily learn and understand the concepts in my workshop by using mobile devices | 3.67 | 1.15 | Agree | 3.83 | 0.92 | Agree |
| 45. | As an ODL learner, I acquire real-world knowledge and skills in practical classes by using my mobile devices | 3.63 | 1.25 | Agree | 3.90 | 0.93 | Agree |
| 46. | As an ODL learner, I learn faster to use of materials and equipment in my practical classes by using my mobile devices | 3.80 | 1.26 | Agree | 3.80 | 1.05 | Agree |

| | | | | | | | |
|-----|--|------|------|-------|------|------|-------|
| 47. | As an ODL learner, I enjoy doing hands-on activities on skills in my practical classes by using my mobile devices | 3.80 | 1.22 | Agree | 3.87 | 0.97 | Agree |
| 48. | As an ODL learner, I am satisfied with the speed to complete my practical tasks by using my mobile devices | 3.90 | 1.07 | Agree | 3.78 | 1.01 | Agree |
| 49. | My instructors guide me effectively through online media on how to complete the tasks in my technical classes | 3.98 | 0.69 | Agree | 4.03 | 0.84 | Agree |
| 50. | I find that it is easy to practice what I am learning in the form of hands-on training in my practical classes by using my mobile devices. | 3.67 | 1.13 | Agree | 3.92 | 1.00 | Agree |
| | Total average | 4.14 | 0.61 | Agree | 3.95 | 0.80 | Agree |

Table 4 illustrated the findings of the overall mean and standard deviation whereas Table 5 and Table 6 showed the relationship between the ODL learners' perceptions on open and distance learning and the ODL learners' perceptions on the mobile technology adoption for technical and non-technical students. Table 4 showed the overall mean for open and distance learning was (M=4.22; SD=0.60) for technical students and (M=3.93; SD=0.72) for non-technical students. The overall mean for mobile technology adoption was (M=4.15; SD=0.61) for technical students and (M=3.95; SD=0.80) for non-technical students.

Table 4. Overall mean and standard deviation for Technical and Non-Technical Course

| Constructs | Technical | | Non-Technical | |
|----------------------------|-----------|------|---------------|------|
| | Mean | S.D | Mean | S.D |
| Open and Distance Learning | 4.22 | 0.60 | 3.93 | 0.72 |
| Mobile Technology Adoption | 4.15 | 0.61 | 3.95 | 0.80 |

Table 5 showed the correlation of each construct between ODL learners' perceptions of Open and Distance Learning and mobile technology adoption for the technical course. Results of Pearson Correlation showed that there is a significant positive correlation ($r= 0.76$; $p<0.01$).

Table 5. The relationship between Open and Distance Learning and Mobile Technology Adoption for Technical Course

| Variables | Mobile Technology Adoption | |
|----------------------------|----------------------------|---------|
| | r | p-value |
| Open and Distance Learning | 0.76 | 0.000 |

As shown in Table 6, the results of the Pearson correlation of each construct between ODL learners' perceptions of Open and Distance Learning and mobile technology adoption for non-technical courses. The results indicated that there is a significant positive correlation ($r= 0.88$; $p<0.01$).

Table 6. The relationship between Open and Distance Learning and Mobile Technology Adoption for Non-Technical Course

| Variables | Mobile Technology Adoption | |
|----------------------------|----------------------------|---------|
| | r | p-value |
| Open and Distance Learning | 0.88 | 0.000 |

3.4. Open-ended Items Results

In the final part (Part D) of the survey, the ODL learners from the technical and non-technical course need to answer three open-ended items (see Table 7). The data was analysed using thematic analysis. For the first item (Item A), the respondents were asked to give the three most important benefits to using mobile devices for open and distance learning. As shown in the table, the respondents rated easy and flexible as the highest rank for this item followed by saving time and promoting self-directed learning as the main themes that emerged in the analysis. Correspondingly, Karim et al. (2023) also found out that mobile phone users value its usability and efficacy in their daily lives.

The second item (Item B) asked the ODL learners to state three main factors that inhibit mobile technology adoption in open and distance learning. From the analysis, there were three main themes that emerged in item B. First, the most rated theme was the internet connectivity problems. Next, the respondents mostly agreed that the uncondusive environment is one of the factors that hinder the use of mobile technology for their learning. Another factor that contributed to item B was experiential learning barriers. It indicated that the ODL learners, particularly the technical students, possibly face some challenges in hands-on training classes. Finally, the ODL learners also require answering Item C. They listed three suggestions to enhance mobile technology adoption in open and distance learning. As shown in the table, the highest rank for the first suggestion was to improve infrastructure and network connectivity.

Table 7. Open-ended Items Results for Technical and Non-technical Course

| Open-ended Item | Rank | Main Themes | Frequency (f) |
|---|------|---|---------------|
| A. Three most important benefits for you as Open Distance Learner (ODL) to use mobile devices for learning. | 1 | Easy and flexible | 73 |
| | 2 | Save time | 51 |
| | 3 | Promote self-directed learning | 22 |
| B. Three main factors that inhibit mobile technology adoption in open and distance learning. | 1 | Internet connectivity problem | 98 |
| | 2 | Uncondusive environment | 24 |
| | 3 | Experiential learning barriers | 18 |
| C. Three suggestions to enhance mobile technology adoption in open and distance learning | 1 | Improve infrastructure and network connectivity | 64 |
| | 2 | Improve an effective mobile teaching approach | 23 |
| | 3 | Provide mobile technology programmes and training | 7 |

The second rank was to improve an effective mobile teaching approach. The last suggestion that the respondents agreed with was to provide mobile technology programmes and training to enhance mobile technology adoption in open and distance learning.

5. Conclusion

In brief, the results and findings provide empirical data on Open and Distance Learners (ODL) perception towards mobile technology adoption among technical and non-technical students in Malaysia. In terms of the perception of open and distance learning, the findings show that the majority of ODL learners from technical and non-technical courses greatly agreed that mobile devices are crucial for communicating with their classmates and instructors through social media. Regarding the perception of mobile technology adoption, the ODL learners from the technical and non-technical courses perceived that mobile devices are extremely useful for open and distance learning. However, the findings illustrate that the technical students barely agreed with using mobile devices for hands-on skills training and workshops. Based on the open-ended items analysis, both the technical and non-technical students agreed that the use of mobile devices is easy and flexible for open and distance learning. They also believed that lack of internet connectivity is the main problem for open and distance learning. Therefore, the majority of the ODL learners suggested this difficulty can be resolved by improving the infrastructure and network connectivity. Hence, it can be concluded that ODL learners from technical and non-technical courses in Malaysia had a positive perception of mobile technology adoption. These research results may provide open learning and distance education systems with reliable ideas for designing and advancing a mobile learning environment in higher learning institutions.

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319-Barriers to Learning in ODE System and How to Overcome them: Perspectives of Students Engaging in Online Tutorials

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Abstract

This paper reported an evaluation of barriers to learning experienced by students taking tutorial online (tuton) provided as one means of learning support system (LSS) at the Educational Economics Study Program, Faculty of Teacher Training and Education, Universitas Terbuka (UT), Indonesia. The Covid 19 Pandemic, which recently hit the whole world, has caused transforming education to virtual learning. As a higher education institution implementing an open and distance education (ODE) system, UT has so far utilized media in learning and does not require face-to-face meetings between students and learning resources. UT requires students to commit to and to carry out self-directed learning. Nonetheless, taking into account that UT's students are not accustomed to self-directed learning, UT still provides face-to-face tutorials for students who need them. Accordingly, UT provides LSS in the form of face-to-face and online tutorial (Tuton). During the Pandemic (2022-2022), UT did not provide face-to-face tutorials. The tutorials provided were Tuton and webinar tutorials (Tuweb). Both tutorials last 8 weeks in a semester at UT's designated times. The material discussed in Tuton and Tuweb is the same, both refer to the targeted learning objectives of the course which developed prior to the implementation of the tutorial sessions. In addition, both have a class size of 30 students max. What distinguishes the two forms of tutorials is their learning process: asynchronous for Tuton and synchronous for Tuweb. One topic in the Tuton is open for one week where students have to study the material and be actively engaged in the discussion. After one week, the topic will change and so on for up to eight weeks. Meanwhile, in Tuweb, students are required to attend class (via TEAMS) at a predetermined schedule to discuss one topic with tutors and other students. In both Tuton and Tuweb, students are asked to upload three Assignments in Weeks 3, 5 and 7. Students who take part in tutorials will get a grade that will be taken into account in their final grade. Given the important role of tutorials in students' learning success, interviews were conducted with 30 students from three Tuton classes to capture the barriers they experienced when participating in Tutons and the ways they used to overcome these barriers. From the interviews, the barriers commonly came across students were lack of skill in using the technology in Tuton and limited access to the internet. The next common barrier students experienced was limited communication between students-tutor-students. The way students deal with this varies, but the one that stands out the most is contacting tutors via personal email. These results indicate the need to provide students with skills in using technology to optimize the benefits of Tuton as one means of LSS and to improve communication between students and tutors in tutorials as well as communication between students.

Keywords: *Asynchronous learning, learning support system, online tutorials, synchronous learning, Universitas Terbuka.*

1. Introduction

Distance learning has emerged as a prominent method of education, particularly for adult learners seeking flexibility in managing their work, home, and academic commitments. This approach offers a significant advantage by providing learners with greater control over the time, place, and pace of their studies. However, like any educational system, distance learning is not without its challenges. Loss of student motivation due to the absence of face-to-face interactions with instructors and peers, potential financial barriers, and a lack of sufficient faculty support are among the barriers that can hinder successful distance learning experiences. This

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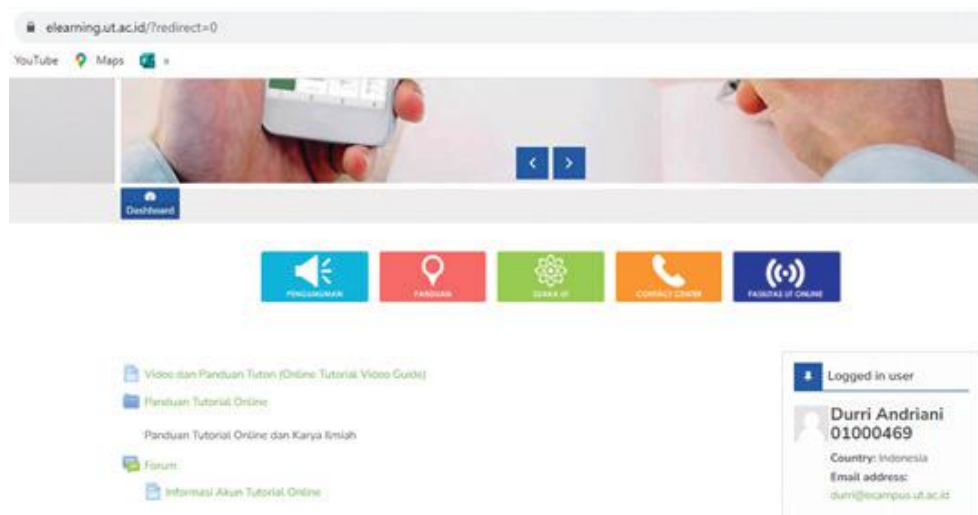
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paper aims to explore the barriers faced by students engaging in online tutorials within the open and distance education (ODE) system and propose strategies to overcome these obstacles.

1.2. Tutorial online at Universitas Terbuka

As a distance education institution for higher education level, Universitas Terbuka (UT) offers a variety of study programs utilizing a distance education mode of learning. One of them is tutorial online (tuton) where students study asynchronously in a period of eight weeks for each semester facilitated by a tutor in one class containing a maximum of 40 students. During the duration of the tutorial, students are required to attend at least six of the eight weeks of tutorial time. In every tuton week, initiation material is provided where students are asked to study and master the topic. Besides that, every week there is also a topic of discussion where students are asked to actively contribute to discussions in the Discussion Forum. Then in weeks 3, 5 and 7 of tuton, students are given assignments that must be uploaded in the space provided. Student activity in opening initiation materials, engaging in discussions, and uploading assignments will get a value that is calculated as part of the student's final grade in the course.

Master for tuton material is prepared separately by qualified experts and is used in all parallel classes. Meanwhile, tutors are responsible for opening tuton, accompanying students registered in the tuton class, motivating students, facilitating student learning needs, and evaluating students' performance in the tuton class. Both tutor and students are required to read and understand requirements for tuton as explained in UT Website (see Figure 1).



Before starting the class, tutors and students are both asked to read and master the tuton guide given at <https://elearning.ut.ac.id/?redirect=0>

The website explains how to log in, how to use tuton including how to open initiation material, upload discussions and assignments.

Figure 1. Manual for On-line Tutorial

1.2. Barriers to Learning

In general, barriers to learning in the ODE system can be categorized into student and faculty barriers. However, these barriers can still be explored deeper by referring to various existing studies. Table 1 shows the classification of each student and faculty barriers based on several studies including:

1. Galusha (1998),
2. Muilenburg and Berge (2005),
3. Becker et al. (2013),
4. Qifu (2013),
5. Talbert (2020),
6. Sugilar (2020),
7. Yeh and Tsai (2022), and Mill (2023).

Table 1. Categorization of Barriers to Learning in ODE System

| No. | Barrier | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|-------------------------|-----------------------|---|---|---|---|---|---|---|---|
| Student barriers | | | | | | | | | |
| 1 | Time management | | x | x | | | | x | x |
| 2 | Academic issues | | x | x | | | | | x |
| 3 | Prerequisite skills | | | | | x | | | |
| 4 | Psychological factors | x | x | | | x | x | x | x |
| 5 | Social interaction | x | x | | x | x | | | |
| 6 | Resources | x | x | x | x | x | | x | x |
| Faculty barriers | | | | | | | | | |
| 1 | Administrative issues | | x | | | x | | | x |
| 2 | Instructor issues | | x | | x | x | | | |
| 3 | Technical issues | | x | x | x | x | x | x | x |
| 4 | Support services | x | | | x | x | x | | |

In the context of distance education, students face various challenges that can hinder their learning experience. Time management becomes crucial as students must balance multiple responsibilities, such as work and family commitments, alongside their studies. Poor time management can lead to difficulties in meeting deadlines and keeping up with course requirements. Additionally, students may encounter academic issues, struggling to comprehend course materials without immediate access to instructors for clarifications. Insufficient prerequisite skills, such as digital literacy or self-directed learning abilities, can also impact students' performance in distance education. Moreover, the absence of face-to-face interactions with peers and instructors may lead to feelings of isolation, fatigue, self-doubt, and lack of motivation, affecting overall engagement and success in the ODE system. Furthermore, limited access to essential learning resources, such as course materials and multimedia tools, may impede students' full engagement with the curriculum.

The implementation of distance learning also presents numerous challenges for faculty and students alike. Administrative processes, such as course registration and accessing learning resources, often hinder students' seamless learning experiences. Furthermore, faculty members may struggle to effectively adapt their teaching styles to the ODE system, leading to potential difficulties in facilitating student learning online. Technical issues, including internet connectivity problems and navigating online platforms, frequently impede both students' and faculty members' engagement in distance learning. Moreover, the lack of readily available and accessible support services, such as tutoring, academic advising, and technical assistance, creates significant barriers that hamper students' progress and success in the ODE system. These barriers must be addressed to enhance the overall effectiveness and accessibility of distance education for both students and faculty.

Table 2. Barriers to Learning

| No. | Barriers | J. M. Galusha | Lin Y. Muilenburga & Z L. Berge | K Becker, C Newton, & S Sawang | Wang Qifu | R Talbert | S Sugilar | Ching-Yi Yeh & Chin-Chung Tsai | Athabasca University |
|-----|---|---------------|---------------------------------|--------------------------------|-----------|-----------|-----------|--------------------------------|----------------------|
| | | (1998) | (2005) | (2013) | (2013) | (2020) | (2020) | (2020) | (2022) |
| 1 | Time management (Poor, lack of time) | | v | v | | | | v | v |
| 2 | Psychological factors (Motivation, belief, fatigue) | v | v | | | v | v | v | v |
| 3 | Academic issues | | v | v | | | | | v |
| 4 | Administrative issues | | v | | | v | | | v |
| 5 | Technical issues | | v | v | | v | v | v | v |
| 6 | Instructor issues | | | | | v | | | |
| 9 | Support services | v | | | | v | v | | |
| 7 | Prerequisite skills | | | | | v | | | |
| 8 | Social interaction | v | v | | | v | | | |
| 9 | Resources (Internet, learning materials, cost) | v | v | v | | v | | v | v |

1.2. Overcome Barriers

The implementation of the ODE system has emerged as a significant alternative for learners seeking flexibility and accessibility in their educational pursuits. However, the ODE system is not without its challenges as explained previously. Various barriers can impede the learning experiences of both students and faculty, hindering the full realization of its potential. Understanding and addressing barriers are crucial for educational institutions to develop effective strategies and support systems that promote a conducive learning environment for both students and faculty in the ODE system.

Based on existing literature, the following strategies can be considered to overcome barriers to learning in the ODE system (Planet, 2021; Muilenburg & Berge, 2001) as follows.

1. Technological Integration

Addressing technological barriers is crucial in ensuring a seamless ODE experience. Educational institutions should prioritize providing comprehensive technological training for both students and faculty. Equipping learners and instructors with necessary digital literacy skills and resources will empower them to navigate online platforms and leverage technology effectively for academic purposes.

2. Enhanced Communication

Building robust communication channels between students, tutors, and peers can alleviate feelings of isolation and foster a sense of community in the virtual learning environment. Encouraging regular interactions through various communication tools, such as email, discussion forums, and virtual classrooms, can promote active engagement and collaboration among participants.

3. Student Support Services

Comprehensive support services are instrumental in assisting distance learners throughout their academic journey. Institutions should offer dedicated academic planners, tutoring support, and technical assistance to guide students through their courses, provide timely feedback, and address any challenges that may arise during the learning process.

4. Faculty Training and Support

Empowering faculty members with specialized training in ODE pedagogy, course development, and technology integration is vital to enhance their effectiveness as online educators. Recognizing the contributions of distance learning in faculty tenure considerations can further incentivize their active involvement and commitment to the ODE system.

By addressing the barriers through technological integration, improved communication, student support services, and faculty training, educational institutions can foster an inclusive and supportive learning environment for distance learners. As we continue to adapt to changing educational landscapes, it is essential to identify and overcome these barriers to ensure the success and effectiveness of distance education programs.

2. Method

This research is qualitative research in nature, involving students who take Tuton in the Economics Education (EE) Study Program at Department of Teacher Training and Education, Universitas Terbuka. The EE Study program has fifty courses that students can choose from as long as the choices are in accordance with the applicable curriculum. For this study, three tuton classes were selected to obtain data on the barriers to learning students' experience and how the students overcome these barriers.

2.1. Respondent

Students who take Tuton in the first semester of 2023 (2023.1) as respondents. The respondents involved were all participants in three courses where the researcher served as tutor in those courses. These classes were chosen to ensure that students reported all their real barriers faced during Tuton 2023.1 while Researcher/Tutor were chosen to ensure that the reported barriers were real barriers experienced by students during their engagement in the courses. Being the one who was responsible for the day-to-day activities in the Tuton class, Researcher/Tutor could directly examine whether the reported barriers were really happening in the class.

The three tuton classes studied were Entrepreneurship Education (or EdE with 36 students), Management Information Systems (or MIS with 32 students), and Management of Production and Small Industry (or MPS with 38 students). Therefore, there are a total of 106 students involved in the Research.

2.2. Data Collection

Data collection was carried out during the Tuton 2023.1 period (10 April - 10 July 2023) by noting all the barriers and how students overcome those barriers reported by students. When necessary, the Researcher elaborates the barriers (and how to overcome them) reported by students through the Chatroom provided in Tuton Application.

2.3. Data Analysis

Content analysis is used to analyze the data obtained. The data are grouped based on similarities of meaning. The results are then compared with theory and prior research results. The groupings were depicted in Table 3.

Table 3. Grouping of Barriers to Learning used in this Research

| No. | Barriers |
|-----|--|
| 1 | Time management (poor time management, lack of time) |
| 2 | Psychological factors (motivation, belief, fatigue) |
| 3 | Academic issues |
| 4 | Administrative issues |
| 5 | Technical issues |
| 6 | Instructor issues |
| 9 | Support services |
| 7 | Prerequisite skills |
| 8 | Social interaction |
| 9 | Resources (Internet, learning materials, cost) |

3. Findings

From a total of 106 students registered in three Tuton classes researched, a number of 33 (31.13%) students reported experienced barriers in Tuton; 16 (40.48%) students in PIM class, 11 (33.33%) students in EdE class, and 6 (18.18%) students in MIS class (see Figure 2.).

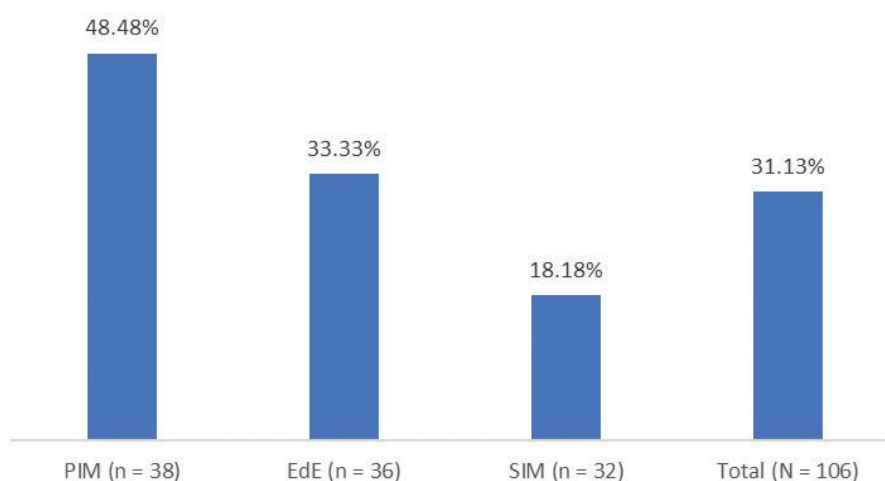


Figure 2. Number of Respondents

3.1. Barriers to Learning

Meanwhile, from thirty-three students reported experiencing barriers to learning in Tuton, there were forty-six barriers mentioned. A number of 23 (60.5%) barriers were mentioned by students in PIM class, 16 (44.4%) in EdE class, and 7 (21.9%) in SIM class (see Figure 3.). On average, one student mentioned one barrier, 24 students reported one barrier each, two students reported two barriers each, and four students reported three barriers each.

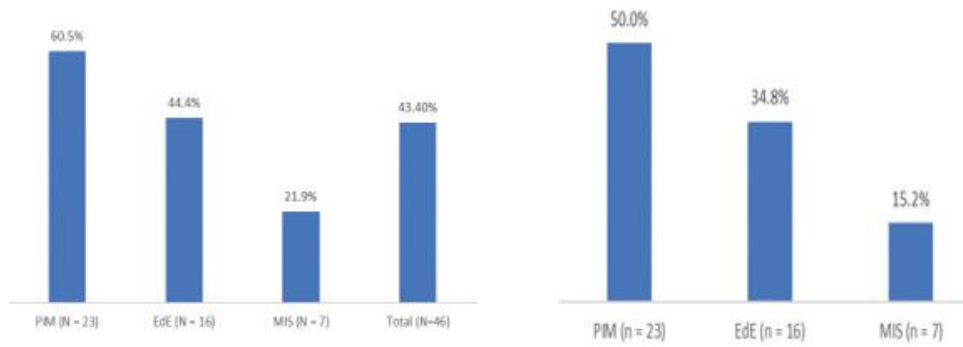


Figure 3. Number of Barriers Mentioned

The 46 barriers mentioned fall into four categories, namely (1) Social interaction, (2) Technical issues, (3) psychological factors, and (4) Learning Material as depicted in Figure 4.

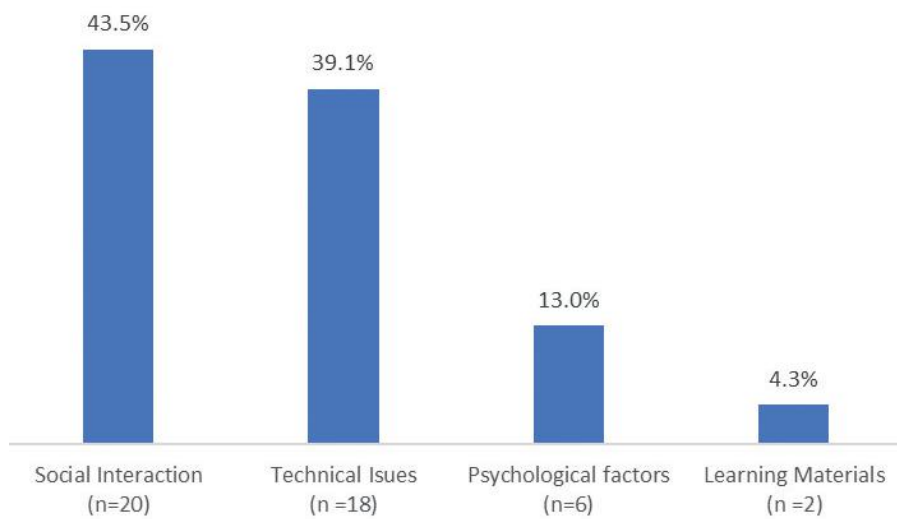


Figure 4. Number of Barriers Based on Categories

Meanwhile, the barriers per course are shown in Figure 5. The most occurrence barriers for all three sampled courses are social interaction, followed by technical issues, and psychological factors. Barriers to learning related to learning materials, although small, were reported by 4,3% students. It is interesting that no students in EdE reported facing barriers related to learning material.

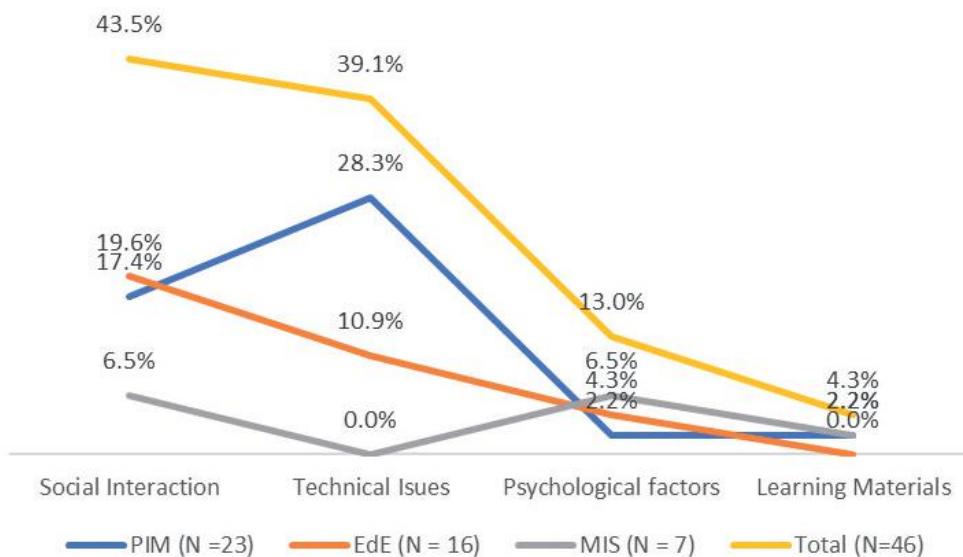


Figure 5. Number of Barriers in Each Class Based on Total Barriers

Student constraints are collected from student statements written in the chat column (see Figure 6.).

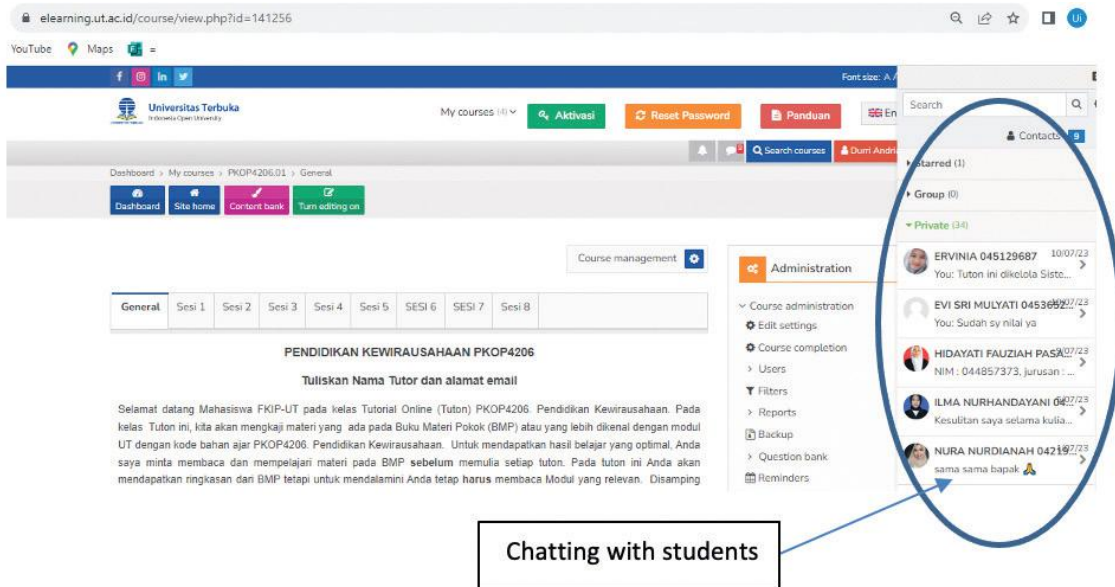
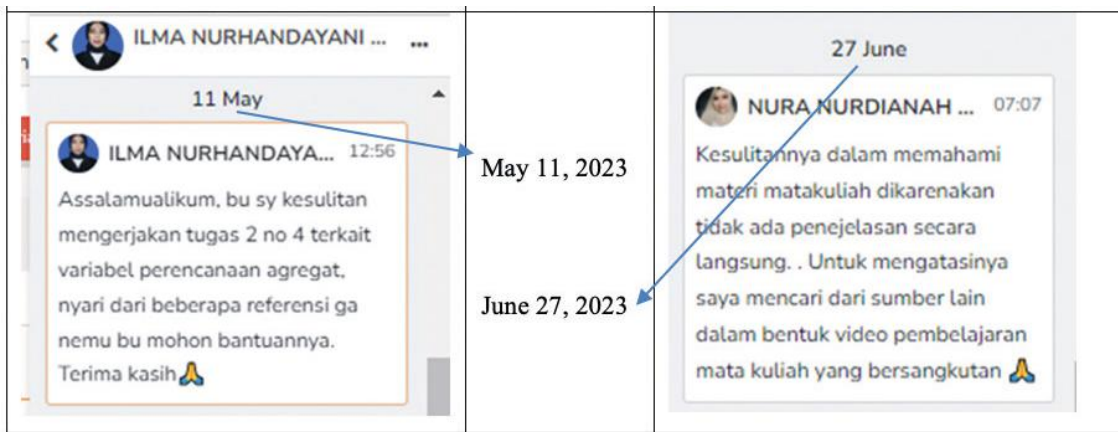


Figure 6. Front-Face Of Tuton Website

Some examples of student barriers to learning in Tuton were shown in Table 4.

Table 4. Examples of Students' Report on Barriers to Learning They Faced During Tuton

| Reported Barriers | Date Repoeted | Reported Barriers |
|---|--|--|
| <p>27 June</p> <p>ERVINIA 045129687 19:49</p> <p>Kesulitan saya saat gagal mengupload tugas, dan tidak ada tugas pengganti... Apakah ada alternatif lain untuk menambah nilai?</p> | <p>June 27, 2023</p> <p>June, 11, 2023</p> | <p>8 June</p> <p>ERVINIA 045129687 20:28</p> <p>Assalamualaikum tuton, mohon maaf saya memiliki kendala pada saat pengiriman tugas 2 pas kmrin saya kira sudah ke save ternyata pada saat kemarin saya liat lagi ternyata belum terkirim, apakah masih bisa saya mengirim tugas 2 lagi tuton...mohon bantuannya...🙏
terimakasih tuton..</p> |
| <p>5 July</p> <p>ILMA NURHANDAYA... 14:10</p> <p>Kesulitan saya selama kuliah di UT yaitu sulit berdiskusi dan sharing materi mata kuliah dengan teman, karena saya tidak mempunyai pokjar jurusan pendidikan ekonomi ini. Cara mengatasinya yaitu ketika saya mengalami kesulitan terhadap materi saya akan menanyakan kepada Bapak/Ibu Dosen Tuton yang bersangkutan dan membaca materi tambahan dari beberapa sumber seperti jurnal dan e-book 🙏</p> | <p>July 5, 2023</p> <p>July 9, 2023</p> | <p>9 July</p> <p>HIDAYATI FAUZIAH ... 07:27</p> <p>Nama : Hidayati Fauziah Pasaribu</p> <p>HIDAYATI FAUZIAH ... 07:29</p> <p>NIM : 044857373, jurusan : Pend. Ekonomi. Kesulitan yang saya hadapi selama menempuh kuliah di UT adalah dalam membagi waktu antara mengerjakan tugas perkuliahan dengan pekerjaan yang saya jalani. Sedikit sekali saya meluangkan waktu dalam membaca BMP yang ada. Terimakasih</p> |



3.1. Methods of Overcome Barriers to Learning in Tutor

The way students solve problems is categorized according to the categories introduced by Muilenburg & Berge (2001) and Planet (2021) who grouped methods to overcome barriers to learning into five, namely (1) technological integration, (2) enhanced communication, (3) student support services, and (4) faculty training and support. The results were presented in Figure 7. The majority of students overcome their learning difficulties by improving communication, especially with tutors. Almost all problems are communicated with the tutor in the hope that the tutor will help solve them. On the other hand, none of the students mentioned anything about the faculty support system. Method of overcoming barriers to learning mentioned by students but did not appear in Muilenburg & Berge (2001) and Planet (2021) is family support. A number of five students (11%) mentioned they seek support from their spouses to help them overcome barriers in learning with effective results.

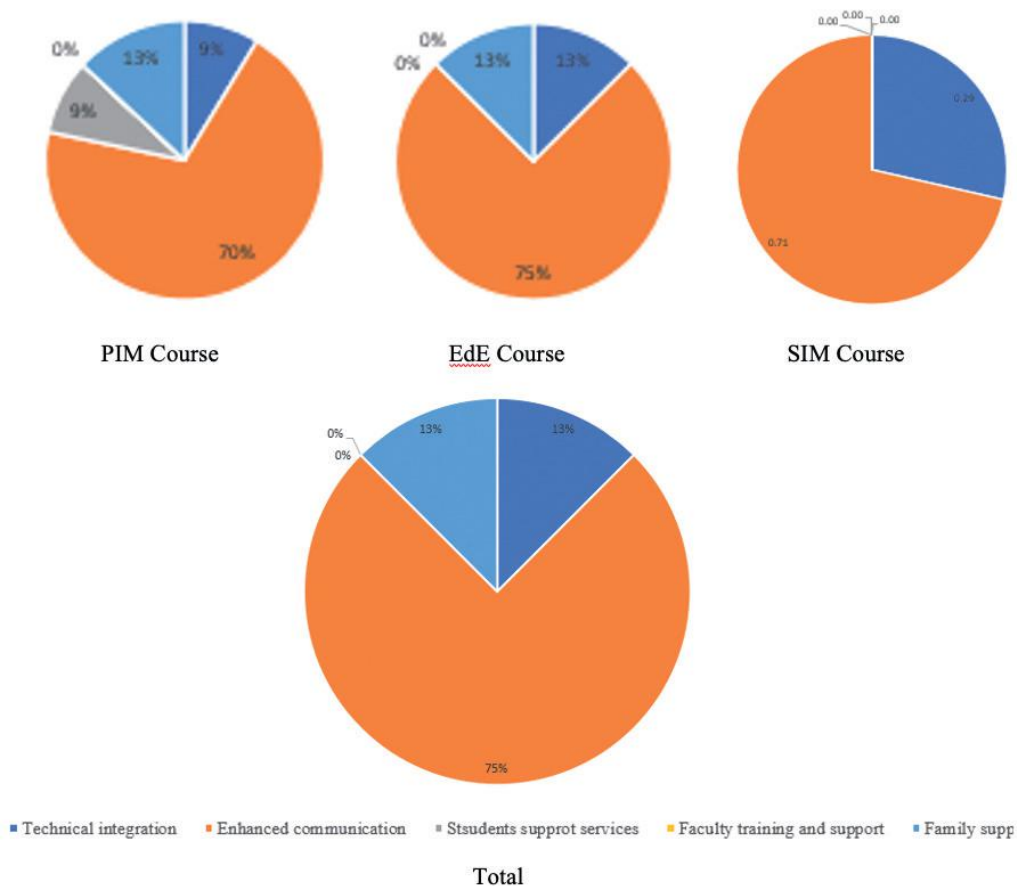


Figure 7. Ways of students to Overcome Barriers to Learning in Tutor

4. Discussion and Conclusion

From a total of 106 students registered in three Tuton classes researched, 33 (31.13%) students reported experienced barriers to learning during their Tuton; 16 (40.48%) students in PIM class, 11 (33.33%) students in EdE class, and 6 (18.18%) students in MIS class. A total of 46 barriers were reported from those 33 students.

4.1. Barriers to Learning in Tuton

A number 31.13% of students reported barriers to learning in tuton environment is low compared to other empirical studies such as Cannon et al (2022) who found out that 67% students struggling in their distance learning or Carasco (2021) with almost similar finding, two-third of online students facing difficulties. The relatively low number of participants in This reported Research experienced barriers to learning in Tuton could cause by several explanation, starting from positive - negative spectrum, as follows.



- 1) students' familiarity with the system,
- 2) the easiness/user friendly of the Tuton application,
- 3) the clarity of the information given to follow the tuton, and
- 4) the indifference of students to get optimal results.







Nonetheless, the number of students in the three researched tuton classes who reported barriers to learning were varied. In fact, the number of students reporting barriers in class PIM is three times higher than in those in MIS courses. One thing that might be the cause of this situation is the character of the course. SIM course presents rigorous material, clear step by step. For example, the development of information systems, which, for example, was initially carried out manually and then developed with the use of increasingly sophisticated information and communication technologies. This development is clear. It is different from the PIM material which explains small industry management. For example, it describes learning material related to various variables of choosing a business location. The variables are clear but how small entrepreneurs then decide on the location of their business is a different story.

The forty-six barriers mentioned fall into four categories, namely (1) Social interaction, (2) Technical issues, (3) psychological factors, and (4) Learning Material as depicted in Figure 4. The first three barriers were also found in prior research (Galusha, 1998; Muilenburg & Berge, 2005; Becker et al., 2013; Qifu, 2013; Talbert, 2020; Sugilar, 2020; Teh & Tsai, 2022; Mill; 2023) but the last listed barrier was not found in another research. One of the reasons for barriers in learning material might come from students' confession of "...do not have enough time to read the module" or "... too busy to learn what is written in the module and to tuton".

The following is a discussion related to barriers to learning experienced by students using some of the student's language

Table 5. Examples of Barriers Mentioned by Students

| Category | Examples |
|------------------|--|
| Technical issues | <div style="display: flex; justify-content: space-around;"> <div style="border: 1px solid #ccc; padding: 5px; width: 45%;"> <p style="text-align: center;">27 June</p> <p> ERVINIA 045129687 19:49</p> <p>Kesulitan saya saat gagal mengupload tugas, dan tidak ada tugas pengganti... Apakah ada alternatif lain untuk menambah nilai?</p> </div> <div style="border: 1px solid #ccc; padding: 5px; width: 45%;"> <p style="text-align: center;">8 June</p> <p> ERVINIA 045129687 20:28</p> <p>Assalamualaikum tuton, mohon maaf saya memiliki kendala pada saat pengiriman tugas 2 pas kmrin saya kira sudah ke save ternyata pada saat kemarin saya liat lagi ternyata belum terkirim, apakah masih bisa saya mengirim tugas 2 lagi tuton...mohon bantuannya... 🙏
terimakasih tuton..</p> </div> </div> <p>Technical issues reported by students mostly related to their difficulties in uploading discussions and /or assignments. This, in part, were related to the students lack of skills in operating computer and utilizing the Internet</p> |

| Category | Examples |
|-----------------------|--|
| Social interaction | <div data-bbox="422 190 853 672"> <p>5 July</p> <p> ILMA NURHANDAYA... 14:10</p> <p>Kesulitan saya selama kuliah di UT yaitu sulit berdiskusi dan sharing materi mata kuliah dengan teman, karena saya tidak mempunyai pokjar jurusan pendidikan ekonomi ini. Cara mengatasinya yaitu ketika saya mengalami kesulitan terhadap materi saya akan menanyakan kepada Bapak/Ibu Dosen Tuton yang bersangkutan dan membaca materi tambahan dari beberapa sumber seperti jurnal dan e-book 🙏</p> </div> <div data-bbox="885 212 1348 660"> <p>Students tell of their difficulties studying without having opportunities to discuss learning materials face to face with other students. They felt they were forced to master learning material by themselves. As a matter of fact, <u>Tuton</u> requires students to actively engaged in Discussion Forum at least once in every week with pre-determined topic. In the Discussion Forum, not only that students can discuss topic with other students but also with their tutor.</p> <p>Topics for discussion relate to topic of learning materials in each week of <u>Tuton</u></p> </div> |
| Psychological factors | <div data-bbox="422 694 853 1198"> <p>9 July</p> <p> HIDAYATI FAUZIAH ... 07:27</p> <p>Nama : Hidayati Fauziah Pasaribu</p> <hr/> <p> HIDAYATI FAUZIAH ... 07:29</p> <p>NIM : 044857373, jurusan : Pend. Ekonomi. Kesulitan yang saya hadapi selama menempuh kuliah di UT adalah dalam membagi waktu antara mengerjakan tugas perkuliahan dengan pekerjaan yang saya jalani. Sedikit sekali saya meluangkan waktu dalam membaca BMP yang ada. Terimakasih</p> </div> <div data-bbox="885 739 1348 1153"> <p>Most common barriers to learning mentioned were students' activities as teachers which left them no time to learn learning materials targeted to be mastered. All of students in the three <u>tuton</u> classes in this Research were students in Department of Teacher Training and Education where student is required to be active <u>an</u> teacher.</p> <p>Students stated that their busy schedule caused their time for study to be very limited. Even to read modules and initiation materials in <u>tuton</u> only the time available is very limited</p> </div> |
| Learning Material | <div data-bbox="422 1220 853 1624"> <p>11 May</p> <p> ILMA NURHANDAYANI</p> <p> ILMA NURHANDAYA... 12:56</p> <p>Assalamualikum, bu sy kesulitan mengerjakan tugas 2 no 4 terkait variabel perencanaan agregat, nyari dari beberapa referensi ga nemu bu mohon bantuannya. Terima kasih 🙏</p> </div> <div data-bbox="885 1220 1348 1624"> <p>27 June</p> <p> NURA NURDIANAH ... 07:07</p> <p>Kesulitannya dalam memahami materi matakuliah dikarenakan tidak ada penejelasan secara langsung. Untuk mengatasinya saya mencari dari sumber lain dalam bentuk video pembelajaran mata kuliah yang bersangkutan 🙏</p> </div> <div data-bbox="422 1646 1348 1792"> <p>The barriers faced by students when engaging in <u>Tuton</u> is limited materials needed to help them master the learning material and no direct explanation regarding the material discussed. However, with a little effort, students can actually meet the needs of the required teaching materials because UT provides a variety of learning resources such as virtual reading rooms and radio tutorials.</p> </div> |

In conclusion, the barriers to learning in tuton experienced by students fall into four categories, namely (from the highest to lowest) (1) social interaction, (2) technical issues, (3) psychological factors, and (4) learning materials.

There are at least four factors that cause these barriers, as follows.

- 1) students are not used to conduct independent study where they are required to plan, do, control, and , take certain measures accordingly,
- 2) students are busy carry out their duties as teachers which only leaves little time for study,
- 3) difficulty getting study material, and
- 4) Limited skills in operating Computer as utilizing the Internet

4.2. Overcoming Barriers to Learning in Tuton

The number of respondents who experience barriers to learning in Tuton (31.13%) is small compared to the results of previous studies which ranges between 60 – 70%. Nonetheless, respondents provided information on how they overcame the barriers. There are four ways that students use to overcome the barriers, namely (from the highest to the lowest):

- 1) enhanced communication,
- 2) implement technical integration,
- 3) seek for family support, and
- 4) take advantage of student support services.

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321-Acceptance Model of AI for Scientific Papers: Case Study of Indonesia

Ira Geraldina¹, Julia Safitri², Ami Pujiwati³, Mohd Faiz Hilmi⁴

Abstract

The use of Artificial Intelligence or AI in everyday life is predicted to be a game changer, including for writing scientific papers. Along with the increasing trend of using AI to help write scientific papers, this study aims to examine students' intentions to use AI technology in completing their scientific work. Previous research has elaborated on the use of AI in the educational process, particularly in the student evaluation process, but has not studied much about the use of AI for scientific writing. This study uses a quantitative approach and a sample of students who take the Scientific Writing class at the Universitas Terbuka, Indonesia. This paper makes a conceptual contribution to the development of a body of knowledge by adding a technology-personal-organization framework to the Technology Acceptance Model. Personal innovation and attitudes towards the blue color are expected to increase acceptance of the use of AI as well as technological and organizational support. AI technology should bring benefits and make paper writing easier to do. For AI technology and a personal attitude towards innovation to drive acceptance of AI for scholarly writing, it must be driven by policy organizations that can accelerate the adoption of new technologies as well as adequate infrastructure support. In addition, this paper has a practical contribution by providing which explanatory dimensions are most important which can increase student engagement that drives their intention to use AI for scientific work. Thus, the results of this study can be used as a reference for universities to formulate relevant policies related to technological support and organizational policies to adapt AI to scientific work. In other words, the results of this study may better explain whether AI technology is a game changer in writing scientific papers and whether AI may increase student engagement in the Scientific Writing learning process.

Keywords: *Technological acceptance model, AI for scientific papers, personal innovation, organization.*

1. Introduction

Universitas Terbuka, as an open and long-distance tertiary institution, each year it is the tertiary institution that graduates the most students in Indonesia. Based on the 2022 Higher Education Statistics, the Open University graduated 57,310 students from 43 study programs. If 97% of graduates come from the undergraduate level, then there are at least 55,590 students taking the Scientific Work course. If it is assumed that all lecturers are still guiding scientific work, then the ratio of supervisors to the number of students supervised is 1:82. Therefore, to maintain the quality of student scientific work, lecturers are assigned to guide a maximum of 15 students, so that the lack of mentors is taken from lecturers outside UT. The use of outside lecturers poses a challenge for UT to design supervision so students can complete scientific work on time and with quality.

Another problem that arises is that most UT students' study while working, so the time available to complete scientific work is limited. This has the potential to cause problems such as the use of paper writing services, plagiarism practices, and the intensity of mentoring that is not optimal. These problems can have an impact on the quality of writing scientific papers. Therefore, the use of technological devices, one of which is artificial intelligence (AI) is an option to solve this problem.

There are several scenarios for using AI in the world of education, namely as a student and school assessment tool, giving grades and evaluating student assignments and exams, teaching, smart schools, and online and mobile-remote-based education. In the context of writing scientific papers, AI can help provide recommenda-

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tions for research topics and knowledge according to student preferences (L. Chen et al., 2020; X. Chen et al., 2020;). The use of AI technology can increase output, access, retention and reduce costs and time to complete scientific work (Bates et al., 2020). Previous research shows that research in the field of AI in the educational context is still limited to the use of AI to assist learning and evaluation, but has not investigated the potential of AI technology, especially machine learning in writing scientific papers.

Talking about education in the era of society 5.0 is of course related to changes in the learning system in that era. Where this revolutionary era is closely related to 21st Century skills related to rapidly developing technological advances. This also has a connection with the learning system which certainly refers to increasingly advanced technological concepts. Trilling and Fadel (2009) argue that 21st century skills consist of three main types of skills, namely: (1) life and career skills, (2) learning and innovation skills, and (3) information media and technology skills.

Facing the era of society 5.0 requires 6 basic literacy skills such as data literacy, namely the ability to read, analyze, and use information (big data) in the digital world. Then technological literacy, understanding how machines work, and technology applications (coding, artificial intelligence, machine learning, engineering principles, biotech). And finally, human literacy, namely humanities, communication, & and design. As educators in the era of society 5.0, educators must have skills in the digital field and think creatively (Su & Yang, 2022). According to (Sanusi et al., 2022) assessing that in the era of society 5.0 (society 5.0), educators are required to be more innovative and dynamic in teaching in class. Therefore, there are three things that educators must take advantage of in the era of Society 5.0. including the Internet of things in the world of Education (IoT), Virtual/Augmented reality in the world of education, Utilization of Artificial Intelligence (AI) in the world of education to find out and identify the learning needs needed by students.

According to (Embarak, 2021) Optimizing the use of education is one of the achievements of happiness and prosperity for society. Education with high quality reflects the existence of a group of individuals who are advanced, peaceful, and directed towards constructive traits (Ho et al., 2021). Sarker (2021) in the current era of the Fourth Industrial Revolution (4IR or Industry 4.0), the digital world has a wealth of data, such as Internet of Things (IoT) data, cybersecurity data, mobile data, business data, social media data, health data, etc. To intelligently analyze this data and develop suitable intelligent and automated applications, knowledge of artificial intelligence (AI) and machine learning (ML) is key. Various types of machine learning algorithms such as supervised, unsupervised, semi-supervised, and reinforcement learning exist in the area. In addition, deep learning, which is part of the large family of machine learning methods, can intelligently analyze data at scale. In this paper, we present a comprehensive view of machine learning algorithms that can be applied to enhance application intelligence and capability. Furthermore, according to (Sanusi et al., 2022), machine learning teaching is now considered important and relevant in schools globally. Despite the ongoing discourse and increasing research in the emerging field, teachers' conceptions of machine learning remain under-researched. Martins & Gresse Von Wangenheim (2022), Machine Learning (ML) is becoming increasingly needed in the world of education from the high school level to higher education. Research conducted by (Alshurideh et al., 2020) explains that most of the technology adoption literature uses the technology acceptance model (TAM).

1.1. Technology Acceptance Model

TAM is a theory that explains the perceptions of technology users. The Technology Acceptance Model (TAM) shows that there are two certain beliefs, namely perceived ease of use of technology and perceived benefits of technology to determine one's behavioral intentions in using technology (R. Ibrahim, et al, 2018). The technology acceptance model (TAM) is a theory of technology acceptance used in this study. The technology acceptance model (TAM), introduced by (Davis, 1987) is an adaptation of the theory of reasoned action (TRA) specifically for modeling user acceptance of technology. This model was developed again by several researchers. TAM describes a causal relationship between a belief (the benefits of an information system and its ease of use) and the behavior, needs, and users of an information system. TAM aims to explain and predict user acceptance of an accounting information system. The TAM is used as a basis for knowing the relationship between perceptions of usability and perceived ease of use in the interest of IT (information technology) users.

1.1.1. Personal Innovativeness

Innovation is the creation and implementation of new processes, products, services, and methods of delivery which result in significant improvements in outcomes, efficiency, effectiveness, or quality. Personal inno-

vation is the act of making a change in your life with the aim of making your world a better one. Personal innovation can be on a professional, personal, or family level. Perceived Ease of Used. Personal innovation is about rethinking the ways you do things daily, so we can improve with each passing day. Maybe you have applied some personal development to your life and career, but as the times change, what got you successful before might not work for the future (Kim et al., 2018). According to (Abdullah et al., 2016) the best predictor of students' Perceived Usefulness of the e-portfolio is Perceived Ease of Use followed by Enjoyment. Both Perceived Ease of Use and Perceived Usefulness predict students' Behavioral Intention to Use the e-portfolio. Research conducted by (Veflen & Gonera, 2023) explains that improving understanding regarding acceptance of e-portfolio systems and this work is therefore of particular interest to researchers, developers, and practitioners of e-portfolios. The results indicate that design thinking activities may be useful also for large food safety projects. Multidisciplinary collaborative workshops can generate optimism and a sense of belonging among the participants, visualization tools can contribute to simplify complex information, and empathic observation studies make it easier to think user centric. Perceived usefulness and ease of use determine the formation of certain attitudes towards the use of innovations (Davis, 1989). Perceived usefulness is defined as how far a person believes that the use of technology can improve his performance. Perceived ease of use is defined as how far a person believes that using a technology will be effortless (Davis, 1989). (JM et al., 2018) stated that there is a relationship between perceived ease of use and perceived usefulness in attitudes toward technology use stating that TAM is quite reliable and can be used in various contexts of technology adoption. (Moslehpour et al., 2018) also stated that perceived ease of use can increase perceived usefulness and increase understanding of technology adoption. (Fagan et al., 2012) This study suggests that future research should consider the impact of an individual characteristic, personal innovativeness in the domain of information technology, to better predict users' intention to adopt an information technology innovation.

H1: Personal Innovativeness affects significant on Perceived ease of use (PEU)

H2: Personal Innovativeness affects significant on Perceived usefulness (PU)

1.1.2. Attitude Toward the Blue Color

Attitude towards use in TAM is conceptualized as an attitude towards using a system that takes the form of acceptance or rejection as an impact when someone uses technology in their work, Attitude is the individual's positive or negative feelings towards a behavior (Fazio et al., 1989). Hoppe et al. (2001) defines that attitude explains one' acceptance of information technology. Attitude (attitude) or commonly called Attitude Towards Using (attitude towards use) defined by Davis (1989) as a person's positive or negative feelings if forced perform the behavior to be determined ("an individual's positive or negative feelings about performing the target behavior"). Whereas (Irwanto, 2023) defines attitude towards attitude towards behavior (behavior) as an evaluation of users about their interest in using the system ("user's evaluation of wishes he uses the system"). Research conducted by (Chien et al., 2019) results showed that (1) both older and younger adults had more positive explicit attitudes toward robots after inter- action; (2) older adults had lower state curiosity than younger adults, however, their state curiosity would be up to the same level as younger adults when they perceived the robot with higher levels of personal as- sociation; and (3) the implicit association between robots and negative words was stronger for older adults than younger adults, suggesting that older adults had more implicit negative attitude toward robots. The results suggest that, despite older adults' relatively more negative implicit attitude toward robots, personally relevant positive experiences could help improve their explicit attitudes toward robots. The results of research conducted by (Al-Badi et al., 2022) the study found that both of them hold positive perceptions towards Artificial Intelligence implementation in personalized learning at Higher Education Institution in Oman.

H3: Attitude Toward the Blue Color significant on Perceived ease of use (PEU)

H4: Attitude Toward the Blue Color significant on Perceived usefulness (PU)

1.1.3. Technology

Technology refers to methods, systems, and devices which are the result of scientific knowledge being used for practical purposes. Technology is defined as the body of knowledge that deals with the innovation, invention, and application of technical means, as well as their interrelationship with life, society, and the environment (Fensham, 1900). Since the need for e-learning has been rising year over year, the Internet and technology's rapid development have encouraged the education industry to embrace Internet-based learning resources from primary to higher education. E-learning in this context refers to a concept in education that makes use of digital

technology and gadgets to distribute learning materials and promote distance learning (Alyoussef, 2023). Research on technology acceptance conducted by (Tubaihsat, 2018) explains that this study adds to the growing body of knowledge on issues related to the acceptance of technology in the health informatics field, focusing on nurses' acceptance of EHRs. Technology adoption is affected by uncertainty, perceived ease of use, and perceived usefulness. Compatibility and perceived ease of use are affected by perceived usefulness (Sugandini et al., 2018). In the future, education systems will have to cope with several challenges associated with digitalization. A key element for this is the use of digital tools to increase the integrity and efficiency of the teaching and learning experience of educators, students, and administrative roles (Haderer & Ciolacu, 2022).

H5: Technology significant on Perceived Ease of Used (PEU)

H6: Technology significant on Perceived usefulness (PU)

1.1.4. Organization

(Smircich, 1983) Organizational structure is a system that describes how certain activities are directed to achieve the goals of an organization. These activities can include rules, roles, and responsibilities. The organizational structure also determines how information flows between levels within the company. What is AI in an organization, artificial intelligence refers to the ability of machines to learn and make decisions based on data and analytics. When used strategically, AI has the potential to make a big difference in how we work. The purpose of this study was to assess the impact of Artificial Intelligence (AI) on education (Su & Yang, 2022). Premised on a narrative and framework for assessing AI identified from a preliminary analysis, the scope of the study was limited to the application and effects of AI in administration, instruction, and learning (Haderer & Ciolacu, 2022). The study ascertained that AI has extensively been adopted and used in education, particularly by education institutions, in different forms. systems leverage machine learning and adaptability, curriculum and content has been customized and personalized in line with students' needs, which has fostered uptake and retention, thereby improving learners' experience and overall quality of learning (Chen et al., 2020). The roles that users' individual and organizational characteristics play in technology acceptance was examined. Perceived work group characteristics were considered an organizational characteristic, attitude toward change and job stress were considered Perceived work group characteristics, attitude toward change, and job stress were related to one of the technology acceptance variables, perceived ease of use of the IT system. Ease of use was, in turn, related to perceived usefulness of the IT system, the other technology acceptance variable. Both perceived ease of use and usefulness were related to user satisfaction. individual characteristics (Lee et al., 2009). The main finding is that individual absorptive capacity mediates between affective commitment and actual usage of a flexible benefit system. And the study result showed that affective commitment has a positive effect toward absorptive capacity (Yulianti & Pusparini, 2021).

H7: Organization significant on Perceived Ease of Used (PEU)

H8: Organization significant on Perceived Usefulness (PU)

1.2. Perceived Ease of Used

According to (Sugandini et al., 2018) perceived ease of use is defined as the extent to which a person believes that using a technology will be free of effort. Perceived ease of use is based on the extent to which potential users expect the new system to be used free of difficulties. Research conducted by (Baki et al., 2018) the main purpose of the study is to determine the factors that affect the intention of users to use e-learning and to obtain results which can guide system developers and researchers. In accordance with this purpose, 203 studies investigating the e-learning acceptance of the users through the Technology Acceptance Model (TAM) were found in the literature. In those studies, variables which are suggested to determine Perceived Usefulness (PU) and Perceived Ease of Use (PEOU) and results of related hypotheses are analyzed. The ease of using AI technology in writing scientific papers can increase student engagement because AI technology makes it easier for them to finish writing their scientific papers.

H9: Perceived Ease of Used significant on Student Engagement Attitude

1.3. Perceived Usefulness

Davis (1989) perceived usefulness is the level of a person's belief that the use of a particular system will enhance his performance. Perceived usefulness is defined as the extent to which a person believes that using a technology will improve his job performance, perceived usefulness is defined as the individual's perception

that using the new technology will enhance or improve his or her performance. (Tahar et al., 2020) The results indicated that perceived ease-of-use and perceived security had a positive effect on the use of e-Filing, while perceived usefulness had no effect on the use of e-Filing. In addition, the readiness of information technology did not mediate the relationships among the perceived ease-of-use, perceived usefulness, and perceived security on the use of e-Filing. This study implies that the Directorate General of Taxes, as a provider of e-Filing services, may improve the quality of e-Filing, especially in terms of ease and security. This is because, based on the results of this study, both aspects have been empirically proven to be able to increase the intention to use e-Filing in reporting the annual notification letter. Furthermore (JM et al., 2018) The results showed that the variables of perceived ease of use and perceived usefulness has a positive and significant impact on the attitude toward using. Perceived ease of use and perceived usefulness also had a positive and significant impact on actual usage. Attitude toward using has a positive and significant impact on actual usage. In this study also found that the actual usage form of direct influence perceived ease of use and perceived usefulness without attitude toward using. The usefulness of using AI technology in writing scientific papers can increase student engagement because AI technology may help them to finish writing their scientific papers.

H10: Perceived Usefulness significant on Student Engagement Attitude

1.4. Student Engagement Attitude

Student engagement has been defined as participation in educationally effective practices, both inside and outside the classroom, which leads to a range of measurable outcomes and as the extent to which students are engaging in activities that higher education research has shown to be linked with high-quality learning outcomes. Similarly, define engagement as “the quality of effort students themselves devote to educationally purposeful activities that contribute directly to desired outcomes (Trowler, 2010). The study aims to identify learner’s attitudes toward mentoring, Finding shows that learner’s attitudes play a role in predicting e-mentoring. To ensure the success of the e-mentoring program, this research provides evidence that a learner’s attitude are critical factors to ensure students would stay involved with their mentors (Omar et al., 2012). Finding shows that learner’s attitudes play a role in predicting e-mentoring. To ascertain the successful of e-mentoring program, this research provide evidence learner’s attitude are critical factors to ensure students would stay involve with their mentor (Omar et al., 2012). The use of technology in educational settings has many influences, such as ease of information access, teachers work efficiency and increasing student motivation, The purpose of this study is to investigate the teachers’ attitude and intention to use Quizizz as an online game-based learning platform in the learning process, Findings of the study also show that teachers’ attitude towards Quizizz was positive, and they intended to use Quizizz in the learning process in the future. Intention to use Quizizz is also related to the age of the teacher. The older the teacher, the lower the intention to use Quizizz (et al., 2019). There were minimal significant relationships identified in terms of background characteristics (pre-entry attributes) and academic and social integration with the institution that could be linked to departure intention. It should be noted, however, that the results reported in this study do not endeavor to provide a test of the complete model (et al., 2019).

H11: Student Engagement Attitude significant on Intention

2. Method

This study uses primary data by distributing e-questionnaires to students who have taken scientific work courses at the Universitas Terbuka, Indonesia and were obtained 175 respondents. The research model was estimated using structural equation modelling as the research framework below that examines the student intention using AI for scientific work. The level of personal innovativeness, attitude toward the blue color, and organizational support are the exogenous variables that lead to the acceptance of AI technology. The perceived ease of use and perceived usefulness is expected influencing the student’s engagement and increasing the student intention using the AI technology. This study explored the influencing factors on student intentions and acceptance of AI technology, namely technology, personal, and organizational factors. The model is modified from Technology Organization Environment Framework and the Technology Acceptance Model (Marangunic & Granić, 2015; Na et al., 2022).

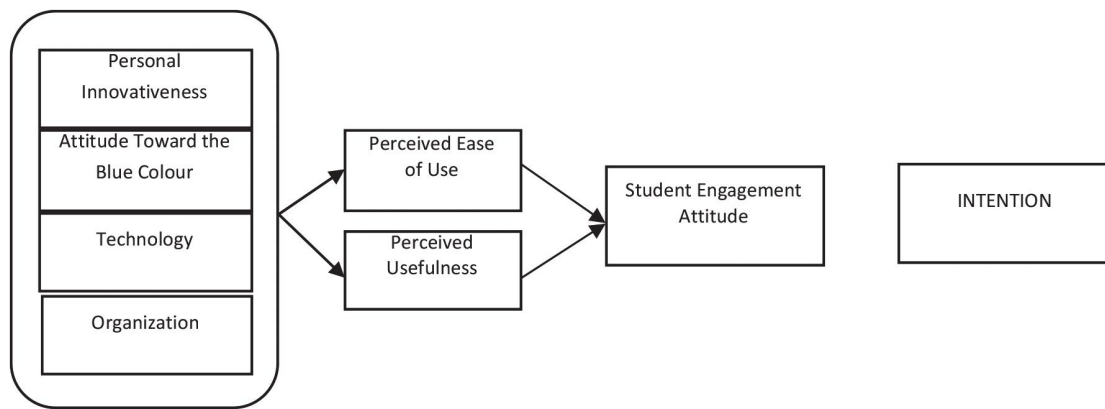


Figure 1. Technology Personal and Organizational Acceptance Model Framework

2.1. Variables and Measurements

Table 1 presents the construct and its valid and reliable indicators of the research model. Technology defines as the ability for technological adoption and suitability of the current technology to the organisation. It measures the relative advantage, conformance, and technology complexity compared to the current technology used. Personal refers to a person's response to something particular, which can be used to set oneself apart from others and convey patterns of thinking, emotion, and behaviour (Na et al., 2022). Regarding the intention to use AI technology, personal response to AI can be influenced by personal innovation and attitude towards blue colour. The degree to which a person's disposition or attitude reflect his or her inclination to experiment with technologies independently of the transmitted experience of others is referred to as personal innovativeness. That indicates that people must be willing to innovate using current solutions. Users who infuse any technical solution are compelled to use every feasible and appropriate application for both intended and unintended purposes (O' Connor et al., 2016). Blue color that might influence personal in workplace attitudes and behaviors. Attitude of blue color is a marker variable that conceptually, capturing response tendencies towards AI technology (Miller & Simmering, 2022). Organizational reflects management leadership and communication play crucial role in innovation. It measures management support towards AI technology for scientific work purposes (Na et al., 2022).

Perceived ease of use and perceived usefulness derive from Technology Acceptance Model. Perceived ease of use defines as degree to which the individual accepts that the AI technology will be easy to adopt without extensive physical effort or a steep learning curve. Perceived Usefulness measures the extent to which potential users assume that the use of the AI technology contributes to an easier performance of work tasks (Ibrahim et al., 2018; Mohr & K uhl, 2021). The ease of use and the usefulness of AI technology for scientific works is expected increasing student engagement to complete the scientific course as subjective attitude and behavioural intention of a user regarding the new technology or device (AI) to be used (Min et al., 2004).

Table 1. Mean Value of Indicator of Its Variables

| Variables | Code | Indicators | Mean |
|-----------------------------|------|--|------|
| Personal Innovativeness | P11 | I like to vary my set of routines at a moment's notice. | 3.96 |
| | P12 | I need the stimulation of frequent change. | 3.50 |
| | P13 | If I heard about a new task, I would look for ways to experiment with it. | 3.96 |
| | P14 | Among my friends, I am usually the first to try out with the new task given. | 3.50 |
| Attitude Toward Blue Colour | ABC1 | Blue is a beautiful colour. | 4.17 |
| | ABC2 | Blue is a lovely colour. | 4.02 |
| | ABC3 | Blue is a pleasant colour. | 4.07 |
| | ABC4 | The blue colour is wonderful. | 3.98 |
| | ABC5 | Blue is a nice colour. | 4.04 |
| | ABC6 | I like the blue colour. | 4.03 |

| Variables | Code | Indicators | Mean |
|-----------------------------|------|--|------|
| Technology | TEC1 | The benefit of an AI virtual assistant for academic writing has more advantages compared to the current e-learning. | 3.57 |
| | TEC2 | The use of an AI virtual assistant for academic writing is conformance with the existing e-learning system. | 3.61 |
| | TEC3 | AI virtual assistant for academic writing should have a less complicated process or a less complex interface than the current one. | 3.69 |
| Organizational | ORG1 | The using an AI virtual assistant for academic writing change the policy of scientific work in study programs. | 3.54 |
| | ORG2 | The using an AI virtual assistant for academic writing changes of the style and process of supervising of scientific work. | 3.63 |
| | ORG3 | AI virtual assistant for academic writing adjusting of teaching material. | 3.68 |
| Perceived Ease of Use | PEU1 | Interacting with the AI virtual assistant for academic writing does not require a lot of efforts. | 3.57 |
| | PEU2 | I find virtual assistants for academic writing to be easy to use | 3.45 |
| | PEU3 | It is easy to be skilful at using an AI virtual assistant for academic writing. | 3.49 |
| | PEU4 | It would be easy for me to find information at an AI virtual assistant for academic writing. | 3.49 |
| Perceived Usefulness | PUF1 | Advancing studies through using AI virtual assistant for academic writing can help my learning to be more efficient. | 3.63 |
| | PUF2 | Advancing studies through using AI virtual assistant for academic writing can help me acquire the information I needed. | 3.67 |
| | PUF3 | Advancing studies through AI virtual assistant for academic writing can be helpful to my work or learning. | 3.65 |
| | PUF4 | AI virtual assistant for academic writing improves my learning performance. | 3.57 |
| | PUF5 | AI virtual assistant for academic writing would increase academic productivity. | 3.58 |
| Student Engagement Attitude | SEA1 | I feel pleasant using an AI virtual assistant for academic writing. | 3.50 |
| | SEA2 | Using AI virtual assistant is a good idea. | 3.53 |
| | SEA3 | Using AI virtual assistant is a smart way finishing paper for academic writing work. | 3.53 |
| Intention | INT1 | I intend to use AI virtual assistant for academic writing. | 3.30 |
| | INT2 | I am expecting to use AI virtual assistant for academic writing. | 3.34 |

3. Findings

Figure 2 presents an estimated research model using structural equation modelling shows that the model meets the goodness of fit criteria.

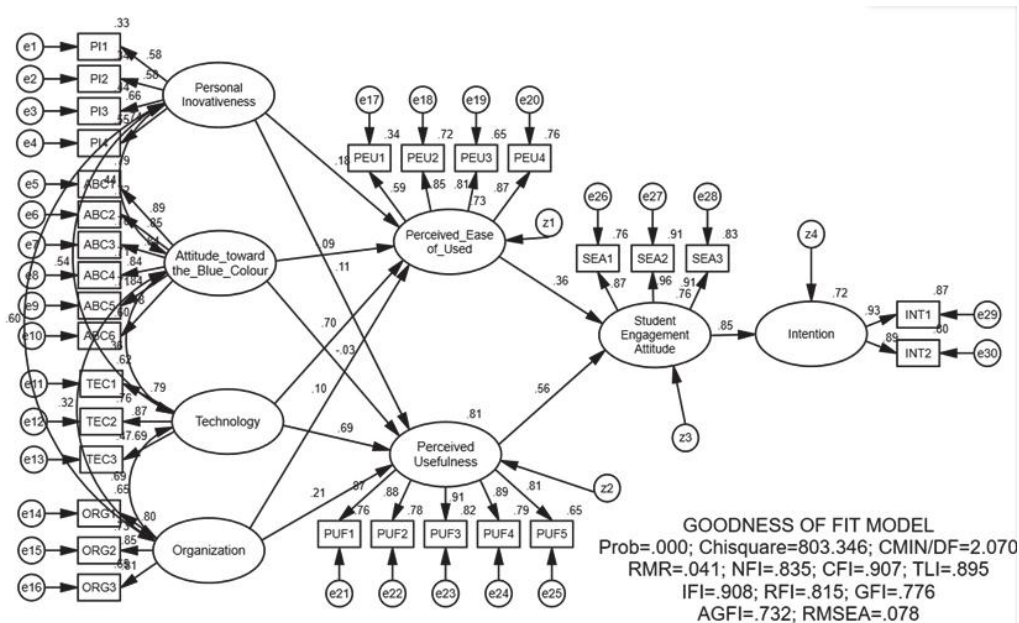


Figure 2. Estimated Research Model

3.1. Validity and Reliability

Table 2. Presents that All Variables are Reliable and the Valid Indicators. We Excluded the Invalid Indicators.

| Variables | Indicators | λ | Validity | AVE | CR | Reliability |
|--------------------------------|------------|-----------|----------|------|------|-------------|
| Personal Innovativeness | PI1 | 0.583 | valid | 0.42 | 0.87 | reliable |
| | PI2 | 0.574 | valid | | | |
| | PI3 | 0.667 | valid | | | |
| | PI4 | 0.742 | valid | | | |
| Attitude Toward the Color Blue | ABC1 | 0.889 | valid | 0.71 | 0.96 | reliable |
| | ABC2 | 0.849 | valid | | | |
| | ABC3 | 0.836 | valid | | | |
| | ABC4 | 0.843 | valid | | | |
| | ABC5 | 0.842 | valid | | | |
| | ABC6 | 0.778 | valid | | | |
| Technology | TEC1 | 0.808 | valid | 0.67 | 0.86 | reliable |
| | TEC2 | 0.877 | valid | | | |
| | TEC3 | 0.772 | valid | | | |
| Organizational | ORG | 0.825 | valid | 0.68 | 0.86 | reliable |
| | ORG2 | 0.877 | valid | | | |
| | ORG3 | 0.772 | valid | | | |
| Perceived Ease of Use | PEU1 | 0.563 | valid | 0.62 | 0.91 | reliable |
| | PEU2 | 0.852 | valid | | | |
| | PEU3 | 0.813 | valid | | | |
| | PEU4 | 0.880 | valid | | | |
| Perceived Usefulness | PUF1 | 0.873 | valid | 0.76 | 0.95 | reliable |
| | PUF2 | 0.890 | valid | | | |
| | PUF3 | 0.898 | valid | | | |
| | PUF4 | 0.893 | valid | | | |
| | PUF5 | 0.806 | valid | | | |
| Student Engagement Attitude | SEA1 | 0.870 | valid | 0.84 | 0.88 | reliable |
| | SEA2 | 0.960 | valid | | | |
| | SEA3 | 0.914 | valid | | | |
| Intention | PUF1 | 0.932 | valid | 0.84 | 0.77 | reliable |
| | PUF2 | 0.896 | valid | | | |

3.2. Model Estimation Results

The results of the model estimation show that the technology variable has a positive effect on perceived ease of use (H3) and perceived usefulness (H7). The two TAM variables, namely perceived ease of use (H9) and perceived usefulness (H10) have a positive effect on student engagement attitudes. Student engagement has a positive effect on student intention to use IA in writing scientific papers (H11).

Table 3. Model Estimation Results

| Variables Relationship | | Hypotheses | Estimate | P | |
|---------------------------------|---|-----------------------------|----------|-------|------|
| Personal Innovativeness | □ | Perceived_Ease_of_Use | H1 | .122 | .086 |
| Attitude_toward_the_Blue_Colour | □ | Perceived_Ease_of_Use | H2 | -.050 | .194 |
| Technology | □ | Perceived_Ease_of_Use | H3 | .451 | *** |
| Organization | □ | Perceived_Ease_of_Use | H4 | .074 | .383 |
| Personal Innovativeness | □ | Perceived_Usefulness | H5 | .125 | .200 |
| Attitude_toward_the_Blue_Colour | □ | Perceived_Usefulness | H6 | -.025 | .637 |
| Technology | □ | Perceived_Usefulness | H7 | .747 | *** |
| Organization | □ | Perceived_Usefulness | H8 | .246 | .049 |
| Perceived_Ease_of_Used | □ | Student_Engagement_Attitude | H9 | .570 | *** |
| Perceived_Usefulness | □ | Student_Engagement_Attitude | H10 | .530 | *** |
| Student_Engagement_Attitude | □ | Intention | H11 | .985 | *** |
| R-Square | | | | | |
| Perceived_Ease_of_Use | | | | | .810 |
| Perceived_Usefulness | | | | | .729 |
| Student_Engagement_Attitude | | | | | .755 |
| Intention | | | | | .721 |

4. Discussion and Conclusion

4.1. Discussion

The results of the study show that technology is an important determinant that can affect the acceptability of using AI for writing scientific papers. The technological elements in question are relative advantage, conformance, and technological complexity. An organization must consider the benefits or features of a new technology before choosing or adopting it over an existing technology. The introduction of new or innovative technology by an organization should align with the company's values, the desire for new technology, and the experience of potential users. In this case, Universitas Terbuka should consider the cost and benefit of the AI application development economically and financially. It should have a better relative advantage for the stakeholders compared to existing technology used, such as e-learning without AI installed into it.

In addition, even while new AI-based technologies have huge potential and benefits, Universitas Terbuka may delay or forego adopting them entirely if they are incompatible with the current operating systems or will cause major inconvenience during deployment. For instance, the AI application may lack compatibility between the organization's existing software and hardware and the forthcoming innovations. Universitas Terbuka must ensure that the AI applications to be developed are compatible with e-learning used in the current teaching and learning process for scientific work classes. For starters, the Universitas Terbuka can add teaching material to the scientific paper writing class module regarding the use of open AI to help complete student scientific work. For users to adopt new technology, it should also have a simpler interface or process than the one they are currently using. Therefore, adding AI features to e-learning in scientific work courses must be friendly to use, so that the technology really facilitates the completion of writing scientific papers, not the other way around.

Organizational elements have no effect on the acceptability of using AI in writing scientific papers, possibly because the measures used are limited to management support related to teaching policies and mentoring of scientific paper courses. Students do not see the need for policy changes related to scientific work if the Open University adopts AI technology for writing scientific papers. Students of course have a different perspective from management and lecturers who are concerned with the quality, originality, and integrity of scientific work.

The personal element does not affect the acceptability of using AI in writing scientific papers because students in the context of this study are users of AI technology who are relatively more passive when compared to those who develop technology. In addition, attitude toward blue color is not a possible marker variable because in general students are used to using technology with monitor screen interfaces. Students of Universitas Terbuka are getting used to using a variety of applications that use monitor screens in the process of lecture activities starting from admissions, tutorials, to graduation activities.

The results of this study confirm that students perceive using AI technology will make the completion of scientific papers course easier and enhance their performance. It motivates students to engage more with their scientific papers course. AI technology can be a more efficient and effective alternative than using the services of a scientific writing consultant. Student engagement in scientific work courses using AI assistance ultimately increases their intention to use AI technology.

4.2. Conclusion

The Universitas Terbuka may consider using AI technology to complete writing scientific papers. However, the Universitas Terbuka must ensure the relative advantages and compatibility of AI technology with the systems or technologies currently used. In addition, the AI technology used must have a simpler interface, so that the presence of AI technology makes it easier for students to complete scientific work. Therefore, the Open University may consider revising the master of teaching materials in scientific work courses by introducing the use of Open AI in writing scientific papers.

This research only captures students' intentions regarding the use of AI in scientific work courses. Further research is suggested to explore the intentions of faculty members and management regarding the use of AI in scientific work courses, so the results should be more comprehended than this study.

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325-AI Based System to Predict KNOU Students' Retention

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Abstract

Open university students have more possibility of dropout than ordinary college students. KNOU (Korea National Open University) has conducted continuous research and efforts to prevent them from dropping out. Artificial intelligence has opened a new way in higher education institutions for supporting students' learning based on numerous academic and learning data (Ouyang, Zheng, & Jiao, 2022). KNOU has so far conducted an analysis of who continues or stops studying after the fact. However, AI-based big data analysis has allowed KNOU to predict students whether to continue or stop studying during the semester. Using the KNOU data warehouse, we collected two-year data for the entire process from admission to graduation of about 100,000 students and made AI learn them. The KNOU retention model which was developed using multiple algorithms found 218 influencing factors suitable for the KNOU situation in various areas such as academic registration, online learning, and academic achievement. The KNOU retention prediction system using the ensemble technique was established, and the prediction of students' retention attending the spring semester of 2023 was realized. The empirical results of the KNOU retention prediction system were statistically significant. KNOU began predicting dropout by calculating the possibility of individual students' retention every month during the semester. According to the results of the dropout prediction, students are divided into three groups (general, risk, high risk). The prediction results of students' dropouts are provided to faculty members every month along with principal learning-related indicators. For each department and course, prediction of students' dropout can be checked during the semester, as well as early recognition and support for students at high risk or risk of dropout. Through the AI-based retention-dropout prediction system, KNOU has become possible to provide data-based student support services and institutional administration. There is an active discussion on what kind of intervention and learning support will be possible for students identified as having a high risk or risk of dropout.

Keywords: *AI, big data, retention, dropout, prediction*

1. Introduction

Recent technological development is very fast, and new technologies such as artificial intelligence have allowed the university to advance various functions. Universities have previously analyzed various data on events and results that occurred in schools to derive the causes and alternatives. However, artificial intelligence technology has enabled universities to not only interpret and apply data analysis, but also predict and respond. However, in order for such AI analysis to be possible, data must be systematically collected, and in order to apply it at the institutional level beyond the level of pilot modeling, it must be equipped with a system that is easy to collect and utilize data at the institutional level.

KNOU went through the process of upgrading existing statistical information into a big data analysis environment, which enabled administrative work to be efficient based on data utilization or data analysis results. KNOU worked on building a data hub portal and then applied AI technology to predict students' behavior by analyzing existing big data. AI learning analysis examined learners' academic behavior, identified factors that affect students' academic continuity, and predicted and provided subsequent academic activities and results through current students' academic behavior. KNOU's student retention-dropout prediction model

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system is meaningful as a practical example in that it has a system for collecting and utilizing such data at the university level and predicts each student's academic retention-dropout and provides it to instructors.

2. Literature Review

This study is about the development of AI-based retention-dropout prediction systems at open universities. The theoretical background and prior studies related to these studies were reviewed by dividing them into research on retention-dropout, which is the subject of the study, and AI-based research, which is the method of research.

2.1. Students' retention and dropout

Open university has contributed to the expansion of higher education and the improvement of excellence of adult learners. However, contrary to expectations, the rate of learners failing to continue their studies and stopping or dropping out of school is higher than that of traditional universities (Breslow et al., 2013, Tyler-Smith, 2006). The dropout rate of open universities is 3-4 times that of traditional universities (Lee, et al, 2020). Students at open universities have characteristics that vary in age, occupation, and academic background compared to students at traditional universities. Unlike traditional students who concentrate on their studies in college, adult learners often play various social roles such as jobs and housework while performing their studies. In addition, difficulties such as a sense of isolation and lack of interaction in a distance education environment may affect continuing study (Kwon, 2020). In order to prevent academic interruption and support academic continuity of open university students, it is necessary to consider new alternatives through consideration of the learning experience of distance university learners (Marr, 2018).

Models of Tinto (1975), Kember (1989), Eaton & Bean (1995) and various empirical studies based on it have continued to identify variables of academic interruption of online university learners and explore the relationship between each variable to explain the phenomenon of academic interruption comprehensively and structurally. Researchers tried to explore various variables such as individual variables such as learners' environment, psychological variables such as motivation, and educational institutional variables that affect the curriculum and learning to explore the causes of adult learners' continuity or suspension of study and suggest alternatives. (Jung & Lee, 2017).

Lee & Kim (2022) analyzed 88,000 data on KNOU students' academic continuity and analyzed factors that affect KNOU students' academic continuity among their personal characteristics (gender, age, entrance grade, entrance semester) and academic performance (number of subjects participating in mid-term evaluation, final evaluation, rating, acquisition, etc.). Among the variables of students' personal characteristics, age and admission grade influenced students' academic continuity. Among the academic performance variables, almost all variables, such as the number of subjects participating in the interim evaluation, the number of subjects participating in the final evaluation, ratings, and acquisition credits, had a relatively large impact on academic continuity. It is interpreted that the variables of academic performance have a great influence on academic continuity because the sincerity of academic performance is linked to academic continuity.

Recent data-based studies have attempted to identify variables related to academic continuation-interruption and reveal a comprehensive relationship, as well as to predict academic continuation or suspension of online university learners (Jung, 2020). Even if the meaning and background of learners' learning behavior cannot be fully explained, the product of a certain learning process was used to predict the behavior of learners to continue or stop their studies in the future.

2.2. AI-based research in online higher education

Recently, research and practice on AI-based online higher education have been widely conducted (Ouyang, et al., 2022). Studies on AI-based online higher education have been applied to "prediction of learning status, performance or satisfaction, resource recommendation, automatic assessment, and improvement of learning experience" (Ouyang, et al., 2022, p.7893). About two-thirds of cases of applying AI to online higher education focus on predicting students' academic performance, and predicting students' dropout risks, academy performances, and sites effects in online courses (Ouyang, et al., 2022). Mubarak et al. (2020) built a model to predict students at risk of dropout based on interaction logs in an online learning environment, with an accuracy of 84%. Aguiar et al. (2014) predicted the persistence of online classes by analyzing the portfolio of engineering students and showed results that predict them more accurately than models based on traditional academic data such as SAT scores, GPA, and demographics.

In an online higher education environment with a relatively high risk of dropout, predicting the continuation or suspension of such learning can benefit both individual students and higher education institutions. Baners et al. (2019) provided guidance and feedback by early identification of students with the possibility of academic interruption. In this way, the prediction system allows instructors and school administrators to identify problems with students' studies, support students' academic processes, and help students continue without stopping their studies (Moreno-Marcos et al., 2018).

According to Ouyang et al. (2022), the most frequently used algorithms in research on AI-based online higher education are decision tree (DT), neural network (NNN), naive bays (NB), and support vector machine (SVM), and several algorithms are used in one study. When these AI-enabled algorithms are applied to multiple variables, the accuracy of the prediction model increases.

Recently, AI-based research in online higher education has been increasing rapidly, but the cases applied to open universities are still insignificant. In order to utilize the development of AI technology to reduce KNOU students' academic dropout and increase academic retention, an AI-based KNOU academic retention prediction system was developed.

3. Method

3.1. Data-hub Portal System

Ultimately, this study aimed to derive an analysis model that predicts retention-dropout of KNOU students by analyzing big data based on AI and to provide it to professors and school administrators. In order to develop such a students' retention analysis model, it was necessary to systematically organize the data and specify the goal of what results they wanted to obtain. The tasks performed before the predictive analysis model can be summarized as follows.

First, the current data status of KNOU was investigated to provide additional data and consolidate overlapping data. Through this, data indicators were extracted through the expert meeting. Second, we investigated the data status of each administrative department and analyzed their needs to weight the dropout prediction indicators. Third, we conducted FGI with instructors to identify factors of students' retention.

In order to select indicators for KNOU's data status and academic persistence, we investigated all the current data status of KNOU. Currently, the data status provided by the statistical information system is divided into the following areas: Academic Affairs/Educational Environment/Administration/Major Disclosures / Student Life Cycle Analysis. It supports time series analysis by integrating distributed data within the KNOU and maintains a system for managing key data of the KNOU. We also want to provide an easily accessible information environment so that users can utilize the statistics they want in the web environment. We organized the statistical information and confirmed the factors for academic persistence through expert meetings to form the basic variables of the AI-based dropout prediction system. In particular, in the case of statistics required for university information disclosure, we tried to utilize various data variables by including statistics included in university information disclosure (Korea Educational Development Institute), education statistics (Ministry of Education), and statistical annals (Planning Department, KNOU).

We investigated the data status of each department and conducted a needs analysis. In fact, the person in charge of each department conducted interviews with each department to investigate all data on campus to secure meaningful data and develop indicators. In order to design an innovative future educational direction for our university, we received various opinions and ideas on the areas and forms that need to be analyzed, and sought to explore ways to utilize the analysis results for 'teaching and learning support services' and 'induction of academic continuation'.

The faculty FGI was conducted on teaching and learning aspects, department/university policy-decision aspects, U-Campus data analysis, and survey questions. To select the instructors, we selected professors who are in charge of major policy decisions at the school, professors who have experience as the head of the headquarters of educational informatization, professors who have conducted research on mid- to long-term development strategies, and professors who have served as the director of the Distance Education of Institute. The above professors were provided with explanatory materials on the need and purpose of developing an AI-based dropout prediction system, as well as the contents of the data hub portal and learning analytics, and their opinions were collected through in-depth interviews.

3.2. Retention-dropout Prediction Model

After this data restructuring, specific steps were taken for retention- dropout analysis. Data on students' characteristics (gender, age, region, etc.), affiliation (department, grade, college, etc.), course (taking courses, enrollment, etc.), academic affairs (registration, grade, etc.), learning (online learning variables), and counseling support (counselling, tutoring, etc.) were collected. 540 million data were collected, and the data that AI learns, verifies, and tests were classified.

Table 1. Data for students retention-dropout prediction model

| Data | | Case n | Note |
|------------|----------------|-------------|--------------------|
| Total Data | Collecting | 544,000,000 | 35 tables |
| Data | Training set | 570,000 | 2021-2022 Y |
| | Validation set | 310,000 | 2019 Y |
| | Test set | 320,000 | 2018 Y |
| Predicting | Cycle | | Monthly(beginning) |

The importance of variables was analyzed through basic statistical analysis and data preprocessing (abnormalization of outliers and missing values). A variable selection method that selects a variable through an algorithm was applied. Three algorithms (XGBoost, LightGBM, and CatBoos) were used, but the algorithm ensemble technique was applied using the average value of three algorithms.

Table 2. Applied algorithms for KNOU students' retention-dropout prediction model

| XGBoost | LightGBM | CatBoost |
|---|--|---|
| - Algorithm with parameters added to prevent overfitting | - Perform residual minimization learning with vertical asymmetric tree model | - Direct use of categorical variables without proactive data preprocessing |
| - Learning to minimize residuals to reduce the difference between actual and predicted values | - Leaf-centric segmentation minimizes predictive error loss values | - Provides categorical loss functions to work effectively for classification problems |

4. Findings

4.1. Retention-prediction modeling

Using data built in consideration of KNOU students' admission to graduation, a model was developed to predict students' retention-dropout by analyzing students' academic patterns with artificial intelligence. The number of data, accuracy, and recall rate of the prediction model for each algorithm and classification target are presented in Table 3. The accuracy of the prediction model was very good at 97.3% as of June 2023.

Table 3. Results of students' retention-dropout prediction modeling

| Training Date | Model-Period-Object | Training Data | N. of Training Data | Accuracy | Recall: Enrolled | Recall: Expelled |
|---------------|----------------------|---------------|---------------------|----------|------------------|------------------|
| 20230612 | CATB-Af/Mid-New | 2018~20203 | 307,532 | 98.36 | 96.9009 | 99.8168 |
| 20230612 | XGB-Af/Mid-New | 2018~20203 | 307,532 | 92.09 | 99.8994 | 84.2801 |
| 20230612 | LGBM-Af/Mid-New | 2018~20203 | 307,532 | 94.51 | 99.7916 | 89.2296 |
| 20230612 | CATB-Af/Mid-Enrolled | 2018~20203 | 868,718 | 99.06 | 99.6254 | 99.5653 |
| 20230612 | XGB-Af/Mid-Enrolled | 2018~20203 | 868,718 | 99.68 | 99.7334 | 99.6324 |
| 20230612 | LGBM-Af/Mid-Enrolled | 2018~20203 | 868,718 | 99.67 | 99.7108 | 99.6236 |
| Average | | | 3,528,750 | 97.32 | 99.2769 | 95.3579 |

The developed retention-dropout prediction model for KNOU students was actually applied to students attending in the spring of 2023, confirming how consistent it is with the actual retention-dropout results and

prediction results of students. As of April 2023, the rate of enrollment prediction for actual enrolled students was 96.2%, and the rate of expulsion prediction for expelled students was 84.3%. In addition to the accuracy of the prediction model itself, the prediction of retention-dropout of actual students showed an accuracy of 90.23% as of April 2023.

Table 4. Students retention-dropout prediction accuracy

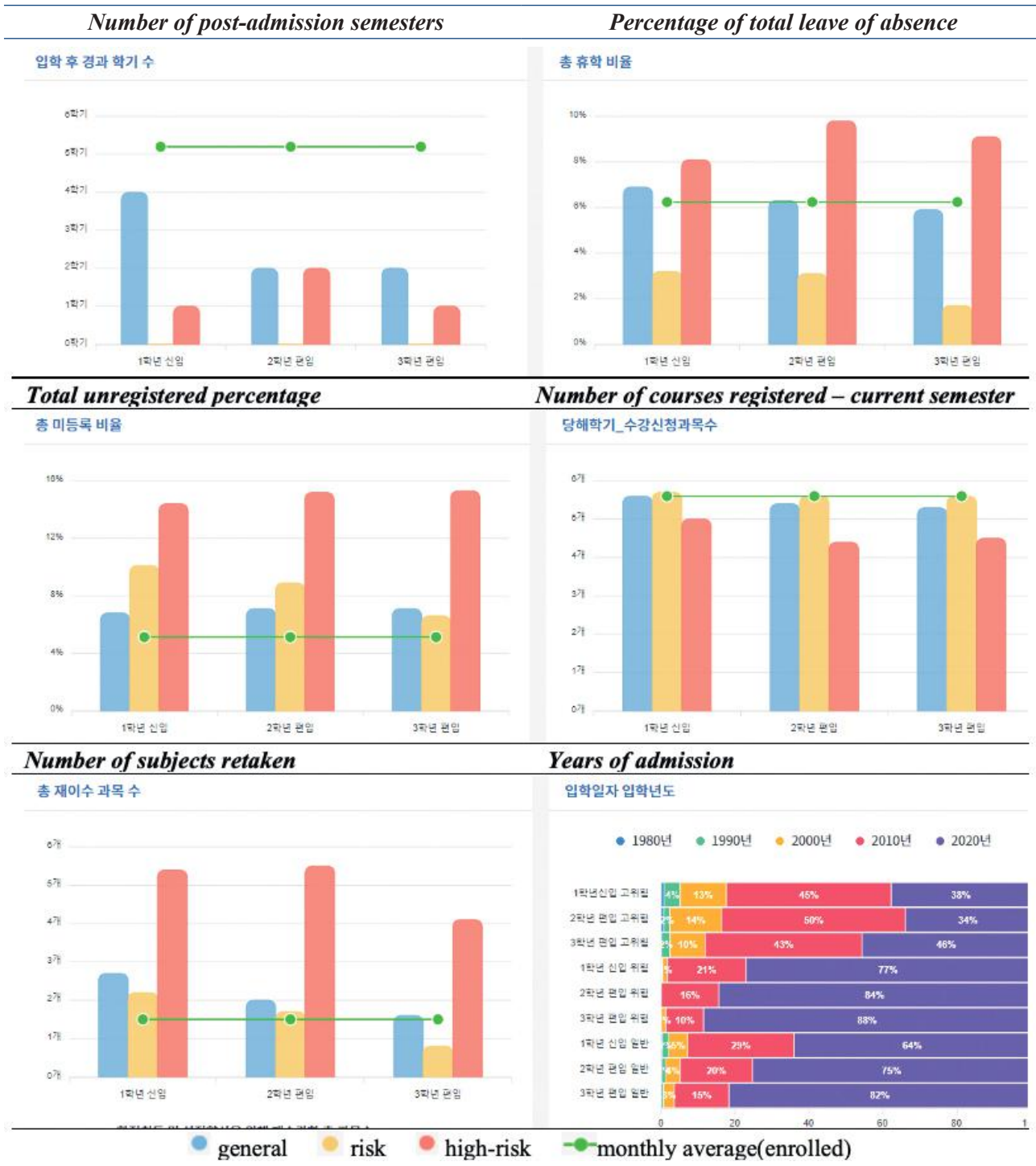
| Target Month | No of Students | Real Status | | Prediction Result | | Prediction Accuracy | | |
|--------------|----------------|--------------|--------------|-------------------|--------------|---------------------|----------------|----------------|
| | | Enrolled [A] | Expelled [B] | Enrolled [C] | Expelled [D] | Total | Enrolled [C/A] | Expelled [D/B] |
| April 2023 | 88,535 | 87,879 | 656 | 84,494 | 553 | 90.2% | 96.2% | 84.3% |
| March 2023 | 89,305 | 88,336 | 969 | 84,080 | 790 | 88.3% | 95.2% | 81.5% |

Table 5. KNOU Students' retention-dropout prediction results screen



As shown in Table 5, we developed a visualization screen that provides these prediction results as well as prediction models, providing information to identify students' retention-dropout predictions and learners' characteristics for each subject. In the Retention-dropout prediction, students with a high possibility of dropout were divided into high-risk groups (70% or more), risk groups (50-69%), and general groups (less than 50%).

Table 6. Major influencing factors in KNOU Students' retention-dropout prediction



The prediction status was presented by operating a system that predicts retention-dropout on a monthly basis to instructors, and major influencing factors were identified. It was provided to inquire student prediction information by department and subject.

5. Discussion and Conclusion

KNOU has established a new framework for comprehensively collecting and providing a large amount of data in the institution, and has established a system that predicts retention-dropout of KNOU students based on AI. This retention-dropout prediction system is technically meaningful in that it has prepared an environment for deriving and analyzing significant dropout factors based on AI. In addition, institutional and administrative work has enabled data-based decision-making and provided services that can preemptively respond to students' dropouts.

Without stopping here, KNOU plans to develop APIs so that they can be used as basic data in other operating systems to support academic recommendations and achievement for students in at-risk groups with a pattern similar to those of dropout students.

These AI-based research and practices have issues with the scope of personal information management and utilization. It has the task of agreeing on how to use students' personal and academic data to what extent and how much security setting is appropriate. In addition, as much as accurately predicting the retention-dropout of students, it is as important how to intervene and support students' studies with this prediction system. Using the results of students' retention-dropout predictions, we are actively discussing ways to provide students with necessary information and support their studies. It is expected that this AI-based prediction system will greatly contribute to the continuance of adult learners studying at open universities without being alienated or dropped out of the academic process.

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332-Acceleration of Student Satisfaction and Loyalty through Logistic Service Quality Program by Universitas Terbuka

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Abstract

Logistics service quality is a development of service quality to measure customer satisfaction in the logistics field. When logistics service quality is well-executed, it will undoubtedly result in customer satisfaction. Satisfied customers have an impact on the sustainability of logistics service quality. Despite Universitas Terbuka not being directly involved in logistics operations, it serves external stakeholders, particularly students, through policies, information dissemination, learning support facilities such as online tutorials, web tutorials, distribution of teaching materials, and many more. Properly managed logistics, in terms of quantity, quality, timeliness, and cost, can become a key asset for a public organization, serving as a strategic source of revenue that drives economic activities. This research aims to determine the impact of Universitas Terbuka's logistic service quality program on improving student satisfaction and loyalty. The research adopts a quantitative approach with an explanatory design. The research sample consists of 120 students from the Tuweb (Tutorial webinar) and Tuton (Tutorial online) programs in the first academic year 2022.1. Data collection is conducted using an online questionnaire instrument and processed using path analysis. The research findings indicate that information quality, as an indicator comprising logistic service quality, is deemed important by the respondents, followed by indicators such as personnel contact quality and complaint handling. In terms of student satisfaction, the respondents consider process quality as an important indicator. The path analysis results demonstrate that logistic service quality directly influences student satisfaction, indicating that an improvement in logistic service quality will be followed by an increase in student satisfaction. Logistic service quality also has a direct and indirect impact on student loyalty. Therefore, an enhancement in logistic service quality will be followed by an increase in student loyalty, both directly and indirectly through satisfaction. In conclusion, logistic service quality is capable of improving student satisfaction and loyalty, both directly and indirectly through student satisfaction. Information quality, as an indicator of logistic service quality, receives special attention from the respondents. It is recommended that Universitas Terbuka's management focus on the quality of information provided to students, including the speed of information delivery and the content, as it impacts student satisfaction and ultimately enhances student loyalty.

Keywords: *Logistic Service quality, student satisfaction, loyalty*

1. Introduction

Logistics service quality represents an advancement of service quality, aimed at quantifying customer satisfaction within the logistics sector. When logistics service quality functions effectively, it inevitably results in customer contentment. This satisfied customer base subsequently influences the sustainability of logistics service quality. As the continuum of customer satisfaction rises, it consequently affects customer retention, which involves a company's efforts to maintain clientele loyalty, encouraging repeated utilization of services from the same company. Strategies designed to ensure the success of customer retention are crucial considerations for any business.

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Logistical services are provided to external parties, particularly students, by Universitas Terbuka. Even though Universitas Terbuka is not directly involved in logistics operations, it acts to serve external stakeholders through policies, information dissemination, and support for learning facilities. This includes offerings such as Tutorial Online (Tuton), Tutorial Webinar (Tuweb), distribution of educational materials, and more. Precisely managed logistics, encompassing aspects like quantity, quality, timeliness, and cost-effectiveness, can emerge as a pivotal asset for public organizations. It serves as a strategic revenue source, stimulating economic activities.

In contemporary times, numerous organizations emphasize achieving high customer satisfaction. When customers merely experience satisfaction, they tend to swiftly shift preferences when presented with superior offers. Conversely, highly satisfied customers exhibit a reluctance to alter their choices. Elevated satisfaction fosters an emotional bond with the company, nurturing loyalty towards the institution. As per Sutopo and Suryanto (2003), "Service denotes any effort that enhances customer satisfaction." Haksever (2000) defines service as an economic activity generating temporal, spatial, and psychological utility.

Normann (2002) outlines characteristics of services as follows: a) Services are intangible. b) Services fundamentally differ from tangible goods. c) Services inherently involve tangible actions. In services, production and consumption activities are inseparable. Prasetyorini (2003) asserts that service quality literally represents exceptional service, maintaining and retaining existing customers while also attracting new ones. Additionally, according to Tjiptono (2005), customer loyalty within the service marketing context represents a response underlying continuity, relationships, and sustained purchases from the same service provider due to dedication. Reynolds and Beatty (2000) posit that the ultimate goal of customer satisfaction is customer loyalty. Satisfied customers are inclined to recommend to others and make repeat purchases. Hallowell (2002) maintains that customer satisfaction holds the potential to build loyalty. Loyal customers exhibit lower tendencies to switch products or services, are less price-sensitive, make more frequent and substantial purchases, engage in positive word-of-mouth, and generate business referrals. Similarly, as indicated by Semuel and Wijaya (2009), service quality directly influences customer loyalty and indirectly impacts it through satisfaction. This study aims to explore the impact of Universitas Terbuka's logistic service quality program on accelerating student satisfaction and loyalty.

2. Literature Review

2.1. Logistic Service Quality

According to Niveen El Saghier and Hoque Bhuiyan (2013) in their study, they concluded that service quality is an attitude resulting from the comparison of consumers' expectations of service quality with the perceived performance of the company. Service quality is the customers' perception of the service they receive and whether it matches their expectations (Agyapong, 2011). There are two main perspectives on service quality: the perspective of customer expectations and perceptions. Customers consider service quality performance to be low when what has happened is said to be good but does not match their expectations. However, customers truly perceive high service quality performance when their expectations are high, and the service they receive matches their expectations.

Research by Hyun Mi Jang et al., (2013) identified that logistics service quality involves activities carried out by providers of goods delivery services that consistently focus on delivery quality and efficiency. The primary goal of logistics service quality is to significantly enhance customer satisfaction. Quality in supplier physical distribution activities has the greatest impact on customer satisfaction.

Logistics service quality can be studied from two distinct perspectives: the objective perspective and the subjective quality perspective. This industry viewpoint perceives quality as an accurate evaluation of all the stages and operations required to deliver a service. From this perspective, service quality is a comprehensive assessment or attitude, reflecting the superior nature of the service. The objective perspective is measured through customer perceptions in relation to their expectations (subjective components), which are the main components of logistics service quality.

Based on the above explanations, it can be concluded that logistics service quality is the effort undertaken by companies to meet and respond to the needs and desires of consumers for goods and services by optimizing the network of goods and services delivery to customers in a timely manner. When this is achieved, consumers will feel satisfied, and their expectations will be fulfilled. Logistics Service Quality is an endeavour by companies to respond to the needs and desires of consumers for goods and services by optimizing the

network of goods and services delivery to customers in a timely manner, resulting in consumer satisfaction and meeting their expectations.

According to Mentzer (1999), the dimensions of logistics service quality do not solely measure physical attributes but also measure dimensions including: 1. Personnel Contact Quality, which refers to the customer's orientation towards contact people from the logistics department of the company. Specifically, customers assess whether customer service staff are knowledgeable, empathetic towards customer situations, and helpful in resolving customer issues. Parasuraman, Zeithaml, and Berry (1985) suggest that customer perceptions of service quality are formed during service delivery. 2. Information Quality, which refers to customer perceptions of the information provided by the company about products that customers can choose. If the sought-after information is available and of adequate quality, customers can use this information to make decisions. 3. Order Discrepancy Handling, this variable refers to how well the company handles discrepancies in orders that occur after the order is delivered to the customer. The company's ability to handle such issues effectively will impact customer perceptions of the quality of the company's service.

2.2. Customer Satisfaction

Kotler (2009) states that in general, satisfaction is the feeling of pleasure or disappointment that arises when an individual compares the perceived performance of a product (or outcome) to their expectations. Lovelock et al. (2005) define satisfaction as follows: "Satisfaction can be defined as an attitude-like judgment following a purchase act or series of consumer product interactions. Satisfaction is a function of positively disconfirmed expectations (better than expected) and positive affect." Kotler & Keller in their book "Marketing Management" (2013) define satisfaction as follows: "Satisfaction reflects a person's judgment of a product's perceived performance in relation to expectations. If the performance falls short of expectations, the customer is satisfied. If it matches expectations, the customer is satisfied. If it exceeds them, the customer is delighted." Customer satisfaction is the response of customers to the evaluation of the perception of the difference between initial expectations before purchase (or other performance standards) and the actual performance of the product as perceived after using or consuming the respective product. Satisfaction or dissatisfaction is a comparison of consumer expectations to the perception of actual service encounters. From these various definitions, it can be concluded that the meaning of satisfaction is the feeling or response of an individual towards something considered good or adequate and pleasant or disappointing, arising from the consumption of a product or service after comparing their own expectations against what they actually receive from the product or service.

2.3. Loyalty

According to Griffin (2005), "The definition of loyalty involves the formation of an attitude and pattern of behaviour of a consumer towards the purchase and use of products resulting from their previous experiences." According to Baloglu (2002), "Loyalty is the attitude and behaviour of customers that indicates repeated purchases of a particular product or service, and also demonstrates a high commitment to the brand or company."

Loyalty is a psychological condition related to one's attitude towards a product; consumers form beliefs, establish likes and dislikes, and decide whether they want to purchase a product (Hasan, 2014). Consumer loyalty involves behaviours associated with a product's brand, including the likelihood of renewing brand contracts in the future, the potential for customers to change their support for a brand, and the likelihood of customers wanting to enhance the positive image of a product (Hasan, 2014). Based on this definition, it is evident that loyalty is primarily directed towards a behaviour demonstrated by regular purchases, based on the decision-making unit. Therefore, it can be concluded that loyalty is the deep commitment of customers to remain subscribed or consistently repurchase selected products or services in the future.

3. Methodology

This research employs a quantitative approach with an explanatory research design. The data collection involves both qualitative and quantitative data from a sample of 70 student respondents from the first semester of the academic year 2022. 1, enrolled in the courses ISIP4216/Social Research Methods and LUHT4353/Scientific Writing Techniques. Data is collected using an online questionnaire. The data analysis technique used in this study is the confirmatory factor analysis method, a type of factor analysis. Factor analysis is a technique aimed at identifying underlying dimensions that explain the observed variables.

4. Findings

The findings of this study indicate that “information quality” serves as a significant indicator comprising logistic service quality, as perceived as important by the respondents. Following this, “Personnel contact quality” and “Complaint handling” indicators are also highlighted. In terms of student satisfaction, respondents consider “process quality” as a crucial indicator.

4.2. The Effect of Logistic Service Quality on Student Satisfaction

Regression analysis results were utilized to examine the effect of logistic service quality on student satisfaction at UT, as presented in the table below.

Table 1. Results of the Effect of Logistic Service Quality on Student Satisfaction

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .708 ^a | .502 | .496 | 1.277 |

a. Predictors: (Constant), LOGISTIC SERVICE QUALITY (X)

b. Dependent Variable: STUDENT SATISFACTION (Z)

Sumber : Pengolahan Data Primer

Source: Processing Primary Data

The value of Adjusted R Square obtained from the data analysis is 0.502. This signifies that the variations in the Quality of Service (X) variable can account for 50.2% of the variations in the Customer Satisfaction (Z) variable, while the remaining 49.8% is attributed to other factors not included in this study.

The regression analysis results were utilized to examine the effect of student satisfaction on overall satisfaction, as illustrated in the following output:

Table 2. Results of the Effect of Student Satisfaction on Overall Satisfaction

| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|-------|------------------------------|-----------------------------|------------|---------------------------|-------|------|
| | | B | Std. Error | Beta | | |
| 1 | (Constant) | 4.297 | 1.239 | | 3.469 | .001 |
| | LOGISTIC SERVICE QUALITY (X) | .710 | .073 | .708 | 9.679 | .000 |

a. Dependent Variable: STUDENT SATISFACTION (Z)

The hypothesis test for the variable of service quality’s effect on customer satisfaction is conducted by comparing the obtained t-count from Table 16, under the t-column, with the t-table value derived from the t-distribution. If the calculated t-count is greater than (>) the tabulated t-table, then the null hypothesis (H₀) is rejected. The statistical results of the t-test for the service quality variable reveal a calculated t-count of 9.679, with a tabulated t-table of 1.986, and a significance level of 0.000. Since the significance value is smaller than 0.05 (0.000 < 0.005), the regression coefficient with a positive value of 0.710, the hypothesis stating that “Logistic Service Quality significantly influences student satisfaction” is accepted.

This study provides results that indicate a significant influence of logistics service quality on customer satisfaction, aligning with the perspective of (Mentzer, Flint, & Hult, 2001), which asserts a positive impact and relationship between logistics service quality and customer satisfaction. When the components of the logistics service quality dimension perform well, they lead to customer satisfaction. Delivering optimal logistic services

to customers is a primary objective for logistics companies to ensure that customers experience satisfaction when using their services. (Mentzer et al., 2001) also suggests the existence of two stages toward customer satisfaction based on the quality of logistics service. The first stage is the ordering process.

4.3. Effect of Logistics Service Quality on Loyalty

Table 3. Results of the Effect of Logistic Service Quality on Loyalty: Model Summary

Hasil Pengujian R^2 Hipotesis 1 Model Summary^b

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .601 ^a | .362 | .355 | 1.484 |

a. Predictors: (Constant), LOG SERVQUAL (X)

b. Dependent Variable: LOYALTY (Y)

The adjusted R-Square value obtained from the data analysis is 0.362. This signifies that the variation in the Logistic Service Quality variable (X) can explain approximately 36.2% of the variation in the Student Loyalty variable (Y), while the remaining 63.8% is attributed to other factors not considered in this study, such as brand image, price, and location.

Table 4. Results of the Effect of Logistic Service Quality on Loyalty: Coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|------------------|-----------------------------|------------|---------------------------|-------|------|
| | B | Std. Error | Beta | | |
| 1 (Constant) | 5.637 | 1.440 | | 3.915 | .000 |
| LOG SERVQUAL (X) | .619 | .085 | .601 | 7.260 | .000 |

a. Dependent Variable: LOYALITAS (Y)

Sumber : Pengolahan Data Primer

Source: Processing Primary Data

The statistical t-test result for the service quality variable yields a calculated t-count of 7.260, with a tabulated t-table of 1.986 and a significance level of 0.000. Since the significance level is smaller than 0.05, and the regression coefficient has a positive value of 0.601, the hypothesis stating that “logistic service quality has a significant positive effect on student loyalty” is accepted. Based on these analysis results, it is evident that when logistic service quality is enhanced, it is followed by an increase in student loyalty.

4.4. The Effect of Student Satisfaction on Loyalty

The coefficient of determination is used to observe the percentage of variation in the dependent variable (Customer Loyalty) that can be explained by the variation in the intervening variable (Customer Satisfaction).

Table 5. Results of the Effect of Student Satisfaction on Loyalty: Model Summary

Model Summary

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate |
|-------|-------------------|----------|-------------------|----------------------------|
| 1 | .734 ^a | .539 | .534 | 1,262 |

a. Predictors: (Constant), STUDENT SATISFACTION

Sumber : Pengolahan Data Primer

Source: Processing Primary Data

The Adjusted R Square value obtained from the data analysis is 0.534. This indicates that the variation in the Customer Satisfaction variable (Z) can explain 53.4% of the variation in the Customer Loyalty variable (Y), while the remaining 46.6% is explained by other factors not included in this study.

Table 6. Results of the Effect of Student Satisfaction on Loyalty: Coefficients

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|--------------------------|-----------------------------|------------|---------------------------|--------|------|
| | B | Std. Error | Beta | | |
| | 1 (Constant) | 3,809 | 1,180 | | |
| STUDENT SATISFACTION (Z) | ,754 | ,072 | ,734 | 10,417 | ,000 |

a. Dependent Variable: LOYALTY (Y)

Sumber : Pengolahan Data Primer

Source: Processing Primary Data

The hypothesis testing for the variable “Student Satisfaction” on “Loyalty” is conducted by comparing the obtained t-count. The t-test statistic results for the “Student Satisfaction” variable yielded a t-count of 10.417, with a t-table value of 1.986 and a significance level of 0.000. Since the significance level is less than 0.05 ($0.000 < 0.05$), the effect of the “Student Satisfaction” variable on “Loyalty” is deemed significant. This implies that an increase in student satisfaction leads to a corresponding increase in student loyalty.

The results of testing the direct effect of the “Logistic Service Quality” variable on “Student Loyalty” and the indirect effect of the “Logistic Service Quality” variable on “Student Loyalty” through “Student Satisfaction” as an intervening variable in path analysis can be summarized as follows:

4.5. Sobel Test

Table 7. Results of the Path Analysis Test

Hasil Uji Analisis Jalur Kualitas Pelayanan (X) terhadap Loyalitas Pelanggan (Y) dengan Kepuasan Pelanggan (Z) sebagai variabel intervening

| Model | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
|--------------------------|-----------------------------|------------|---------------------------|-------|------|
| | B | Std. Error | Beta | | |
| | 1 (Constant) | 2.911 | 1.289 | | |
| LOGSERVQUAL (X) | .168 | .102 | .164 | 1.656 | .101 |
| STUDENT SATISFACTION (Z) | .634 | .102 | .618 | 6.248 | .000 |

a. Dependent Variable: LOYALTY (Y)

The results of the direct effect testing of the service quality variable on customer loyalty and the indirect effect of the service quality variable on customer loyalty with customer satisfaction as an intervening variable in the path analysis can be summarized as follows:

$$\text{Sat} = \sqrt{(b2)(sa)^2 + (a2)(sb)^2 + sa2sb2}$$

$$\text{Sat} = \sqrt{(0.634)^2(0.102)^2 + (0.168)^2(0.102)^2 + (0.102)^2(0.102)^2}$$

$$\text{Sat} = \sqrt{(0.401956)(0.010404) + (0.02822)(0.010404) + (0.010404)(0.010404)}$$

$$\text{Sat} = 0.017136$$

$$t = ab/\text{sat}$$

$$t = (0.168)(0.634) / 0.017136$$

$$t = 0.106512 / 0.017136 = 6.215686$$

t count > t table so that there is a significant indirect effect

5. Conclusion

Logistic service quality is capable of acceleration student satisfaction and loyalty both directly and indirectly through student satisfaction. Information quality, as an indicator of logistic service quality, is an aspect that garnered special attention from the respondents. Therefore, it can be suggested that the management of Universitas Terbuka focuses on the quality of information provided to students, both in terms of the speed of information delivery and the content of information, as it has an impact on increasing student satisfaction and ultimately acceleration student loyalty.

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338-Semi-online Proctoring Exam Model: A Solution to Demographic Access Limitations by Universitas Terbuka

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Abstract

The administration of final semester exams is an integral part of higher education systems, especially in the post-Covid-19 pandemic era. Final semester exams are conducted with various schemes to adapt to the conditions while maintaining the aspect of fulfilling objective requirements for participating and measurable students. One type of exam service organized by Universitas Terbuka during the pandemic is the Take Home Exam, which is considered an effective exam service. However, with the dynamics post-pandemic, Universitas Terbuka has reintroduced the online-based exam system, which requires students to come to designated exam locations equipped with computers connected to the Universitas Terbuka Central Office Server. Therefore, this research aims to analyse the implementation of a semi-online proctoring exam model as a solution to address demographic access limitations and provide flexibility in exam scheduling. Challenges have emerged in the implementation of final semester exams, particularly regarding demographic access limitations for students residing in remote or inaccessible areas, as well as the limited time available for working students. Therefore, this study aims to analyse the implementation of a semi online proctoring model for final semester exams as a solution to address demographic access limitations and flexibility challenges. This research adopts a qualitative approach with data collection techniques, through interviews and observations. The findings reveal that the implementation of a semi online proctoring model for final semester exams can minimize demographic access limitations for students. However, several challenges are faced, such as unstable internet connections and students' lack of understanding of the online exam system. To overcome these challenges, the researcher recommends the development of information technology infrastructure and training for students on the use of online exam systems. In conclusion, the implementation of final semester exams with a semi online proctoring model can serve as a solution to address demographic access limitations and challenges in participating in exam schedules, particularly for working students.

Keywords: *Final Semester Exams, Semi Online Proctoring Model, Demographic Access Limitations, Technology.*

1. Introduction

The COVID-19 virus was first discovered at the end of 2019, and the World Health Organization (WHO) declared it a global pandemic in 2020. The educational system started seeking for new teaching and learning strategies. This was especially prominent upon the issuance of Circular Letter No. 4 of 2020 by the Minister of Education and Culture, which advised that all educational activities in institutions should maintain distance, and all instructional content should be delivered remotely to individual homes. To prevent the transmission of viruses, each institution was forced to implement cutting-edge innovations in the educational process. Reducing in-person educational activities in educational institutions and universities and replacing them with online learning represented one of the government's mandates.

The COVID-19 epidemic brought both opportunities and challenges to the distance learning institution Universitas Terbuka (UT). As a pioneering institution in distant learning in Indonesia, UT took advantage of the opportunity to upgrade its current learning facilities. In response to the pandemic, UT introduced a ground-

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breaking change by implementing a Take Home Exam, enabling students to complete their exams without the need to visit the UT Regional Office, also known as Unit Program Belajar Jarak Jauh UT (UPBJJ-UT). This innovative approach reduces physical interactions and minimizes the risk of virus transmission.

Prior COVID-19, 37 UT Regional Offices (UPBJJ-UT) managed the Final Semester Exam (*Ujian Akhir Semester/UAS*) at exam centres located across various Indonesian regions and cities. These examination locations were frequently located in nearby schools which operated under UPBJJ-UT management. UPBJJ-UT managed the availability of exam rooms, invigilators, exam papers, and exam support materials (attendance lists, participant lists, and Examination Implementation Reports, as well as Answer Sheets (*Lembar Jawaban Ujian/LvJU*) for multiple-choice questions and Exam Answer Books (*Buku Jawaban Ujian/BJU*) for open-ended questions).

On top of that, to provide students with flexible exam options, UT had been developing a Computer-Based Exam (*Ujian berbasis Komputer/UBK*) system since 2004. However, UBK was not yet fully implemented online. Soft copies of exam papers were still manually sent to UPBJJ-UT, and the exam paper sets were stored on the respective servers of the organizing UPBJJ-UT. As a result, the confidentiality and security of exam papers were not optimally ensured. In order to enhance security, UT improved the UBK system in 2008 with the aim of implementing it solely online under the name of the Online Exam System (*Sistem Ujian Online/SUO*).

Furthermore, UT developed a proctoring mode for exams known as Ujian Semi Online Proctoring (USOP). USOP is a synchronous exam type where students can virtually take exams from their homes or any location through real-time online connection, using hardware devices such as computers/laptops connected to UT servers via the internet.

All activities resumed their regular patterns after the outbreak was over. However, complications have recently emerged in the administration of exams, notably in relation to demographic access limitations for students who live in remote areas or are faced with difficulties as well as time constraints for working students. Therefore, this study aims to analyse the implementation of the Semi Online Proctoring Exam mode for end-of-semester exams as a solution to demographic access limitations and flexibility in exam scheduling. The research objective is to analyse the implementation of the Semi Online Proctoring Exam mode for end-of-semester exams as a solution to demographic access limitations and flexibility in exam scheduling.

2. Literature Review

During the Covid-19 pandemic, all teaching and learning activities, especially in higher education, shifted online, including examination systems. The proctoring system is one of the online examination formats that allows students to take exams from any location. Proctoring involves online supervision through a webcam. According to the journal “A Systematic Review on AI-based Proctoring Systems: Past, Present and Future” by Aditya Nigam et al. (2021), various platforms and technological innovations supporting online supervision have emerged. The positive side of this is that it greatly assists in maintaining the quality and fairness of online activities, especially when it comes to school or university evaluations. Without proper supervision, evaluation results cannot be considered reliable benchmarks.

Proctoring is depicted as an anti-cheating system. This is particularly accurate when implemented with compatible devices. Some necessary devices to support this system include a webcam, microphone, and stable internet connection. As proctoring is an online supervision system, the first step for participants is to take a photo of their face via a smartphone camera or webcam. The collected photo is subsequently uploaded to the server through a cloud service. The exam invigilator then accesses a computer with the necessary permissions. The next step involves the functioning of facial recognition technology, allowing invigilators to verify participants’ identities. Identity checks for participants are also conducted.

Several forms of cheating can be detected by the proctoring system, including:

1. Cheating probability computations are performed every 30 seconds and their multiples.
2. If a participant leaves the exam page, their action is considered fraudulent (e.g. opening new tabs, accessing other documents, and using other programs)

Online proctoring can be referred to as remote proctoring. Invigilators can request access to the exam screen in front of participants. In contrast, offline proctoring's invigilation quality is harder to ensure due to the lack of cross-check records. Through online proctoring, the likelihood of cheating occurring during the exam can be significantly reduced. Proctoring is an appropriate choice and an effective solution for maintaining assessment credibility.

3. Methodology

This study adopts a quantitative method, specifically the descriptive analyst type, to thoroughly examine the subject matter. The research methodology encompasses both qualitative and quantitative data to provide a comprehensive perspective. It adopts a case study design, allowing for an in-depth analysis of the phenomenon under consideration. The primary participants in this study are 85 students from various geographical areas who have participated in proctoring exams, alongside key informants from the UT staff. The data collection procedure comprises the administration of an online questionnaire to ensure accessibility and efficiency in collecting responses, as well as an extensive study of current literature relevant to the research topic. The collected data is submitted to an accurate descriptive statistical analysis, enhancing the depth and accuracy of the research in revealing insights.

4. Findings

In the realm of online learning and assessment today, proctoring serves as a valuable resource for higher education institutions to safeguard their academic integrity. Academic integrity requires upholding values such as honesty, trust, fairness, respect, and responsibility in learning, teaching, and research. Online exam invigilation, which takes advantage of the most recent advances in artificial intelligence and machine learning, aids to uphold those values by minimizing cheating and enhancing assessment accuracy.

Proctoring monitors examinees during exams via their webcams, capturing pictures of them and their surroundings during the exam. Recorded examinations will be provided to the institution's instructors in cases of 'flagged' incidents (suspicious activities) that require review, either during or after the exam.

Based on responses from users of semi-online proctoring services, it was found that 73 individuals, or approximately 86%, asserted that Semi-Online Proctoring Exams (USOP) exhibited an optimal level of supervision. The remaining 7 individuals declared neutrality, while 5 indicated suboptimal satisfaction. Upon confirmation with key informants responsible for USOP, it was stated that before the UPBJJ-UT staff conduct the USOP, a semi-proctoring based online exam, they must first install Microsoft Teams on their Android/IOS smartphones or laptops/PCs. Microsoft Teams facilitates communication between UPBJJ-UT staff and student participants of the USOP. Both UPBJJ-UT staff and students are required to activate the video feature on Microsoft Teams to ensure that USOP participants are genuinely registered for the USOP exam. Once all participants have successfully joined the USOP group meeting, the subsequent steps involve participant identification. Each USOP participant is obliged to show their face and close-up of their identity to the smartphone's video camera, which is connected to the online exam class meeting room on Microsoft Teams. Participants must take turns demonstrating their identity. Subsequently, participants are required to show the surroundings of the exam room/exam location by directing the video camera around the 360-degree field of view. The camera should be positioned beside participants to capture the laptop/PC monitor screen, exam Answer Books (BJU), and the USOP participant under controlled conditions. Indeed, during the exam, online invigilators can oversee students through their webcams, screen, and microphone to ensure compliance with exam regulations.

Regarding statements about the ease of operating Semi-Online Proctoring Exams (USOP), there were 80 individuals, or approximately 94.11%, who agreed, while the remaining 5 individuals disagreed. This stems from the implementation of semi-online proctoring exams (USOP) using commonly used applications, such as MS Teams. The exam results are subsequently captured and uploaded.

Statements regarding how Semi-Online Proctoring Exams (USOP) significantly benefit students in remote areas indicated unanimous agreement from 85 individuals, or 100%. Based on statements from key informants, USOP is a special exam scheme offered by Universitas Terbuka to students who are unable to attend face-to-face exams (*Ujian Tatap Muka/UTM*) due to urgent circumstances. Typically, students given the opportunity to participate in USOP are those performing Hajj, working offshore, working abroad, pregnant students

approaching their due dates, students experiencing accidents on the day of UTM, and those residing in remote areas. USOP is a synchronous exam where students can participate virtually from their homes or other locations, conducted in real-time through hardware devices such as computers/laptops connected to the UT server via the internet.

Statements indicating how Semi-Online Proctoring Exams (USOP) greatly assist students in adjusting their exam schedules garnered agreement from 85 individuals, or 100%. Statements about the quality of service provided by staff during Semi-Online Proctoring Exams (USOP) showed 80% expressing high satisfaction, while 15% remained neutral, and 5% expressed dissatisfaction. Explanations regarding the quality of service during USOP exams indicated a satisfactory level of service from staff, as interactions between staff and students occur through MS Teams, following the aforementioned steps. Some challenges commonly encountered by students are related to unstable internet connections due to remote or island-based locations, resulting in unstable signals during the exam.

5. Conclusion

The research findings indicate that the implementation of semi-online proctoring for final semester exams can mitigate the limitations arising from students' demographic access. However, there were several types of difficulties, such as a weak internet connection and students who were unable to comprehend how online exam systems operated. Thus, it strongly recommended that the examination locations have a stable internet network for ensuring the effectiveness of online proctoring exams.

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339- Mental Health Challenges, Academic Performance and Coping Strategies of Online Learning Students

Anjum¹

Abstract

Background: The traditional mode of learning has been switched to online (distance) learning particularly after the COVID-19 epidemic. Online learning has been opted as an alternative way all over the world. But, online learning poses significant challenges to higher education.

Objectives: The main objective of this study was to address the mental health challenges of distance learning students. This study also aimed to assess the academic performance of distance learning students. Another objective was to suggest useful coping strategies to deal with mental health issues and enhance the academic excellence of distance learning students.

Methods: This study distributed online questionnaires to 800 hundred students recruited from 7 universities of Punjab, Pakistan. Purposive sampling technique was used to collect the sample. Both boys (n=450) and girls (n=350) from different disciplines were included in the sample. The age range of the sample was 18 to 26 years. DASS (depression, anxiety and stress scale) was used to assess mental health status of online students. Academic performance scale was used to collect students' academic status. To identify useful coping strategies, a coping strategies scale was used. All scales were individually administered. Data were analyzed using SPSS (version 23.0).

Results: The results showed 40 % of distance learning students suffered from increased levels of depression, anxiety and stress. Their academic performance also decreased because of these mental health issues. The use of emotional coping strategies was found useful to deal with students' mental health problems.

Conclusion: A large number of students suffer from mental health problems. So, there is not only a need to establish counseling units at distance learning institutions but universities should also arrange academic seminars and workshops for students, to interact and minimize feelings of loneliness.

Keywords: *mental health, online learning, coping strategies, higher education, COVID-19 epidemic*

1. Introduction

Distance learning is a method of study with any learning process without the student needing to attend a school or college. Distance education started in the mid of nineteenth century in Europe. In Pakistan "Open University" a distance learning institute started in early 70s. It was the first distance learning institute in Asia and second in whole world. This system was design according to the explicit needs of people living in rural areas and particularly for female population who were unable to study (Ngampornchai, Adams, 2016). Today, both developed and developing countries are realizing the value of distance learning particularly after COVID -19. Now in the whole world policies are underdevelopment to enhance educational access. To make distance learning system fully functioning it is also mandatory to work on its shortcomings. So, the present study discusses the health related problems (psychological and physical) attached with distance education system and debates on the strategies to cope those problems.

In a distance learning system a student spends hours and hours every day in front of Zoom without social interaction. A new term "Zoom Fatigue" refers to the feeling of exhaustion that occurs after long zoom class. Long online classes and facing screens for prolonged periods is mentally draining for students. Loneliness is

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reported among online students. Actually social and communication skills are learned with social interaction. Students need to connect with their friends. Distance learning students are deprived of this interaction. This lack of interaction greatly impacts students' mental health. Such students have a lack of motivation, and isolation.

With psychological health impacts physical health problems are also observed among distance learning students Abdulghani (2008). In addition, distance learning students have no chance of participation in physical activity. Muscle pain, headache and eye strains are commonly observed among distance learning students. It is obvious that there is an intertwined connection between mental health and physical activity. Numerous studies found that sedentary lifestyle i.e. Prolonged sitting periods are strongly related with diseases, such as obesity among students Cohen, Kamarck, and Mermelstein (1983). Such diseases coexist with or lead to psychological health problems. So, it is important and mandatory to give attention to both psychological and mental health problems among students.

When we talk about the sources of stress it is important to recognize Academic challenges that distance learning students face. For example, staying focused in an online class is a big challenge. Furthermore students face the distractions at home, loss of internet connections and unable to find immediate response are major causes of stress among distance learning students. Consequently, students set things aside. They tend to procrastinate. As a result their submission deadlines are missed. So this causes stress and anxiety to students.

Coping strategies are referred to as behavior, thoughts or even emotions that people use to cope with stressful situations Datar, Shetty, and Naphade (2017). There are two types of coping strategies used to eliminate the stress i.e. emotion focused coping and problem focused coping Carver (1997). It is important to identify which strategy is useful in a particular situation. Emotion focused coping strategies are used to alleviate stress (Soliman 2014). Strategies included in emotion focused coping strategies include seeking social support from friends, teachers and family etc. whereas in problem focused coping people directly aim to eliminate the source of stress (Gade, Chari, Gupta 2014).

To enhance the quality of distance education this study not only addresses psychological and academic issues but also suggests strategies to cope with these problems.

2. Methodology

Quantitative research method with cross-sectional research design was used. Data was collected through an online survey.

2.1. Sample

In this study purposive sampling was employed to collect the data using an online survey. A total of 800 BS final year students were part of this study. The age range of the sample was 18-26 years ($M = 21.5$, $SD = 2.4$). Students with different age, gender and educational background, and geographical areas were included. Students previously diagnosed with any clinical problem or under treatment were not part of the study.

2.2. Measures

2.2.1. Demographic information sheet

Depression, Anxiety and Stress Scale (DASS): to assess the mental health problems of students DASS developed by Lovibond (1995) was used. This is a self-report scale consisting of depression, anxiety and stress subscales. This is a widely used scale and several studies used this to assess mental health problems of students. DASS is a 21 items scale scored on 0 (not at all) to 3 (most of the time). All three DASS subscales i.e. depression.78, anxiety.76, stress. 89 and total scale possess high reliability .85. Sample items of DASS are like life meaningless, difficult to relax, close to panic.

2.2.2. Academic performance scale

The academic performance scale (Birchmeier et al.) Was used to measure students' perception regarding their own performance. This scale consists of 8 items scored on a 5 point scale. Alpha reliability of this scale is .89. Students' cumulative grade point average score was recorded.

2.2.3. Coping scale

Coping scale measures strategies that students use to cope with mental and physical health problems. This scale was developed by Carver (1997) this scale consists of 22 coping strategies. Problem focused and emotion focused categories are included in this scale. Alpha reliability of this scale is .88 and .83 consecutively.

2.3. Procedure

Students were included in the study with their consent. All Questionnaires were individually filled. Written purpose of this study was described to participants. Written guidelines to fill the questionnaire were also provided to participants.

The study participants responded on demographic information sheet, DASS, academic performance scale and coping scale individually. The present study was conducted in all ethical manners. Participants were told that personal information provided by students will be kept confidential and used for research aims. They were also told that they had the right to withdraw at any time from the research.

3. Results

Table 1. Reliability analysis of measures (N=800)

| Measures | Item numbers | Mean \pm SD | A | Potential Min-max | Actual Min-max |
|--------------------------------------|--------------|------------------|-----|-------------------|----------------|
| Depression, Anxiety and Stress Scale | 21 | 42.34 \pm 5.11 | .77 | 0-40 | 0-63 |
| Academic performance scale | 10 | 38.52 \pm .04 | .82 | 0-20 | 3-30 |
| Coping Scale | 22 | 53.22 \pm 3.45 | .82 | 0-30 | 0-88 |

Note: α =Reliability

Table 1 shows all measures have required reliability.

Table 2. Pearson Correlation Analysis among Variables (N=800)

| Variables | 1 | 2 | 3 | 4 |
|---|---|--------|-------|--------|
| 1. Depression, Anxiety and Stress Scale | - | -.65** | .54** | -.66** |
| 2. Academic performance | - | - | .82** | .55** |
| 3. Emotion focused Coping Strategies | - | - | - | -.77** |
| 4. Problem focused Coping Strategies | - | - | - | - |

** $p < 0.01$

Above table shows a significant negative relationship between depression, anxiety and stress scale (DASS) and students' academic problems. Emotion focused coping strategies are also positively related with mental health and academic performance. So, coping strategies are used with these symptoms. Whereas negative correlated with problem focused coping strategies.

Table 3. Linear Regression Analysis for Prediction of Coping, DASS (depression, anxiety stress) and academic performance among distance learning students (N = 800)

| Variables | Emotion focused Coping | | | Depression, Anxiety and Stress | | | Academic issues | | |
|-------------------|------------------------|-------|---------|--------------------------------|-------|---------|-----------------|--------|---------|
| | B | SEB | β | B | SEB | β | B | SEB | β |
| Distance learning | .32 | .05 | .34*** | 1.31 | .12 | .46*** | .04 | .03 | .21*** |
| R ² | | .12 | | | .26 | | | .05 | |
| F | | 43.44 | | | 21.57 | | | 164.03 | |

*** $p < .001$

Above table shows distance learning is a significant positive predictor of coping strategies. Distance learning significantly positively predicted mental health problems i.e. depression, anxiety and stress ($\beta = .46$, $p < .001$) with 26% of variance. Results also predict academic issues based on distance learning ($\beta = .21$, $p < .001$) with 5% variance.

Table 4. Causes of mental health and academic related issues among distance learning students (N = 800)

| Category | Stressors | Mean and SD |
|-----------------------------------|---|----------------|
| Academic related/facility related | Problem in reading material | 3.27
(0.62) |
| | Concentration to maintain lecture listening of long hours | |
| | Non availability of learning material resources | 2.16
(1.24) |
| | Inability to manage time for studies | 2.00
(1.13) |
| | Lack of Direct and instant Communication | 2.16
(1.24) |
| | Non availability of technology related resources | 2.12
(1.11) |
| Psychological related | Feel loneliness | 3.51
(1.27) |
| | Anxiety to complete tasks | 2.63
(1.19) |
| | Inability to concentrate | 2.87
(1.12) |
| | Lack of motivation | 2.43
(0.72) |
| | Worries about future | 2.21
(1.23) |

Above table shows that most of the academic related problems among distance learning students is about reading material in the absence of a teacher. Loneliness is the other biggest issue with 3.51 mean.

Table 5. Mean and standard deviation for Preferred Coping Strategy

| Coping strategy | Mean and SD |
|------------------------|----------------|
| Seek emotional support | 3.72
(1.27) |
| Positive reframing | 2.54
(1.22) |
| Self-distraction | 2.30
(1.12) |
| Instrumental support | 2.21
(0.24) |
| Humor | 2.11
(1.24) |

Above table shows that mostly students cope with their stress by seeking help from friends and family. Secondly, positive reframing is used to cope stress. So, emotion focused coping is used to minimize the stress.

4. Discussion

This study was conducted to examine the psychological health and academic problems of distance learning students. Another aim of this study is to assess causes of these problems. Furthermore, the present study also examines preferred coping strategies that distance learning students used to alleviate mental and physical symptoms.

First hypothesis of this study was to assess psychological symptoms among distance learning students. Distance learning students work individually and away from campus and their classmates. So it was hypothesized that distance learning students suffer from psychological issues. Findings proved our hypothesis and showed that distance learning significantly positively predicted mental health problems i.e. depression, anxiety and stress among students.our results match with the study of Anjum (2019).

Another aim of this study was that distance learning students also have academic problems. The results of the present study also proved our second hypothesis and showed significant positive prediction of academic problems among distance learning students (see table 3). Another objective of this study was to find the root causes of these symptoms. So, to fulfill this aim three categories of stress causes were found i.e. academic related, psychological and physical. Distance learning students feel that they couldn't get immediate response from their quarries, feel difficulty in reading material and sometimes non availability of technology creates problems. The main reason for psychological issues among distance learning students was loneliness. They feel a lack of social life and absence of their classmates. Furthermore, as their major work is on screen so their main issue in physical strains was eye strains and headache consequently. These findings match with the study of Yusoff, AbdulRahim, and Yaacob (2010).

This study also assesses differences in psychological and physical symptoms among boys and girls of distance learning students. Findings show that girls have more psychological and physical problems. These findings are related with previous research (Dahlin, Joneborg & Runeson, 2005). As for the use of coping strategies, both boys and girls use coping mechanisms. So, no significant difference was found in the use of coping strategies. Our findings were found related to previous research conducted by Datar, Shetty, and Naphade (2017).

Last hypothesis of this study was to assess preferred coping strategies they use to alleviate psychological and physical symptoms. According to the findings, emotion focused coping was used frequently. Folkman and Lazarus (1986) also found that students use more emotion focused coping.

Limitations and suggestions: Although this study was conducted on a limited sample, this study provides insight that not only counseling sessions should be arranged but series of workshops and seminars for the interaction and knowledge of students should be conducted by institutes of distance learning. Distance learning teachers should also play their role to build the emotional resilience to cope stress.

5. Conclusion

Distance learning students suffer from psychological and physical health problems. These problems can be eliminated with the use of coping strategies. Distance learning institutes should make such policies that not only can remove the causes of these problems but also provide such opportunities in which students can interact with their friends and teachers. So it is recommended that it should be in the policy of distance learning institutes to provide opportunities of social interaction among their students.

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341-The “Take Home Exam” Exam Preparation Flow Strategy in the Universitas Terbuka, Distance Learning System

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Abstract

One of the quality components of the quality of tertiary institution graduates can be seen from the learning evaluation process carried out by students after attending the lecture. Universitas Terbuka, the only university in Indonesia with a remote system, is committed to preparing quality student graduates. Universitas Terbuka manages the exam process for its students throughout Indonesia through the Examination Centre. During the pandemic, the Examination Centre of Universitas Terbuka attempted to develop an exam scheme that students could take anywhere without gathering in a particular place. This study aimed to obtain an overview of the exam preparation strategy using the Take Home Exam (THE) scheme at Universitas Terbuka. This research used a qualitative descriptive method using observation, interviews, and documentation. Observations were made for two months by observing the process of selecting question materials and the layout of the questions in the Take Home Exam (THE) application. The interview respondents were part of the team developing the Take Home Exam (THE) application and implementing the verification of the exam materials. Documentation includes test materials such as essay questions, answer guides and scores, and photos of the Take Home Exam (THE) application. The data obtained were then analyzed by triangulation so that the validity of the research results was accurate. The results of the study show that the Take Home Exam (THE) examination preparation flow strategy has several stages that must be used as standards in essay exam preparation, namely the Preparation Stage: compiling a grid of questions, making item items, and directing answers, verifying questions, and guiding solutions, Implementation Stages of exam implementation and Stages Evaluation. Preparing for the Take Home Exam materials uses the-pemeriksaan.ut.ac.id application. In contrast, students can use the.ut.ac.id—application to download the questions and upload the answers during the exam. The Conclusions from this study indicate that Universitas Terbuka has utilized technology to evaluate student learning and provide alternative exams that can support students wherever they are without neglecting the assessment quality.

Keywords: *Learning Evaluation, Distance Learning, Essay Examination, application, assessment quality*

1. Introduction

The theory of evaluation is as old as the theory of the study itself. William (Kay & Knaack, 2007) states that the evaluation process is important for each aspect of learning design including identifying the students' needs, conceiving a design, developing a prototype, implementing and conveying learning instruction and improving its evaluation process. Another argument states that evaluation is a procedure aiming to get the effectiveness of information by examining the suitability of indicator, material, strategy, media, assessment procedure, and items of questions with expected competencies from the students (Gultom, 2016). Furthermore, Gultom (2016) explains that the learning quality process is gained from observation, interview, test, and assessment in class. Thoha (B, 2017) states that evaluation is a planned activity aiming at understanding the object's circumstances by using varied correspondent instruments, therefore, the results are created to be benchmarks to get a conclusion.

Universitas Terbuka as a higher education that applies distance learning, maintains its learning quality by implementing learning evaluation as well as possible. Varied evaluation instruments are prepared; therefore the learning quality is maintained. It is manifested in three learning evaluation schemes, such as face-to-face

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tests, online tests, and the Take-Home Exam (THE) as a form of the final exam. The appearance of the three schemes is based on varied conditions faced in the education world and developing technology advancement. One situation that needs adjustments in learning evaluation was in the pandemic period.

The pandemic period is the most challenging time in the education world. The traditional learning system became an avoided activity to break the chain of COVID-19 spread. Universitas Terbuka is the only university that implements distance learning also impacted by the pandemic. The final exam which used to be done face-to-face or gathered in the test centre was forced to be abolished. Through the Examination Centre, the Universitas Terbuka innovated by implementing an essay test system namely THE test. The test is an essay test in which the questions can be downloaded by the students through the website link the.ut.ac.id with no time and place limits. Additionally, the students are given deadlines to finish therefore the answers will be uploaded to the website.

Selection of essay exams in schemes of THE is based on several considerations, one of which is avoiding plagiarized answers conducted by the students since the answer fulfillment is not limited by places. This follows the definition of an essay exam which states that an essay is a test that is arranged in the form of structured questions and students answer in their language according to their thoughts therefore the answers can vary (Perkasa et al., 2015). According to the theory of constructivists, the essay test can give students a chance to activate thinking skill on the level of cognitive ability which is higher by doing arrangement, meaning combine their knowledge in solving problems in an original and innovative way (Aristiawan & Istiyono, 2020).

Essay test assessment is different from multiple choice. The implementation of assessment with multiple choice is considered easier than the essay, from the students' perspectives, multiple choice needs not much time to be answered, but the essay needs much time and ability to answer by using their language and structured thinking plot. Additionally, from the teachers' perspectives, it is easier to assess multiple choice than the essay test. The subjectivity level in assessing essay answers is high because the answer is varied, therefore, it needs answer criteria that can accommodate students' answers therefore can be assessed as objectively as possible.

It is on this basis that the series of process flows for the implementation of the THE exam scheme is carried out and becomes something crucial so that the evaluation of student learning can be accounted for validly. Thus, the purpose of the research is to obtain a complete picture of how the strategy of Universitas Terbuka implements the learning evaluation of scheme THE.

2. Research Methodology

This study used qualitative research methods where the research emphasizes processes and meanings that were not tested or measured precisely. Qualitative research relies on researchers to obtain data by entering situations or phenomena as they were without any intervention. Referring to Lincoln and Guba (Forero et al., 2018) this research design used four criteria, namely credibility, dependability, confirmability, and transferability as a form of study trust in exploring the dynamics of THE preparation.

The criteria were manifested by collecting data for two months therefore the data findings consistently could be seen repeatedly within the situation. Furthermore, the observation data was confirmed by interviews with the programmer team and verification of the question material team. To avoid mistakes in data description, therefore, the data results gained were verified by the head of the Examination Centre. During the data collection process, analysis data was collected. In qualitative research, data analysis was not conducted after the data was gained, conducted during the research. The steps were very important to make the gained data meaningful and interpreted accordingly (Syahwani, 2015).

The process of data analysis was to break down a problem or focus of study into parts so that the structure/order of the form of something being described was clear and therefore its meaning could be more clearly understood. The data obtained was selected and grouped according to the categories that have been determined based on the findings. A simplified data analysis consisting of data reduction, data display, and conclusions.

3. Findings

The findings of the study show that the strategy plot implemented by the Examination Centre consists of three steps. The first stage is the preparatory stage, this stage is carried out by the faculty unit in preparing sets of questions and answer guidelines and scores. Then all the question papers are sent to the Examination Centre. In

the Examination Centre, through the layout team, the script was adapted to the format of THE question paper. Furthermore, through the application of the-pemeriksaan.ut.ac.id lecturers are asked to check and reconfirm the question scripts along with the answer guidelines and scores whether the question scripts are following the teaching materials being studied by students and following the question scripts that have been previously sent. This step is known as the finalization step. However, the question papers that have been finalized by the supporting lecturers still go through a checking process carried out by the academic team at the Examination Centre which is referred to as the check master stage. At this stage, all question papers that have been finalized are re-checked both in terms of language and question content as well as suitability with answer guidelines and scores. Here is the flow chart of THE scheme test preparation:

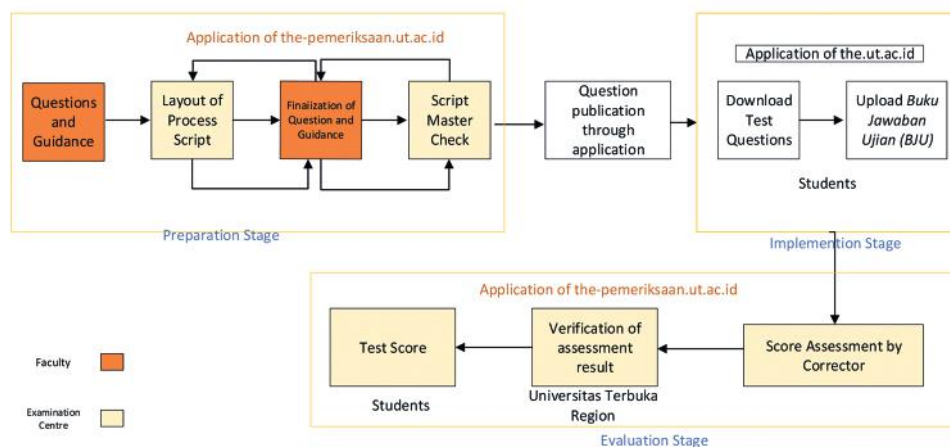


Figure 1. THE scheme plot

After the master check stage is complete and the question paper is ready to be published, then the next stage is the implementation. In the implementation phase, students can download question papers through the application of the.ut.ac.id. Within 24 hours, students can access the application the.ut.ac.id for every lecture that is examined. Within 24-hour deadlines, students are scheduled to be able to complete the exam for six hours starting from the time of downloading to upload. Providing a six-hour working period refers to several factors, including the smooth internet network that is not evenly distributed throughout Indonesia. Universitas Terbuka considers indicators of technical constraints that often occur due to slow internet signals.

By system, student answers are called *Buku Jawaban Ujian (BJU)* or the exam answer sheets will be saved in the application of the-pemeriksaan.ut.ac.id. Through this application, proofreaders who are validated by the faculty can access *BJU* students which have been determined by the Examination Centre for checking answers and scoring. In this evaluation stage, verification is required by the regional Universitas Terbuka to ensure that the score entered by the corrector matches the number of the *BJU* examined.

It is understood that there are two applications developed to support the exam process. The difference between the two applications is in the facilities available. The application of the.ut.ac.id is an application designed so that students can download questions and upload the answer sheet namely *Buku Jawaban Ujian (BJU)*. Furthermore, the application of the-pemeriksaan.ut.ac.id is an application to check exam questions that have been uploaded by students and then directly via the application to be corrected by the proofreader. In the application, there are also several facilities including facilities for preparing manuscripts, finalizing THE manuscripts, examinations of *Buku Jawaban Ujian (BJU)* and verification of inspection results, and other facilities such as reports, etc.

The results of the study also show that in the THE scheme exam strategy flow, there is cooperation from several parties. The first part is the faculty, whose role is to provide a grid of questions, question scripts, and guidelines for answers as well as scores. The faculty through its lecturers is responsible for the content of the essay questions and the answer guide. The second part is the Examination Centre, which authority to manage the entire implementation of the exam starting from collecting question papers, question scripts, answer guidelines, and scores in the question bank, laying out the question scripts to be used in the exam, ensuring the suitability of the question scripts with the course and the layout format as well as answer guidelines and scores. The third

party, the Directorate of Data and Information Systems, has the authority to provide and manage the means of publishing question papers to students through the application of the.ut.ac.id. Moreover, the Examination Centre facilitates the faculty in determining the percentage of courses tested under the THE scheme. The indicators that are taken into consideration in determining this include: (1) The Examination Centre checks the availability of the number of questions sets in the question bank. This needs to be confirmed to the faculty whether the set of questions will still be used or not. Furthermore, the Examination Centre arranged questions of the data set will be used, (2) Data on the availability of the number of question sets is submitted in a forum with the faculty and Vice Rector 1 as academic responsibility of the University (3) In addition to data on the availability of question sets, the Examination Centre also arranged the availability and readiness of test infrastructure so that it can be taken into consideration in making decisions regarding the implementation of the THE exam.

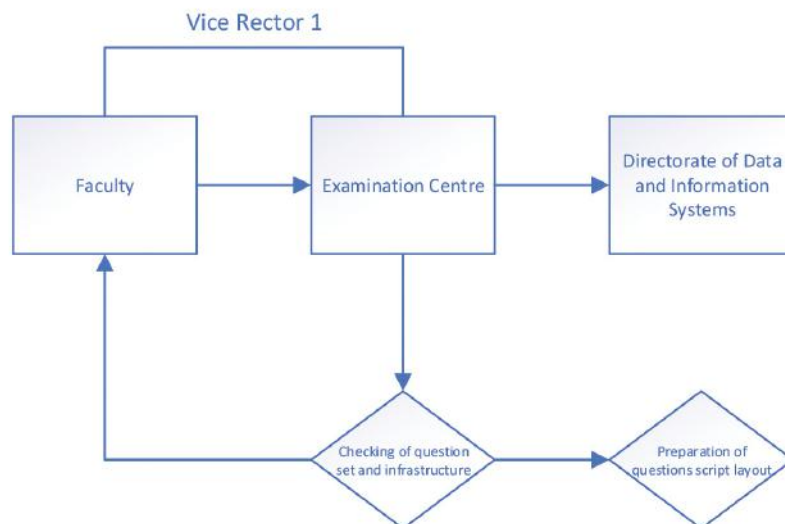


Figure 2. The flow of relationships between units in exam preparation for THE

4. Discussion & Conclusion

from the findings above, it is revealed that Universitas Terbuka has made an effort to implement an appropriate strategy based on technology development by making applications that support the examination process with THE scheme. This is in line with the theme carried out by Universitas Terbuka as a Cyber University. Universitas Terbuka understands that technology is a helping tool that has significant positive impacts on education implementation. Through the developed application, Universitas Terbuka can handle rising problems in the pandemic situation. This is in line with statements that state that technology needed by the education world should shape the needed system in developing its needs or human performance every day, within its process, educational technology needs several components such as components and tools used to process and make data analysis and solve the existing problems (Maritsa et al., 2021). The findings also show that Universitas Terbuka as a distance learning system is designed to solve various educational problems that arise and are urgent (Rahmi Rivalina, 2013).

The arising applications make the THE examination scheme process easier and become good steps as proof of technology utilization, however, Universitas Terbuka does not ignore the questions script quality done by students. This is appearing in the preparatory stage described earlier. Many layers must be passed through a question script, therefore, when it reaches the students, the question paper can not only be kept confidential but also can be accounted for both in terms of content and format. This is reflected in the process of checking the question scripts repeatedly, the aim is to obtain quality question papers before being used. It was stated that poorly designed assessments would cause students to develop a limited conceptual understanding of course material (Bloxham & Boyd, 2007). This is why the Examination Centre and faculty need to recheck each set of questions carefully to keep the subject in accordance, such as the accordance of the teaching materials by students, question grid, format, etc.

Technology utilization in the educational context faces constraints. Most of all for information technology that needs an internet connection. Universitas Terbuka gets around by applying a fairly long time of six hours so

that students can still complete the entire series of THE exam processes smoothly. The educational philosophy states that education aims to humanize humans manifested in the understanding of Universitas Terbuka towards difficulties faced by students with internet access that is uneven in all regions. As stated by Yahfizham ((Prayogi, 2022) ethical perspective the information technology used in the distance learning system can have many negative impacts. Therefore, Universitas Terbuka is trying to build the right strategy in building a strict system in the implementation of the THE scheme exam.

It can be concluded that Universitas Terbuka as a university with a distance education system has conducted education tasks by continuously utilizing technology without ignoring its quality, both the quality of the exam and the quality of the development of its students.

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352-Investigating the Challenges and Strategies for Successful Adaptation to Open and Distance Learning for LLB Graduates in Sri Lanka during the COVID-19 Pandemic

W.D.Manoj¹

Abstract

The COVID-19 pandemic has necessitated the adoption of Open and Distance Learning (ODL) practices in legal education. This abstract presents a research study conducted in Sri Lanka, focusing on the challenges faced by LLB graduates at Open University of Sri Lanka (OUSL) during the transition from face-to-face lectures to fully online instructions, and the adaptation strategies implemented. The research methodology involved a mixed-methods approach, utilizing data extracted from Zoom reports and Moodle reports of certain subjects in the LLB curriculum. Additionally, the author gathered data from various other divisions to assess participation in learning activities and evaluations. These divisions include the library, examination department, public information office etc. The research objectives were to identify the challenges experienced by LLB graduates at OUSL during the shift to fully ODL, examine the impact on student participation and engagement, explore the difficulties faced in conducting online examinations, and analyze the effectiveness of adaptation strategies employed by OUSL. Findings revealed several challenges in the implementation of ODL for LLB graduates at OUSL. Many students faced difficulties in actively participating in online lectures, often due to limited access to internet connectivity and suitable devices. Moreover, online examinations presented challenges related to supervision, technical issues, and varying levels of familiarity with the required software. However, OUSL undertook various measures to address these challenges. They provided technical support, organized training sessions, and improved user interfaces to enhance student engagement and participation. Despite the initial hurdles, LLB graduates showed resilience and adaptability, gradually acclimating to the new learning environment. In conclusion, the research highlights the significant challenges faced by LLB graduates at OUSL during the transition to fully ODL due to the COVID-19 pandemic in Sri Lanka. The findings emphasize the importance of addressing issues related to student participation, technological accessibility, and the integrity of online examinations. The adaptation strategies employed by educational institutions aimed to mitigate these challenges and ensure the continuity of legal education. These insights contribute to the ongoing discourse on effective pedagogical approaches in times of crisis and the future of legal education in Sri Lanka and beyond.

Keywords: ODL system, Face to Face Lectures, Covid-19, Sri Lanka, Open University

Introduction

Online education has emerged as a prominent theme in current discussions surrounding education, representing the primary feasible approach to ensure continuous learning in a global context where prioritizing isolation over social interaction is essential to mitigate the transmission of COVID-19. Presently, the term “online learning” encompasses a wide spectrum of activities, ranging from uploading educational resources on online platforms to conducting real-time teaching sessions through diverse software applications like Zoom. These technologies facilitate the virtual connection between educators and learners, effectively bridging the physical gap through web-based tools. (Miller, A., Topper, A.M.& Richardson, S., 2017) Due to the COVID-19 pandemic, Hodges et al. propose Emergency Remote Teaching (ERT) as a more accurate term to refer to the mode of teaching many education institutions have adopted during the COVID-19 pandemic (Hodges, C.B. et al, 2020). ERT, in contrast to pre-planned online education, involves a “temporary transition of instructional delivery.” Its objective is not to replicate a comprehensive educational ecosystem, but rather to swiftly establish and ensure accessible instruction and instructional assistance during emergency situations or crises. Apart from a few distance education programs offered by the Open University of Sri Lanka, which integrated partial online

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elements, the effective implementation of Open and Distance Learning within the nation's higher education framework assumes particular significance. This observation gains prominence when considering the limited association of online learning with Sri Lankan universities before the onset of the March 2020 pandemic. It is worth highlighting that the LLB program, prior to the emergence of COVID-19, did not adopt a fully online instructional model. Instead, it opted for a blended pedagogical approach, interweaving traditional in-person lectures and assessments facilitated through regional centers, while also delivering specific lecture materials via the Learning Management System (LMS).

The shift to online education within Sri Lankan universities amidst the pandemic occurred abruptly and unexpectedly. Lecturers and students alike were confronted with a compressed time frame to adapt to this novel mode of teaching and learning (Hayashi, R. et al., 2020). Nevertheless, this shift was significantly eased by a range of measures implemented by individual universities in tandem with the University Grants Commission (UGC) of Sri Lanka. The pivotal step taken by the UGC involved the integration of state universities' Learning Management Systems with the Lanka Education and Research Network (LEARN), an organization dedicated to furnishing internet connectivity for educational and research purposes across the nation. This concerted effort led to a notable outcome, where the majority of public universities (encompassing around 90% of state and non-state establishments) were able to offer their students complimentary access to online learning throughout the pandemic period (Hayashi, R. et al., 2020). Both students and lecturers immensely benefited through this solution. According to the LEARN report, as of 23 August 2020, 13 million activities (e.g., accessing reading materials, following lecture slides, attending online quizzers) using learning management systems were launched in a peak week during May (Asian Development Bank, 2020).

Nevertheless, the inquiry into online learning remains a subject of ongoing debate due to its inherent pros and cons. As articulated by Arkorful V. and Abaidoo N., online learning entails the utilization of digital resources to facilitate educational processes. This approach harnesses technological instruments to empower learners to engage in their studies at their convenience and from any location (Arkorful V. & Abaidoo N, 2015). Conversely, despite the valuable contributions of the reviewed literature, there is still a research gap that needs to be addressed. The identified gap lies in the specific context of LLB graduates at OU in Sri Lanka. While the literature discusses the challenges faced by students in general, there is a need for focused research on LLB graduates at OU in the Sri Lankan context to understand their unique challenges and strategies for successful adaptation.

The reviewed literature provides insights from various educational contexts, but there is a lack of studies specifically exploring the challenges and strategies of LLB graduates at OU in Sri Lanka during the COVID-19 pandemic. The legal education system has its own distinct characteristics, which may pose specific challenges during the transition to open and distance learning. Therefore, it is crucial to conduct research that specifically targets LLB graduates at OU in Sri Lanka to gain a comprehensive understanding of their experiences, challenges, and strategies for successful adaptation. This research should aim to investigate the specific challenges faced by LLB graduates at OU in Sri Lanka during the pandemic, such as the impact of online learning on the development of legal analytical skills, the effectiveness of virtual platforms in facilitating legal discussions and debates, and the role of mentoring and guidance in supporting LLB graduates' transition to open and distance learning. Additionally, research should explore the effectiveness of the proposed strategies in the Sri Lankan context and identify any additional support mechanisms required to ensure the successful adaptation of LLB graduates at OUSL.

By addressing these research gaps, future studies can contribute to the existing literature by providing context-specific insights and practical recommendations for LLB graduates at OU in Sri Lanka. This will enable policymakers, educational institutions, and stakeholders to develop targeted interventions and support systems that cater to the unique needs of LLB graduates at OU, ultimately enhancing the quality of legal education in the face of the ongoing pandemic and beyond.

2. Method

This study employs a mixed-methods approach to investigate the challenges and strategies for successful adaptation to open and distance learning for LLB graduates at the OU of Sri Lanka during the COVID-19 pandemic. This approach combines quantitative analysis of Zoom and Moodle reports with qualitative insights obtained from semi-structured interviews and secondary sources such as journal articles, books, and reports. The purpose of this approach is to gain a comprehensive understanding of the issues faced by LLB graduates at the OU and the strategies adopted to overcome challenges in the context of the pandemic.

Data was collected from two primary sources: Zoom reports and Moodle reports. These reports provided insights into the online learning experiences of LLB graduates at OU during the pandemic. The data extraction process involved accessing relevant reports from the university's learning management system and communication platform.

Secondary data was gathered from various academic sources, including peer-reviewed journal articles, books, and official reports. These secondary sources provided a theoretical framework and contextual background for understanding the challenges and strategies related to open and distance learning. Sources were selected based on their relevance to the research questions and the credibility of the authors.

3. Findings

The analysis of data encompasses two distinct periods: the pre-COVID phase and the COVID-affected phase. The data source for this investigation stems from the Open University of Sri Lanka (OUSL), an esteemed institution renowned for its pioneering efforts in open and distance learning. Notably, OUSL traditionally conducted face-to-face lectures for LLB undergraduate students across nine regional centers throughout Sri Lanka. Furthermore, examinations were typically conducted On-site basis.

In the pre-COVID period student engagement with the online platform was minimal and COVID affected period student involvement with the online platform was limited to fulfilling specific requirements, notably compulsory assignments, and the final examination. Therefore, the instances of student logins were notably concentrated around these mandatory components.

The subsequent COVID-affected period presented a stark contrast in terms of online engagement. As a response to the pandemic, OUSL swiftly transitioned to a comprehensive online teaching and assessment approach. During this phase, students were compelled to engage with the online platform for various aspects of their learning journey. The visual representation provided in the figures below illustrate (Figure 3.1 & 3.2) significant fluctuations in student participation.

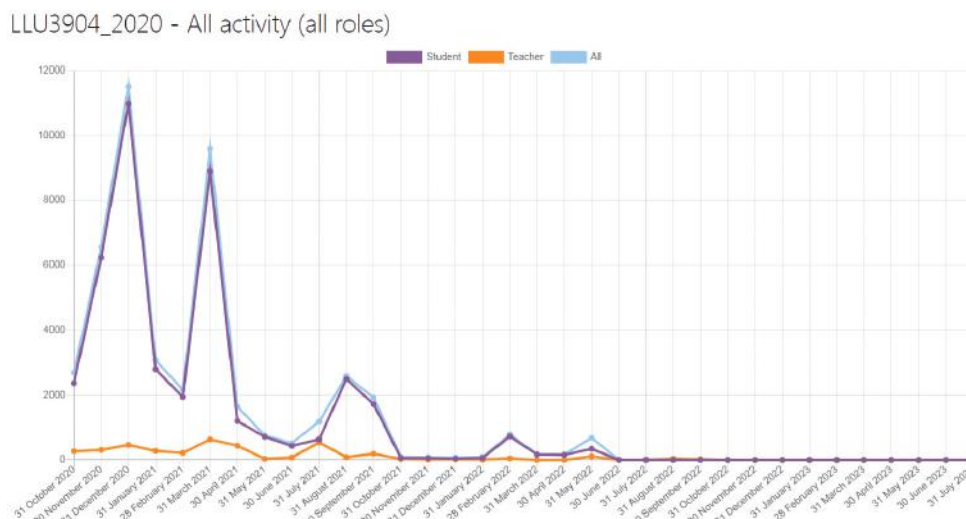


Figure 1. Legal Method (LLU 3904)

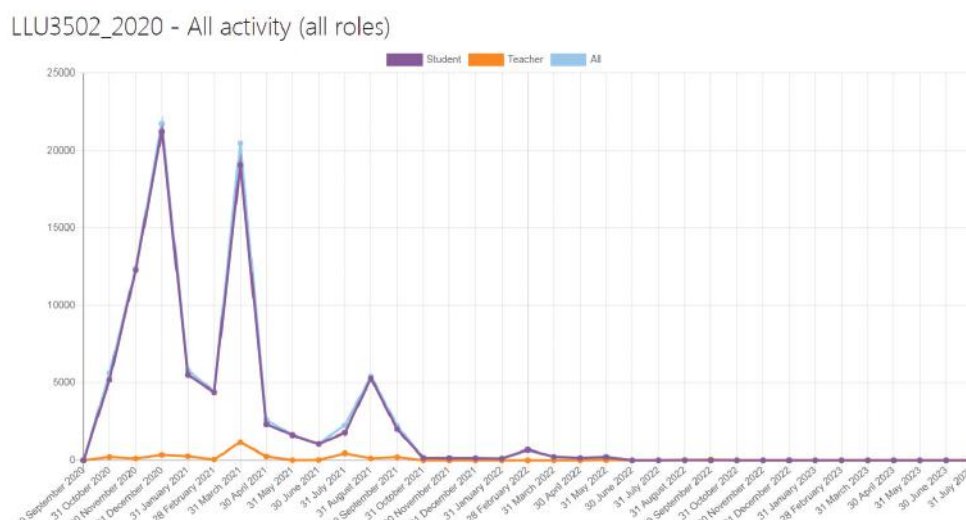


Figure 2. Principles of Equity (LLU 3502)

Specifically, higher rates of engagement are evident in the months of September 2020, December 2020, and March 2021. Notably, September and December coincide with periods of heightened academic activities, such as compulsory assignments and assessments. In March, the figure portrays a similar surge in engagement, aligning with the administration of final examinations conducted through online channels. This trend highlights the adaptation of both students and the institution to the new online examination format. However, the graphical depiction also underscores a notable decline in student participation during the intervening months. These fluctuations in engagement strongly suggest challenges associated with the online learning environment. Students' ability to consistently engage online seems to be influenced by a variety of factors, which warrants a deeper exploration.

In essence, the figure distinctly portrays the impact of transitioning to online learning. It indicates that while student participation surged during critical academic events and online examinations, sustained engagement during non-peak months faced obstacles. The forthcoming sections will delve into these challenges and their implications, offering a comprehensive understanding of the observed patterns.

4. Discussion and Conclusion

The investigation into the challenges and strategies for successful adaptation to Open and Distance Learning (ODL) for LLB graduates at the Open University of Sri Lanka during the COVID-19 pandemic unearthed a range of critical insights. The findings provide a comprehensive understanding of the hurdles faced by students in the new remote learning landscape and shed light on the strategies employed to overcome these challenges.

4.1. Main Hurdles Faced by Students

One of the foremost challenges emerged from the data was the limited access to internet connectivity and suitable devices among LLB graduates. The transition to online lectures required consistent and reliable internet access, a luxury not uniformly available to all students. Many respondents reported difficulties in participating actively in virtual classes due to disruptions caused by unreliable internet connections. As evidenced by numerous studies focused on online education, student demotivation often stems from inadequate internet connectivity and household environments that lack the learner-friendly atmosphere of a traditional classroom setting. (Means & Neisler, 2020) Additionally, the lack of suitable devices presented obstacles in accessing course materials and engaging effectively with online platforms. The shift to online examinations brought to the forefront a series of multifaceted challenges. Participants voiced concerns about the adequacy of remote examination settings in ensuring fair and secure assessment conditions. The absence of in-person supervision led to apprehensions regarding academic integrity. Furthermore, technical issues arising during online exams, ranging from connectivity disruptions to software glitches, added an additional layer of stress to the assessment process. It was also noted that varying levels of familiarity with the required software among students contributed to inconsistencies in their performance during examinations.

4.2. Addressing Challenges and Promoting Adaptation

In recognition of the formidable challenges that arose from the transition to Open and Distance Learning (ODL) during the COVID-19 pandemic, the Open University of Sri Lanka undertook a multifaceted approach to mitigate the obstacles faced by LLB graduates. The institution's concerted efforts were focused on ensuring that students could navigate the remote learning landscape effectively and derive maximum benefit from their educational pursuits.

Acknowledging the crucial role of technology in remote learning, the university proactively extended technical support to students. A dedicated technical assistance team was established to promptly address issues related to internet connectivity, software compatibility, and device functionality. This support mechanism played a pivotal role in troubleshooting technical glitches and ensuring a smoother online learning experience for LLB graduates. In addition to that, recognizing the need to equip students with the necessary skills to navigate the virtual learning environment, the Open University organized a series of comprehensive training sessions. These sessions covered a spectrum of topics ranging from effectively utilizing online platforms to mastering software applications relevant to course requirements. By imparting these practical skills, the university aimed to empower LLB graduates with the competence to engage seamlessly in the remote learning ecosystem.

However, this research article acknowledges several limitations inherent to the study. Firstly, the data collection process centered exclusively on a restricted number of participants and subjects within the LLB curriculum

at the Open University of Sri Lanka (OUSL), possibly limiting the generalizability of the findings. This emphasizes the need for a more comprehensive inquiry that encompasses a representative sample spanning the entire breadth of subjects within the curriculum. The recommendation for such a holistic study is of paramount importance for future research endeavors.

While the present study did not reveal significant impacts of specific demographic variables, including gender, age, year of study, and IT literacy level, on the research outcomes, it's imperative to acknowledge that these findings might be influenced by the relatively modest sample size employed. Therefore, a prudent suggestion is put forth for future research initiatives to consider conducting a similar investigation with a larger and more diverse sample. By adopting this approach, the robustness and credibility of conclusions derived from such analyses could be substantially strengthened. This strategic expansion of the study's sample size would likely yield more comprehensive insights, having wide-ranging implications for the landscape of online learning among LLB graduates in post-COVID-19 Sri Lanka.

In conclusion, the study's findings underscore the substantial challenges that LLB graduates faced in adapting to Open and Distance Learning during the COVID-19 pandemic. The limitations imposed by internet connectivity, device accessibility, and the novel examination environment have significantly impacted the learning experience. However, the strategies employed by students and the incorporation of technology-enhanced learning tools offer avenues for resilience and improvement in the ODL landscape. These findings not only contribute to the understanding of educational challenges during the pandemic but also provide actionable insights for educational institutions aiming to enhance the effectiveness of remote learning modalities.

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358-Examining the Effectiveness of Templates Used in the Design and Development of Massive Open Online Courses

İrem ERDEM AYDIN¹

Abstract

MOOCs are courses offered virtually, largely by universities, where volunteer individuals can register and follow the content via the internet. It has taken learning out of the classroom environment and turned it into an environment that is independent of time and space, learner-centered and provides flexible learning opportunities to the learner. In these learning environments with a large number of participants, it is very important to produce quality content by taking into account the needs of learners. In this context, designing engaging lessons that meet the needs of learners, increase their motivation, and increase their interest can be effective in providing quality MOOCs. The design of MOOCs, which serve a wide and diverse audience, requires attention to detail and long hours of preparation. On the other hand, it is very difficult to prepare a shorter, more vivid and easy-to-understand lecture on a computer screen. In this case, course design templates provided to instructors make an important contribution. The aim of this study is to evaluate the course design templates from the perspective of lecturers and experts who offer courses on the AKADEMA platform. As a phenomenological study, the study attempts to evaluate the perspectives of lecturers and experts who use the templates provided to them to offer courses on the AKADEMA platform. An online questionnaire was prepared to collect the data and 12 experts were asked to provide their opinions and suggestions about the AKADEMA course design templates. Afterwards, online interviews were conducted with three participants to obtain more detailed information. In the content analysis study, the strongest aspects of the course design templates were focused on the theme of facilitation and clarity. On the other hand, the instructors' suggestions for improving the templates were that the templates should offer flexibility in making original designs, structuring an interactive design and providing effective feedback to the learners.

Keywords: MOOCs, design templates, guides, faculty members, MOOC design and development.

1. Introduction

Massive Open Online Courses (MOOCs) are online courses prepared to be offered to large and diverse audiences, accessible to anyone who wishes and requiring little or no fee (Selwyn, Bulfin, & Pangrazio, 2015). It has been the focus of attention since 2008, when the first examples were seen, and has shown a significant development especially during the COVID-19 Global Pandemic (Shah, 2020, 16 August). Institutional support is provided to lecturers in the design of KAÇeDs, and the design, development, and implementation processes are carried out by teams consisting of a number of experts. However, it can be mentioned that not every lecturer has the chance to work as a team and they must design and produce on their own. In these cases, course design templates provided to lecturers make an important contribution. The use of course templates contribute to consistency, effectiveness, time, and labor efficiency (Huun & Hughes, 2014). Within the scope of AKADEMA, which is the MOOCs platform of Anadolu University, instructors are provided with various templates to prepare materials, design activities, develop the course flow and create the course environment. There is no academic study on the effectiveness of course design templates in Türkiye in general and in Anadolu University in particular. This study aims to eliminate this deficiency and to examine the effectiveness of the prepared templates from the perspective of lecturers and experts who teach courses on the AKADEMA platform. In addition to being the first study in the field, it can be argued that it can contribute to the applications.

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2. Literature

Open and distance learning applications are a product of the understanding that emerged in order to meet the diversifying needs of individuals in the process of social change. New technologies pave the way for new applications, and developments in information and communication technologies lead to the emergence of new educational platforms in open and distance learning. Massive open online courses (MOOCs) are one of the applications that have emerged to meet these needs. MOOCs are one of the applications that reflect the openness perspective in education, such as open educational applications, open educational resources, open course materials, open access, which are based on the philosophy of openness, which tries to provide access to learning to large masses. The philosophy of openness has been embodied in different applications with technological, economic and cultural changes and developments in the historical process. It has evolved from the approach of expanding access to education to the concepts of reuse, open license and open sharing, especially with OER and MOOC practices that have been influential in the last 20 years (Weller, Jordan, DeVries, & Rolfe, 2018).

Considered as a process that started with open universities, then extended to open access, open educational resources and then to MOOCs, the openness approach refers to a learning structure in which the boundaries between learners and information sources are eliminated. Today, the principle of openness in education forms the basis of open and distance learning and offers opportunities such as anytime, anywhere learning and flexibility in terms of entry and exit from universities (James & Bossu, 2014). The concept of openness has two main distinguishing features. One is that MOOCs are open to learners outside the organizing institution without any prerequisites and that they use open educational resources (Sanchez-Gordon, & Luján-Mora, 2016). In other words, open access and open content. Niadu (2019) emphasizes that beyond open access and open resources, it should also include open access to educational opportunities and the adoption of open learning strategies in learning and teaching. At this point, it can be said that a good design is very important in terms of providing quality service in MOOCs, which provide education to many individuals of all ages and walks of life. Devlin (2013) emphasized the importance of the design process by stating that the biggest reason for dropping out without completing the courses is the application of traditional approaches used in higher education to MOOCs. In this context, it can be argued that in these learning environments with many participants such as MOOCs, it is very important to design courses (producing quality content) by considering learner needs. On the other hand, the fact that audiences such as MOOCs are at different educational levels and have different levels of readiness challenges faculty members to design courses to cover all these participants. Faculty members' designing instruction to cover a wide range of audiences, preparing content suitable for MOOC environments, presenting weekly lessons, conducting evaluations after the lesson, and being available to answer questions from participants throughout the process bring extra workload to faculty members.

Therefore, the design process is one of the important components for the creation of an effective and efficient process. A successful design process ensures that the learning process is planned and systematized. It provides guidance on what needs to be done to achieve the set goals and offers a concrete road map. Templates used in course design processes are an important part of this guidance. At this point, it can be said that e-Learning templates are a facilitating element needed by e-Learning professionals as they provide plans on how to create e-learning content.

MOOC design templates are standard structures used in the design of MOOCs. These templates provide guidance in organizing the materials used in course design and the learning experience. They provide a design framework for how to present materials, how to organize learning activities, and how to achieve learning objectives such as student assignments, exams, and assessments. Studies (Yousef, Chatti, & Schroeder, 2014; Kellogg, 2013) show that using MOOC design templates has many benefits for both learners and instructors. First and foremost, using e-learning templates saves design development time. Using e-learning templates makes the creation of designs faster and easier as they eliminate the need to develop e-learning from scratch. Once the template is developed, it eliminates the need to develop them from scratch every time you need to deliver the same type of eLearning activity. On the other hand, it reduces development costs by allowing us to reuse the same templates as many times as we want. Another important advantage is that having templates ready to go allows you to focus more on the content. Since the templates have been tested before, it allows us to make sure that the way the content presents the information is appropriate (Pappas, 2015).

From the learner's point of view, it helps learners to follow and learn more easily by making the PLEs more consistent and predictable. In this way, it can be argued that templates help make them user-friendly and easy

to understand for learners. On the other hand, they also help instructional designers to make MOOCs more effective and efficient, allowing students to benefit more. At this point, it can be said that templates provide a roadmap that educational designers and MOOC platform providers can follow to design and deliver MOOCs in a better way.

Institutional support is provided to the lecturers in the design of the MOOCs and the design, development and implementation processes are carried out by teams consisting of a number of experts. However, not all instructors have the chance to work as a team and they have to design and produce on their own. In these cases, the course design templates provided to instructors make an important contribution. The use of course templates contributes to consistency, effectiveness, time and labor efficiency (Huun & Hughes, 2014). Within the scope of AKADEMA, the MOOC platform of Anadolu University, instructors are provided with various templates to prepare materials, design activities, develop the course flow and create the course environment. There is no academic study on the effectiveness of course design templates in Türkiye in general and Anadolu University in particular. This study aims to eliminate this deficiency, to examine the effectiveness of the prepared templates from the perspective of lecturers and experts who teach courses on the AKADEMA platform and to discuss them within the framework of Utilization and Satisfaction Theory. The Technology Acceptance Model (TAM) is a model developed to explain and predict the use of information systems and technologies. It was created to understand the process of people's acceptance and use of a new technology. It is a common model used especially to understand the use of technologies such as information systems, online platforms, mobile applications and to measure users' attitudes towards these technologies. According to this theory, decisions to use a technology are based on two main factors:

1. **Perceived Usefulness:** It is the extent to which users believe that using a technology is useful in achieving a specific goal. Perceived usefulness will be high if users believe that using a technology will help them to do their job, increase their productivity, achieve their goals or fulfill a need.
2. **Perceived Ease of Use:** It is how easy and straightforward users think it is to use a technology. Factors such as the level of skill required to use the technology, the learning curve and the complexity of the usage process affect perceived ease of use. If users think that a technology is easy to use, perceived ease of use will be high.

The Use and Satisfaction Theory suggests that perceived use and perceived usefulness have significant effects on attitudes and intentions to use technology. In other words, intentions to use a technology are shaped by users' perceptions of how easy they find the technology and how useful it is. Furthermore, users' satisfaction after using a technology is also one of the factors that influence intention to use and technology use behavior. Users' satisfaction and satisfaction with using technology plays an important role in the acceptance and widespread use of technology. The views of lecturers and experts on course design templates will also be discussed in the context of this theory.

To summarize, the main purpose of the study is to evaluate the effectiveness of the templates provided to the instructors when designing the AKADEMA courses in line with their experiences and opinions and to discuss them in the context of the Uses and Gratifications Theory. In line with this general purpose, the following questions were sought to be answered.

1. In which ways do the AKADEMA guide and templates facilitate course design?
2. What are the greatest strengths of the AKADEMA guide and templates?
3. What should be done to improve the AKADEMA manual and templates?

3. Method

The research was designed as a phenomenological study. In other words, the experiences, understandings, emotions, and perspectives of the lecturers and experts who use the templates provided to them to open courses on the AKADEMA platform while using these templates were described. Phenomenological research method focuses on understanding the essence of the phenomenon, event, object that is handled with a qualitative approach (Creswell & Creswell, 2018). Within the scope of the study, data were collected from a group of lecturers and experts who taught courses in AKADEMA using templates. In the data collection process, an online questionnaire consisting of open-ended questions was first sent to the participants in the study cluster and they were given a wide time frame (one month) to respond. The responses from this first round were analyzed through qualitative content analysis. Then, in order to discuss the emerging themes in more detail, online individual interviews were conducted with three participants who participated in the survey and could reflect

the full range of experiences. The reason for choosing a questionnaire consisting primarily of open-ended questions in the study was to obtain the experiences of a larger number of participants. Thus, the participants were allowed to spend more time on their answers. After analyzing the data obtained from the questionnaire, in-depth semi-structured interviews were conducted with participants who participated in the questionnaire at a sufficient level and touched upon the focused topic/point in order to address the points that needed to be questioned more deeply.

3.1. Data Collection and Analysis

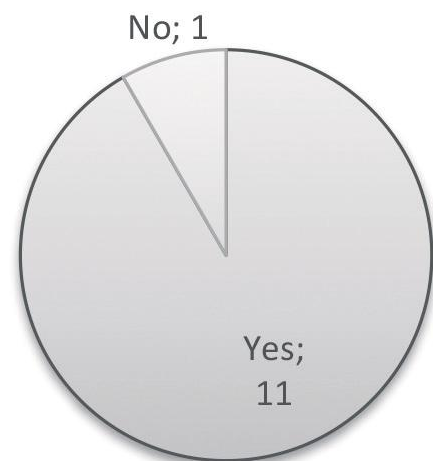
An online questionnaire form was prepared to collect research data and shared with 10 teachers who taught at AKADEMA between October and December 2022. With this questionnaire form, the opinions and suggestions of the instructors about the course design templates specific to AKADEMA were obtained. The instructors were asked to fill in a semi-structured questionnaire form prepared online. In order to check the extent to which the prepared questionnaire form serves the purpose of the research and its applicability, the opinions of field experts were consulted. Corrections were made in line with expert opinions. In order to increase its validity, the research process and the procedures carried out in this process were explained in detail. In this framework, the research method, study group, data collection tools, data collection, analysis and how the findings were organized were explained in detail. The responses from the participants were recorded electronically. After the data collection process was completed, the participant responses were transcribed and content analyzed. The main purpose of content analysis is to reach concepts and relationships that can explain the collected data. The basic process in content analysis is to bring together similar data within the framework of certain concepts and themes and to interpret them by organizing them in a way that the reader can understand (Yıldırım & Şimşek, 2013).

3.2. Participants

One of the applications of MOOCs in Türkiye is the learning platform called AKADEMA, which serves as a mass open course application within Anadolu University. Within the framework of this model, which overlaps with the expression of openness in the open education tradition, courses for lifelong learning, prepared with the knowledge and experience of Anadolu University, are made available to the masses on the internet at <http://akadema.anadolu.edu.tr> without any prerequisites and without any fee. The aim of the AKADEMA application platform, which started to serve with seven courses in two thousand fifteen, is to provide an environment and materials that will offer learning opportunities to anyone from all ages and walks of life, and to provide them with a structured learning experience that will support their lifelong learning processes. As of 2023, it continues to serve with a total of 135 course contents in fourteen different categories. The courses offered within AKADEMA include xMOOC practices that are described as “traditional” and adopt a behaviorist pedagogical approach. In other words, the online open courses on the AKADEMA platform serve as course applications developed to be free of charge and open to anyone who wants to learn. The content of AKADEMA courses, which serve as xMOOC applications, includes short lecture videos, other course materials prepared by the instructor, discussion forums and learner assignments for assessment. The courses offered in AKADEMA are prepared and delivered by volunteer faculty members of Anadolu University. To date, 96 faculty members have volunteered in the preparation of these courses. This study was conducted with 12 experts in this group.

4. Findings

In this study, it was aimed to examine the design templates used in the AKADEMA platform from the perspectives of instructors and experts. For this purpose, it was tried to learn the experiences and opinions of the instructors about the templates presented to them while designing AKADEMA courses. When we analyze the responses, it is seen that all but one of the instructors use templates and guides. One person stated that he did not need to use the system because he had previously taught on the MOOC platform.



4.1. Easy to Use

To identify the perceived easiness of the templates, the participants were asked to answer the following questions: Do you think the AKADEMA guide and templates made course design easier? How did it make it easier? How did you use the resources?

When we evaluate the answers given, it is seen that all of the instructors think that the guides and templates facilitate the lesson design process. The instructors emphasized their thoughts on this issue by pointing out different points. When we examine the answers given, “I think the templates are explanatory”, “Guides and templates cause us to have no question marks in our minds, it makes it easier to design by following the steps”. On the other hand, the instructors emphasized the benefit of templates and guides providing a certain standard. They expressed their thoughts on this issue as follows. “having guidelines makes our work easier and causes a certain standard to be formed”, “since it is divided into sections, it is clearly stated what we need to do, what we need to write, the standard structure makes our work easier”, “templates are easy to use, resources made it easier to apply”, “it encourages us to think of different ways”, “it makes it easier to bring a standard”.

4.2. Advantages and Strength

The participants were also asked to answer the question about the advantages and strengths of the AKADEMA guide and templates. When we examine the responses from the instructors, it is seen that the most powerful aspects of the guides and templates are the ease of implementation and clarity. The most powerful aspects of the guides and templates are thought to facilitate the implementation of the design by expressing their thoughts as “The language of expression is simple”, “It provides speed”, “It provides options”.

The teachers also evaluated one of the strongest aspects of the guides and templates as being explanatory. They expressed their thoughts on this issue as follows: “I can find answers to my questions about the design” “Creating templates for each teaching strategy makes the guide explanatory” “Guidance on how to divide the lesson” “Guiding” “Explaining what we need to do, how and why” Clearly expressing expectations from stakeholders” “Giving examples” “Having explanations for evaluation”.

4.3. Improvements

The participants also asked to indicate their recommendations for the improvement of the templates and guides. When the suggestions for the development of AKADEMA guides and templates were evaluated, the instructors stated that the existing structure did not offer flexibility in making original designs. They expressed their suggestions on this issue as follows: “templates should allow us to follow different teaching strategies when necessary”, “they should allow us to make original designs instead of the standard”, “I would like to try different teaching strategies”, “standardization prevents creativity”, “more original designs can be included for art courses such as painting and music”. In addition, another issue emphasized by the instructors is interaction. The instructors expressed their thoughts on this issue with the sentences “how to create interactive designs can be added to the templates”, “examples from well-known MOOC sites can be given”, “video, audio and video guides and templates can be used”. One instructor also emphasized that the guides and templates should be simplified.

5. Conclusion and Recommendations

In this study, the effectiveness of the course design templates used in the Anadolu University AKADEMA platform was evaluated from the perspective of course instructors and experts. The results were then discussed in the context of Utilization and Satisfaction Theory. The instructors were asked to evaluate what they thought about the course templates and guides in terms of their ability to facilitate course design and what they considered to be their greatest strengths and areas for improvement. After the online questionnaire, three experts were interviewed individually online to get more detailed information on the concepts that emerged in the analysis.

According to the results of the evaluations, all of the interviewees stated that the use of templates and guides greatly facilitated their work when designing lessons. Since design templates eliminate the need for designing from scratch, they make the process of preparing the lessons faster and easier. In addition, it can be said that templates reduce development costs by enabling them to be reused when desired.

In addition to facilitation, another main emphasis of the interviewees was that the use of templates sets a certain standard, ensures consistency, and facilitates the construction of lesson designs. Consistency simply means performing similar operations to accomplish similar tasks when using the interface. From the learner's point of view, it can be said that in the absence of consistency, the mental confusion that the learner will experience will be distracting and distract the learner from the learning material. On the one hand, it is necessary to use a similar interface structure for the learner to ensure that their attention is focused on the content. On the other hand, learners should not spend too much time learning how to use these technologies. In this context, templates can be said to facilitate cognitive navigation with minimal effort to understand the content or to do the activities. On the other hand, studies show that templates, when used consistently, also create a sense of familiarity from the student's perspective (Yousef, Chatti & Schroeder, 2014; Kellog, 2013). This means that each student knows what to expect from each lesson. In this sense, it can be argued that templates will allow students to focus their attention on the content instead of spending time looking for slide instructions.

If we look at the evaluation of the facilitation of templates, which is the main finding of the study, within the framework of the Uses and Gratifications theory, it is possible to say that the importance of the user's perceived ease of use and utility of use is emphasized in the acceptance and effectiveness of the use of a technology. At this point, the results obtained from the interviewees emphasized the benefits of the templates being easy to use and facilitating. The interviewees evaluated the most powerful aspects of the guides and templates as being easy to use and explanatory. They emphasized that the explanatory instructions provided by the design templates made it very easy to prepare the lessons. According to the Utilization and Satisfaction Theory, the ease of use of design templates may encourage instructors and students to adopt and use them. User-friendly interfaces, templates that can be applied quickly increase ease of use and provide comfortable use. In addition, it can be said that the benefits obtained using design templates will enable users to adopt these templates. The benefits derived from the use of design templates will lead users to adopt and maintain these templates. Similarly, it ensures that content is presented in a more understandable, organized, and engaging way. This in turn improves the learning experience of students and it can be argued that it will help teachers to create materials more quickly and efficiently. Accordingly, the level of satisfaction resulting from the use of design templates influences users' adoption and use of templates. The level of satisfaction resulting from the use of design templates affects users' adoption and use of templates. When teachers and students feel that design templates help them deliver content more effectively and enhance the learning experience, the level of satisfaction increases, and it can be assumed that they will continue to use design templates. It is also important that users perceive that they have control over using the design templates. When teachers and students feel that design templates give them more control over organizing and presenting content, they may be more willing to use them.

On the other hand, the study sought to answer which aspects of the guides and templates should be improved. In their evaluations of the aspects of the guidelines and templates that need to be improved, the instructors mainly emphasized that they hinder creativity. It is thought that the design templates do not provide the necessary flexibility for individuals to reflect their own ideas and creativity in their course designs. Although the most important factor that makes a design successful seems to be its functionality, there are studies showing that the main value is on the originality of the product (Huun & Hughes, 2014). These studies emphasize that creativity is a determining aspect of instructional design (Cuesta, 2010). At this point, it can be said that ready-made design templates can reduce the originality and personalized touch of our learning material. Since many people use the same template, the content may look similar, and a feeling of boredom and monotony may arise among learners. Sticking to a particular template may require the design and layout to fit a certain mold. This can limit the application of original ideas or creative approaches. In other words, ready-made design templates can limit creativity in teaching and content development. When you don't have the opportunity to create your own designs, it can limit the chance to express original ideas or offer a different visual experience.

According to the Uses and Gratifications Approach, the user is free and active, chooses the content himself/herself, chooses the mass media that will provide the best satisfaction in line with his/her needs and fulfills his/her needs (Fiske, 2003). When we look from the context of guidelines and design templates, it can be thought that more satisfactory results can be achieved for both learners and teachers if they have the flexibility to prepare designs within the scope of both course content and learners' needs. It can be said that the main purpose of the guide and course design templates is to ensure that learners achieve satisfaction while meeting their learning needs. Learners are also referred to as active, unaffected individuals who determine their own preferences and act with their free will. It can be said that learners are free and active, they choose, buy and

use the tools that correspond to their needs, and they get more satisfaction from the environments they choose. Therefore, it should be kept in mind that design templates serve a specific purpose on the one hand, using design templates in situations with time and resource constraints helps us to create content quickly, and on the other hand, a balance between creativity and design originality should be maintained.

In addition to this, another concept that comes to the forefront regarding the aspects of tutorials that need to be improved is interaction. In open and distance learning experiences, interaction is an important variable that affects learners' academic achievement, course participation and attendance, and motivation for self-directed learning (Matei & Ball-Rokeach, 2011; Xiao, 2017; Wang et al., 2014; Zha & Adams, 2015; Zimmerman, 2012). In order for learners to benefit from KAÇDs, where the participation is massively large and learners and teachers participate in learning processes at different times and environments, interaction should be maintained, increased and managed during the course. It can be argued that the effective structuring of the interaction process in the KAÇDs will increase the learner's participation in the lessons and increase the course completion rates (Aybek, 2017; Aydın, 2016; Artsın, 2019; Bozkurt, 2015; Hone & El-Said, 2016; Sunar, 2017; Yılmaz & Aktuğ, 2011). On the other hand, studies show that there is a significant relationship between the number of messages sent to the online discussion environment and students' success in the virtual course and the quality of their learning experiences (Cho, Gay, Davidson, & Ingraffea, 2007; Zha & Adams, 2015).

At the end of the online survey, it was seen that the answers from the experts were concentrated around interactivity, personalization, and flexibility. In this context, within the framework of these prominent themes, a three-question individual online interview was conducted with three people who were thought to reflect the views and experiences of all participants. The results of this interview are as follows.

What would you suggest increasing interaction in the course design templates used in AKADEMA? Participants emphasized that the content of the templates should be facilitative and guiding. It is thought that it would be effective to explain what to do step by step through an application, supported by audio and video as well as text. Participants emphasized the importance of increasing the interaction between learners, providing a personalized learning environment, and providing feedback to increase the interactivity of course design templates. In order to ensure interaction between learners, it was suggested that forum groups could be created where learners with similar characteristics would come together and activities requiring group interaction could be carried out. It was even stated that participants could be guided to establish their own teams. In this regard, one participant stated, "In feedback, it can be ensured that the learner interacts with peer groups that exhibit similar characteristics with him/her". Creating a personalized learning environment was a point emphasized by all three participants. It was also suggested that learning objectives could have a flexible structure that could change in line with the needs of the learner, rather than linearly. In this way, learners can be supported to interact with content appropriate to their level and needs. One participant expressed his/her opinion in this regard as follows: "Learners can be enabled to log in to the system with a test that will reveal their prior knowledge, learning styles or personality types". It is seen that they think that with a customizable learning design, flexibility can be provided by providing options for learners to create their own learning paths. On the other hand, another point emphasized about increasing the interaction of templates was feedback. It was mentioned that it is important to give feedback about the subjects that the learners are missing or successful, their progress level and their place in the group. It was also stated that this feedback could be supported by auditory media.

Do you think that the course design templates used in AKADEMA have a flexible structure to reflect the creativity of the instructors? Do you think it is important to have this flexibility? If you think it is important, how can it be reflected in course design templates? What are your suggestions in this regard? First, all of the participants think that there should be flexibility in order to reflect creativity. It was emphasized that it is important to explain to the instructors what the limits are in this regard. It is thought that making designs that consider the characteristics of the courses and reflecting the activities will enrich the AKADEMA platform. A participant expressed his opinion on this issue as follows: "I think it is important to have this flexibility. It may be useful to explain to the instructors that the general structure created in the course design templates can be stretched, what can be added with this flexibility, and what can be ignored".

What do you think about the integration of artificial intelligence (AI) applications into AKADEMA course design templates? What kind of support can be obtained from AI in the design of AKADEMA course design templates? It is seen that the participants think that support can be obtained from artificial intelligence, especially in the creation of personalized and adaptive learning environments. At this point, systems that

offer personalized learning designed according to learning needs can be used. Similarly, it is seen that the participants think that it can support increasing the interaction between learners. In this regard, one participant expressed his/her opinion as follows: “Artificial intelligence can be used to create learner-content interactions by grouping similar learners and directing them to the same forum environment”.

5.1. Implications

At the end of the study, in line with the suggestions from the teachers, it can be said that the templates should offer flexibility to use different teaching strategies. Here, more original designs should be provided especially for practical art courses such as painting and music.

Since KAÇDs appeal to a wide range of learners, it may be difficult to ensure interaction between learners and instructors. In this context, it should be investigated how the interaction between learners can be increased and the determined elements should be reflected in the design. Learners should be enabled to create learning communities where they can share information with other learners, discuss and evaluate each other. In this context, it can be said that directing to environmental resources with social network connections can be effective. By including social networks in the learning process with Web 2.0 and later applications, we can ensure that the learner can benefit from the learning process in a more effective, efficient, and attractive way. Features such as forums, live lectures, discussion boards can be integrated with the design to create a structure that will ensure interaction between learners. In this context, we can say that there is a positive relationship between students’ participation in the learning process and their learning performance in online environments.

The learning objectives of the course can be created in a flexible structure that is non-linear at the micro level and can be shaped according to learner needs. In this context, the certificates of attendance of AKADEMA courses can be prepared not for the course, but for each subject within the scope of the course. By emphasizing a personalized design, the learner can be supported to navigate between modules and interact with the content appropriate to their level and needs. This can support learner engagement and enable learners to gain learning experiences in line with their needs without completing the entire course. Learning activities can be created with the option to be carried out individually or as a group. Thus, the learner can benefit from the learning activities in a way that suits him/her in line with his/her own preferences.

In the studies conducted, it has been stated that the KAÇDs should include clear learning objectives that clearly state what students will learn (Xiao, 2017; Kellogg, 2013). In this context, the learning materials to be used in the templates, such as video, audio, written materials, interactive materials, should be used effectively to help students achieve their learning objectives.

It may also be useful to establish an evaluation mechanism to determine whether students have achieved their learning objectives. It should have a structure to provide feedback on learners’ performance and learning in the course. A support mechanism can be created where learners can get help on any issue. In order for the learner to interact with peer groups with similar characteristics, forum addresses consisting of learners with similar characteristics can be provided. General feedback can be given for the questions received and then more specific feedback can be given according to the answers received.

Tracking Systems can be used to review the applications in the course designs on the platform and analyze the shortcomings, aspects that need to be improved, etc. Virtual Assistant applications can be used to help them create course materials. Frequently asked questions can be answered with Chatbot. Long texts can be made less boring by summarizing with automatic text summarization.

Artificial intelligence can be used for segmenting learning content at the micro level, creating visual libraries by creating appropriate and special visuals for the course, determining learner profiles, personalizing learning designs, and creating adaptive learning environments. Artificial intelligence can create added value especially in creating learner-content interactions, grouping similar learners, and directing them to the same forum environment, and ensuring the functionality of the help button.

It may be useful to send a general questionnaire to the teachers and ask them about the problems and shortcomings they have experienced during the process and what their suggestions are for eliminating them. It is possible to say that their suggestions would contribute to the improvement and enrichment of the platform.

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372-Learning Approach Model with Small Groups in Face-to-Face Meetings of High School Students During the Covid 19 Pandemic in DKI Jakarta Province

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Abstract

The Covid-19 pandemic has not only changed the health landscape around the world but has also adapted open and distance learning systems. This of course has implications for preparedness and strategies for achieving learning outcomes that are in accordance with learning designs and maximizing the potential of various approaches in carrying out educational activities during a pandemic. covid 19. Research conducted in DKI Jakarta Province for one year, 2021-2022, has produced many practical and empirical findings in encouraging the creation of a new theory of the world of distance education. Learning activities using the small group method carried out in DKI Jakarta Province were investigated using a quantitative survey method on the effectiveness of the small group learning approach carried out in DKI Jakarta Province. The survey was conducted in 6 municipal areas in Jakarta with a total of 250 high school level schools surveyed, data collection was carried out by purposive sampling at the target schools in each municipality area and the subjects were teachers and students to explore the extent to which learning was implemented using a small group approach and effectiveness in the delivery of learning materials. Over a period of time and by following dynamic policies during the Covid 19 period by going through a year in-depth interview process of the learning conditions studied, it has been found that in the learning system approach with small groups the factors that have a direct influence are time, location and media/ model props in learning. The effectiveness of learning through this approach reaches a 72% success rate, student participation and teacher involvement in the presentation of the material is carried out using a problem solving system with a 92% success rate, namely case studies on available questions, discussion in this small group encourages creativity and the focus of students in solving problems and the willingness to ask questions is greater when compared to the condition of students in face-to-face classes before the Covid 19 period. Of the 6 municipalities in DKI Jakarta Province with 250 schools surveyed, there were three areas that had successful implementation of face-to-face groups The small areas are South Jakarta 84%, West Jakarta 92% and East Jakarta 81%, this parameter is due to being significantly influenced by regular meeting schedules of 86%, readiness of teacher material in learning 91% and opportunities for students to discuss in small classes during the learning process. learning by 85%. As further research, it is hoped that the findings in this study can explore whether the learning model with a small class system outside the pandemic period can be applied nationally where the policy regarding class groups in the learning system in Indonesia is still a standard rule regarding the ratio of teachers and students in one class.

Keywords: *Small Group Method, Covid 19 Pandemic, Learning Strategies, Influential Factors, Level of Learning Success*

1. Introduction

Education is the main weapon in the development of a nation's civilization. Without education, humans do not have the knowledge to build a nation's civilization. Because the progress of human resources depends on the right educational pattern according to the context. Education is faced with a number of problems both from educators and students. Educators are expected to find the right method with the times so that the educational

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process is not monotonous and boring. Like in this covid 19 pandemic situation (Aimang, 2022). There needs to be renewal in the application of education that produces quality human resources. Many things can be done by the teacher in providing good practice to students. Good in speech, attitude, social life, and other manners. This can be done in the learning process. Instilling an attitude of mutual respect, respect and mutual understanding in learning can trigger students' concern and enthusiasm for learning, so that they feel confident in learning. Learning is a process that will have the heaviest impact on student behavior, so that in the era of digitalization teachers are required to be more creative. With today's technology digitalization certainly has a positive impact and avoids negative impacts on students. During this pandemic, of course, the mindset and willingness to learn are very different now, even though technology is advanced (Rijal et al., 2021).

Due to the impact of the pandemic occurring for about two years in 2020-2022, our students are spoiled by learning from home where the implementation is not optimal. Because not all students follow it well. The Covid-19 pandemic has changed the entire world including the educational sector. A recently identified coronavirus is the source of the contagious sickness known as Covid-19. Although it primarily affects the elderly, this virus can harm anybody, including newborns, young children, and adults. This coronavirus can result in moderate respiratory illnesses, life-threatening lung infections, and even death. Some local governments have made the decision to put regulations into place that will expel pupils and begin using online learning techniques (in the network or online). In a few Indonesian provinces, this government program started to be effectively put into practice. Therefore, until the pandemic is finished, no activities should be taken out outside of the home. The online learning system (in the network) is a learning system that is conducted online utilizing the internet network rather than face-to-face interactions between teachers and students (Lubis & Dasopang, 2021). Even when the pupils are at home, the instructor still has to make sure that learning and teaching activities are ongoing. The solution is that instructors must be able to create innovative educational media using internet media.

All schools stopped face-to-face learning and replaced it with the concept of a distance learning model (PJJ) or Home Learning (HL). These schools are not ready for an online learning system, which requires learning media such as mobile phones, laptops or computers. As a teacher teaching face-to-face directly in the classroom, like it or not, you have to be ready for this new learning model. All really to prepare the concept of this distance learning model well (Kurniawati, 2021). Even though at first it was awkward to use a lot of applications such as Google Classroom, Google Meet and Zoom Meeting, there are still many applications that can be used as teaching materials for students. There are many things that I can learn through the distance learning model like the applications that have been mentioned. These features for remote face-to-face are very helpful in the learning process. The issues that arise are not limited to the learning media system; they also include the availability of quotas, which impose significant expenses on both students and teachers in order to meet their demands for online learning. The amount of internet needed has increased dramatically, and many parents of students are unwilling to raise the money for internet networks. Given that their parents have limited incomes or hail from the lower middle class, kids must consider how much time they have to study and how much information they can get. Parents of students who want their children to continue engaging in online learning must first shoulder costs like these (Syahrudin et al., 2022).

The internet network and online learning are inseparable. One of the challenges experienced by Internet network connectivity is experienced by students whose homes have connectivity issues. For pupils who reside in rural, underdeveloped regions, this is especially true. There are times when a cellular network is unstable even while someone is using it because the location is still outside of the signal's range. This is yet another problem that online course students regularly experience, making the implementation less than optimal. Teachers must keep up with the times while using technology. The ability to create instructional strategies and models that complement the characteristics of the students they teach is a requirement for teachers. in (Haryati et al., 2021). The utilization of advanced online resources that are presented properly, made available to students, and simple for them to grasp is something that teachers must become accustomed to.

Teacher the proper online tools or media and in accordance with the topic being taught, instructors must be able to provide simple, efficient, and engaging online learning. Even though online learning will provide students more opportunity to investigate the information being taught, the instructor must have the discretion to decide what is covered, how it is applied, and the best teaching strategies to apply. The WhatsApp Group is the easiest thing a teacher can do by using the WhatsApp Group (Pamungkas et al., 2021). The WhatsApp application is appropriate for online beginners because of how easy it is for pupils to access and operate. While employing numerous online learning tools, online teachers that are more enthusiastic can enhance their skills.

1.1. Learning with a small group approach method

Combining the Cooperative Learning Model with the Small Group Discussion Method. The Cooperative Learning paradigm mandates that students collaborate and favorably depend on one another within the framework of task structure, goal structure, and incentive structure (Aini et al., 2020). Both lower group and upper group students who collaborate to accomplish academic projects can profit from cooperative learning. Upper group students will serve as tutors for lower group students so they can receive specialized assistance from their peers who have the same linguistic orientation. to be able to accomplish learning goals and to significantly impact students' academic success.

combining the Cooperative Learning Model with the Small Group Discussion Method. The Cooperative Learning paradigm mandates that students collaborate and favorably depend on one another within the framework of task structure, goal structure, and incentive structure (Aini et al., 2020). Both lower group and upper group students who collaborate to accomplish academic projects can profit from cooperative learning. Upper group students will serve as tutors for lower group students so they can receive specialized assistance from their peers who have the same linguistic orientation. being able to accomplish learning goals and have a substantial impact on students' academic success in both cognitive, affective and psychomotor assessments, not only the influential model but also the selection of the right method and in accordance with the principles of learning in the studies studied, namely students can find out for themselves the concept of learning and directly involved, so it requires activeness in the teaching process. One that can be used is the Small Group Discussion method (small group discussion). According to (Rahayu & Wirza, 2020). A subset of the discussion technique is known as the small group discussion method (small group discussion). Because students may directly connect with members who are not too many, the small group discussion technique (small group discussion) is used more successfully. Students have many options for problem-solving than only the Small Group Discussion Method (small group talks). Students enhance their knowledge and experience from the activities they do in both inside and outside of the classroom by working together and conversing with one another. It is envisaged that the Cooperative Learning model and the Small Group Discussion Method (small group discussion) would improve student academic performance since they will make the teaching and learning process more collaborative.

The objectives of this study are to: (1) determine the level of use of the Small Group Discussion Method with the Cooperative Learning Model in SMA in the DKI Jakarta Province; (2) pinpoint the factors that directly and indirectly influence the use of the Small Group Discussion Method with the Cooperative Learning Model in SMA in the DKI Jakarta Province; and (3) evaluate the success and effectiveness of the Small Group Discussion Method with the Cooperative Learning Model. To improve student learning results at DKI Jakarta, researchers combine the Small Group Discussion Method with the Cooperative Learning Model. The small group discussion method is one type of discussion strategy. discussion with three to seven pupils in a small group. In (Herwiana & Laili, 2022), applying this method, the class is divided into groups of 4 or 6 students, who are given the task of discussing. In addition, according to (Dedi Robidan, Irwan Ritonga, 2017), this method is designed to work on specific learning tasks or projects. It is recommended that in each group there is one leader/chairman who has adequate leadership or organizational skills, not just academic performance. The task of the leader is responsible for ensuring that all members participate and are disciplined in carrying out their duties. the steps for using the Small Group Discussion Method (small group discussion), namely (1) The teacher presents the problem to be discussed and provides direction as necessary on how to solve it. The subject matter to be discussed can also be determined jointly by the teacher and students. (2) With the guidance of the teacher, the students form discussion groups, choose discussion leaders (chair, secretaries, reporters, arrange seats, rooms, facilities, and so on). (3) While the teacher moved from group to group to keep order and encourage and support each member of the group to actively engage so that the conversation proceeded smoothly, the students talked in their own groups. (4) Following the debate, each group presents their findings. All pupils (particularly those from other groups) responded to the findings that were reported. The instructor reviews or explains the reports. (5) After the conversation has concluded, the students record the outcomes (results), and the teacher compiles a report on the outcomes of the discussion from each group. While, in accordance with the cooperative learning approach (Sumandiyar et al., 2021). In accordance with the premise that learning must be based on changes in knowledge socially among groups of students, cooperative learning is a group activity in which each learner is accountable for his own learning and is encouraged to improve the learning of other participants. Another way to think of cooperative learning is as a shared work arrangement in a supportive environment for other groups.

According to (Pratama et al., 2020), there are six phases that make up the cooperative learning model's syntax: (1) communicating goals and motivating students; (2) presenting information; (3) dividing students into study groups; (4) directing study and work groups; (5) evaluating; and (6) awarding prizes. In terms of the learning process, the Small Group Discussion technique is located in phases 3 (forming study groups for the students), 4 (supervising work and study groups), and 5 (assessment) of the cooperative learning models. Student learning outcomes are this study's major focus. Benjamin S. Bloom asserts that learning outcomes fall into three categories: cognitive, emotional, and psychomotor. Learning outcomes are obtained by evaluating or assessing which is a follow-up or a way to measure the level of student mastery. Meanwhile, according to (Alamsyah et al., 2022), learning outcomes are patterns of behavior, values, understanding, attitude, appreciation, abilities, and skills. According to (aimi, ainun mardhiah, 2021) learning outcomes may generally be enhanced in three areas: the cognitive, psychomotor, and emotional domains. These three areas explicitly cannot be distinguished from one another. These three realms are present in every topic, although the emphasis varies. Thinking skills, such as the capacity for memorization, comprehension, application, analysis, synthesis, and evaluation, are related to cognitive elements. The emotional domain, meanwhile, is connected to attitudes and values. Teachers need to be aware of the many categories of emotional domain learning outcomes. This category is arranged hierarchically, moving from the simple level to the complicated level. The psychomotor domain includes activities like swimming and machine operation that have an impact on physical and manipulative abilities. alterations in the first or third domain brought about by Learning outcomes are the results of the learning process. The lack of changes in the three domains that students experienced after engaging in the learning process can be used to identify learning outcomes. The findings of measurements in the form of assessments may be used to determine the positive and negative aspects of learning outcomes. Assessments may also be used to measure the learning process, namely how involved students are in the learning process, in addition to the learning results. The greater the learning outcomes attained by students should be in accordance with the goals that have been previously set, the better the learning process and activities in following the learning process.

2. Method

This study used a survey design with class XI students in DKI Jakarta Province, this was done to see class action, research conducted in a class to find out the effect of the action applied to a research subject in that class. Meanwhile, according to (Alchamdani et al., 2020) research that is survey in the field of is a methodical investigation of the efforts made by a group of instructors to enhance the application of educational methods by engaging in learning-related activities, based on their evaluations of the outcomes of these activities. Through the use of the Small Group Discussion Method and the Cooperative Learning Model, this study examined the degree to which students in the high school programs at DKI Jakarta that served as research samples were successful learners. The targets of this study were class XI students at senior high schools in DKI Jakarta Province spread across North Jakarta, South Jakarta, West Jakarta, East Jakarta, Central Jakarta and Jakarta Seribu Islands with I group of students consisting of 5 students, spread across 250 high schools in DKI Jakarta. So that the total sample in this survey was 1250 students with 689 male students and the remaining 561 female students spread across 125 public schools and 125 private schools. This research was conducted by distributing questionnaires, interviews through zoom meeting facilities and data analysis was carried out using parametric statistics to be obtained as a result of the findings. The procedure used in this research is the following stages (1) planning, (2) implementation, (3) observation, and (4) reflection. Data collection techniques used in this study are observation and tests. Observation techniques are used to collect data on teacher and student activities with instruments in the form of observation sheets that are filled in during the learning process. The test technique is used to collect data on student learning outcomes using written test sheet instruments which are distributed to students at the end of each action (cycle). The data needed in this study are (1) teacher activity data; (2) student activity data (3) student learning outcomes data. Also, both observational and experimental tools were employed in this investigation. Descriptive, qualitative, and quantitative analytic approaches are employed while analyzing data. Following exposure to research actions, quantitative analysis is employed to assess student learning outcomes in the cognitive, emotional, and psychomotor domains as well as the evolution of teacher and student activities. While descriptive qualitative is employed to characterize reality in light of the facts collected.

The success indicator used in this study to determine whether or not the cycle continues is from the data: The achievement of teacher activities is said to be successful if it reaches $\geq 80\%$. Student activity is also said to be successful if it reaches $\geq 80\%$. Indicators of success for student learning outcomes in each domain, namely: (1)

Student learning outcomes in the cognitive domain, classically students have studied thoroughly, if the learning success of students who score ≥ 80 reaches $\geq 80\%$; (2) Student learning outcomes in the affective domain are achieved if classically obtains a score of $\geq 80\%$ in learning activities; (3) Student learning outcomes in the psychomotor domain are achieved if classically obtaining a score of $\geq 80\%$ in learning activities. Students are declared complete if they have obtained a KKM (Minimum Completeness Criteria) score of $>80\%$. And classical completeness $>80\%$. The completeness limit is set according to the KKM in the school.

3. Findings

In this study, the results of the data obtained are data on student learning motivation from observing teacher activities, student activities, and will also be exposed to student learning outcomes. The first measured aspect is the achievement of teacher and student activities. Aspects observed in teacher activity are: (1) Motivating students to be ready and active in learning, (2) Communicating learning objectives, (3) Conveying activities that will be carried out in the teaching and learning process, (4) Guiding students to form groups of 3 - 5 members and elect the discussion group chairperson, (5) Guiding the way students work in group discussions, (6) Providing assistance to groups experiencing difficulties, (7) Asking each group moderator to present the results of the discussion, (8) Providing reviews or explanations of reports - reports on the results of student discussions, (9) Guiding students to conclude the learning outcomes that have been implemented, (10) Providing evaluation questions in the form of reports to check student learning outcomes. (11) Giving awards to the best groups or students, (12) Giving homework to students in groups. The teacher's activities for two cycles obtained results, namely in cycle I, a percentage of 84% was obtained. in cycle II obtained a percentage of 88%. This percentage has reached the predetermined completeness of 80%. From the results above, it can be presented in the form of a Figure, as listed in Figure I

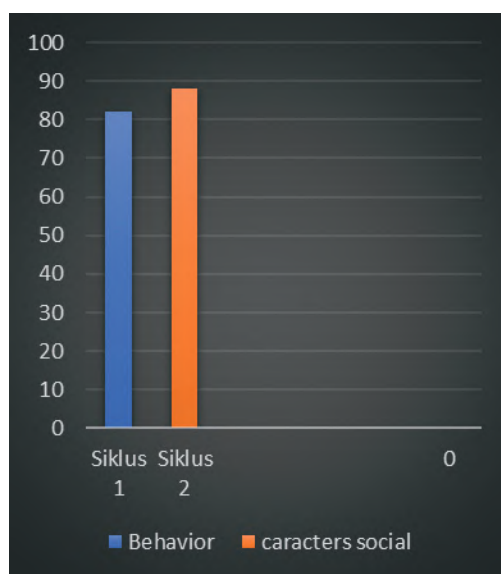


Figure 1. Teacher activity Figure in learning

3.1. Second-Level Heading

Teacher activity in learning by applying the Small Group Discussion Method with the Cooperative Learning Model shows an increase in each cycle. In addition, this study also measures the achievement of student activities. The aspects observed in student activities are: (1) Doing questions and answers about the material to be discussed, (2) Listening to the teacher's explanation of the problems to be discussed and how to solve them, (3) Forming groups according to instructions or guidance from the teacher, (4) Observing the pictures that have been given, (5) Conducting group discussions to complete the tasks given by the teacher, (6) Taking notes, responding, and giving suggestions accompanied by evidence of presentation of the results of other group discussions according to the observations, (7) Taking notes results - results of group discussions, (8) Draw conclusions based on data and find the concepts you want to instill yourself, (9) Answer the final questions given by the teacher. Student activity for two cycles obtained the following results: Student activity in cycle I obtained a percentage of 83%. in cycle II obtained a percentage of 88%. These results have reached the predetermined completeness of 80%. From the results above, it can be presented in a Figure, as shown in Figure 2.

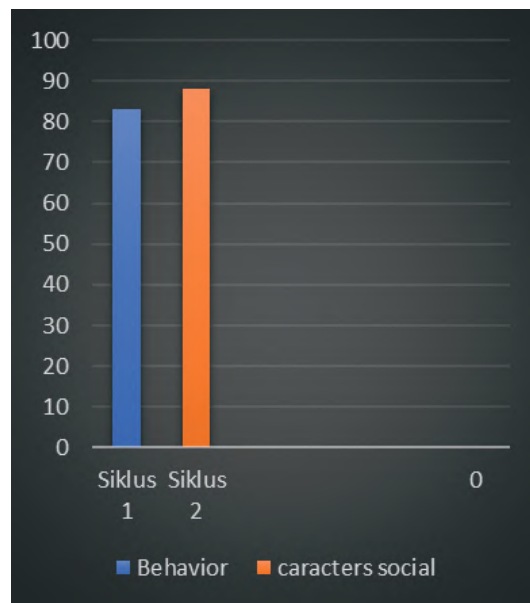


Figure 2. Student Activity in learning

Next is about student learning outcomes. Student learning outcomes consist of 3 domains, namely: affective, psychomotor, and cognitive. Student learning outcomes in the affective domain achieved in this study are thorough, honest, disciplined, responsible, cooperative, courageous in expressing opinions, and open to differences of opinion. Student learning outcomes in the affective domain for two cycles obtained the following results: Out of 1250 student learning outcomes in the affective domain in cycle I, the percentage was obtained: (1) the affective domain of character behavior skills was 83.13% (2) the affective domain of social skills was 86, 83% The percentage has reached the predetermined completeness of 80%. So it was continued in cycle II, From the 1250 learning outcomes of students present, the following results were obtained: (1) the affective domain of character behavior skills was 83.1% (2) the affective domain of social skills was 89.90%. These results have reached the predetermined percentage of completeness, namely 80%. From the results above, it can be presented in the form of a Figure as shown in Figure 3 and Figure 4

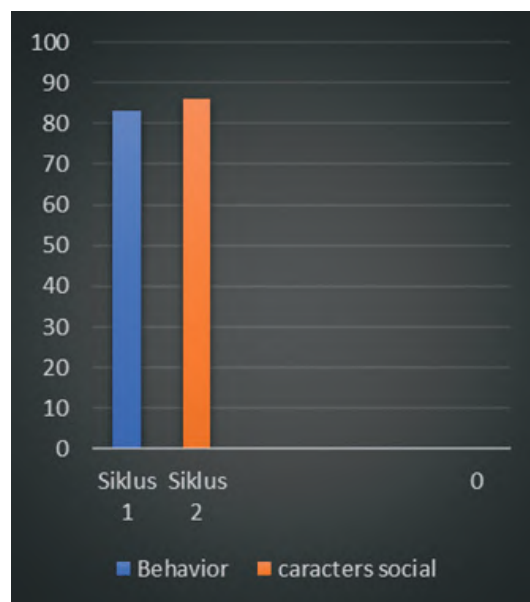


Figure 3. Figure of Affective Learning Outcomes Characteristic behavior skills in learning

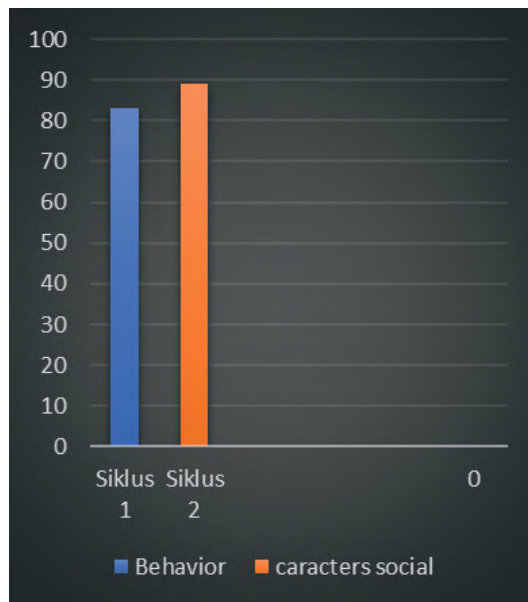


Figure 4. Affective Learning Outcomes Figure Social skills in learning

Affective learning outcomes in learning by applying the Small Group Discussion Method with the Cooperative Learning Model show an increase in each cycle. In addition to affective learning outcomes, this study also measured the achievement of students' psychomotor learning outcomes. The results of student learning in the psychomotor domain that were achieved in this study were making observations, using drawing tools, responding to the results of other group discussions and writing down the results of the discussions. As for the description of the results of the achievement of the learning process with the Small Group Discussion Method through the distribution in six regions in DKI Jakarta, they are as follows: North Jakarta 83%, West Jakarta 93%, North Jakarta 82%, South Jakarta 84%, North Jakarta 80%, Jakarta Islands 80% is presented in the following table:



Figure 5. The results of the distribution of learning completeness in students with the Small Group Discussion Method in DKI Jakarta

3.2. Second-Level Heading

In this discussion, the development of the implementation of the Small Group Discussion Method with the Cooperative Learning Model will be explained in class XI learning materials in high schools in the Province of DKI Jakarta. In this study, especially in the aspect of increasing student learning outcomes, it occurs in three domains, namely cognitive, affective, and psychomotor. Students' cognitive learning outcomes while participating in the learning process in cycles I and II have increased. Student cognitive learning outcomes in cycle I showed a percentage of 84.00%, while in cycle II showed a percentage of 86.00%. Thus it can be concluded that the cognitive learning outcomes of students for 2 cycles have increased by 4%. The cognitive domain relates to learning outcomes which consist of six aspects, namely knowledge, understanding, application, analysis, synthesis, and evaluation. In this study using five aspects, namely C1, C2, C3, C4, and C5. One step in learning activities using the Small Group Discussion Method with the Cooperative Learning Model is to conclude the results of the discussion. The ability to conclude occupies the cognitive domain at a high level, namely C5. The ability to conclude the results of discussions can indirectly spur students to find their own knowledge according to the expected goals. In addition, students gain more knowledge and exchange ideas during the learning process so that students more easily remember the results they obtained themselves. According to (Firmansyah & Daroini, 2021) the discussion method involves all students directly in the learning process, can grow and develop scientific ways of thinking and attitudes.

This is related to the opinion of (Connie et al., 2021) that the conclusions of discussions are easy for children to understand because students follow a thought process before arriving at conclusions. Therefore, conclusions that come from their own thinking with the addition of various sources will make it easier for students to remember the learning they have learned. In this study, it was proven that the application of the Small Group Discussion Method model with the Cooperative Learning Model could improve cognitive learning outcomes for class XI students in the DKI Jakarta Province. Besides cognitive learning outcomes, there are also affective learning outcomes. The students' affective learning outcomes consist of character skills and social skills. For the affective learning outcomes of character skills, in the first cycle of 83.12%. This percentage has not reached the desired target according to the indicators of research success. As for the second cycle of affective learning outcomes of students' character skills of 86.1%. This percentage has reached the desired target according to the indicators of research success. As for social skills, in the first cycle of 82.83%. This percentage has reached the desired target according to the indicators of research success. As for the second cycle, the affective learning outcomes of students' social skills were 86.00%. This percentage has reached the desired target according to the indicators of research success. Based on observations, the scientific (affective) attitude of the observed character skills includes conscientiousness, punctuality, and responsibility. Whereas social skills include appreciating the work of friends, cooperation, daring to express opinions, and paying attention to friends' presentations. All of these aspects arise when the learning process takes place. When students carry out discussions, one aspect that has increased is responsibility. According to (Khasanah & Muflihah, 2021)

Based on observations, the observed psychomotor skills included observing pictures, responding to the results of other group discussions and writing down the results of the discussions. In cycle II student activity in responding to the results of other group discussions experienced a significant increase. They suggest that students essentially need to be given the opportunity to interact with their friends so they can gain a broader understanding. With the exchange of information, students can receive information or theories that are contrary to the traditions or beliefs of previous students so that they can take answers from several existing alternatives. In addition, the discussion method invites participants who don't like to talk to express their opinions. In this study, it was proven that the application of the Small Group Discussion Method with the Cooperative Learning Model could improve the psychomotor learning outcomes of class XI high school students in DKI Jakarta. The achievement of learning completeness cannot be separated from several aspects that support the learning process. These aspects include teacher activities and student activities in the realm of meetings 86%. Student activity in cycle I was 81%. This percentage has reached the desired target according to the indicators of research success. As for the second cycle of student activity of 81.25%. This percentage has reached the desired target according to the indicators of research success. In applying the Small Group Discussion Method with the Cooperative Learning Model, concluding the results of group discussions is an activity that must be carried out. This activity guides students to acquire the right knowledge and in accordance with the goals to be achieved based on the results of the discussion of each group.

Through the application of the Small Group Discussion Method with the Cooperative Learning Model the learning process becomes student-centered so as to increase student activity in the learning process. An

increase in student activity can improve student learning outcomes because students play an active role in discovering for themselves, the learning concept to be achieved through student-centered learning steps. This is in line with Bruner's Discovery Theory (Kholifuddin & Zafi, 2021) that discovery learning is in accordance with the active search for knowledge by humans and by itself gives the best results. Trying alone to find solutions to problems and the knowledge that accompanies them, produces knowledge that is truly meaningful. The increase in student activity cannot be separated from the better guidance of the teacher. teacher activity in cycle I by 81%. This percentage has reached the desired target according to the indicators of research success. As for the second cycle of teacher activity of 83.52%. This percentage has reached the desired target according to the indicators of research success. Teacher activity during 2 cycles experienced an increase of 2.83%, from 81.69% in cycle I to 83.52% in cycle II. In applying the Small Group Discussion Method with the Cooperative Learning Model, the teacher's role in conditioning students to know their roles and work in groups is very important. Students may find it difficult and give up when experiencing obstacles if the teacher does not help them. Therefore, students must be given the confidence that they can solve the problems they face. In this case, the teacher acts as a facilitator and mentor for students to be more active – creative in learning. The teacher also monitors student activities and provides assistance if students find it difficult and unable to solve their problems. Therefore, in the learning process the teacher provides optimal guidance to students both classically and in groups. In the learning process, both teachers and students together become actors in implementing learning objectives. The purpose of this learning will achieve maximum results if learning runs effectively. Students are given the opportunity to make their own observations and discuss the results of observations independently with their group and then exchange opinions with the results of other groups. The learning becomes student-centered. The increase in teacher and student activity is influenced by combining the Cooperative Learning Model with the Small Group Discussion Method. Students and instructors become more engaged in exploring their own ideas on learning objectives when the Small Group Discussion Method is used in conjunction with the Cooperative Learning Model.

The stages or steps of the Small Group Discussion Method with the Cooperative Learning Model also support teachers and students to be more active during learning. This is in line with (Meriana et al., 2021) the advantages of the discussion method are that it involves all students directly in the learning process, each student can test the level of knowledge and mastery of the subject matter and each can grow and develop scientific ways of thinking and attitudes. The Small Group Discussion method with the Cooperative Learning Model prioritizes students to gain knowledge based on direct experience through observation and group discussions. Student knowledge that is built through a process of experience is different from simply listening to information obtained from the teacher. Learning with experience will involve the process of mental development as a whole, starting from cognitive, affective, and psychomotor (Maslahah, 2022) It has been demonstrated that when the Cooperative Learning Model and the Small Group Discussion Method are used together, student learning outcomes in the cognitive, emotional, and psychomotor domains improve over the course of two cycles. According to (Yustinus, 2021), learning outcomes may be judged by whether students' experiences in the three domains have changed as a result of the learning process. In addition to being measured in terms of the process, how far the various types of learning outcomes children have, the success of each teaching and learning process is also determined by how far the students' learning outcomes have been attained. The findings of measures in the form of may show both the excellent and negative learning outcomes.

Assessments can be used to illustrate the learning process, i.e., to determine the amount of student engagement in the learning process, in addition to assessing learning results. The learning outcomes attained by students should be greater in accordance with the previously defined objectives, the better the learning process and student participation in the learning process. Overall, each cycle of learning in class XI SMA at DKI Jakarta that combines the Small Group Discussion Method with the Cooperative Learning Model demonstrates an improvement in learning quality. To attain the proportion specified on the research success indicator, teacher and student activities as well as learning completion in the cognitive, emotional, and psychomotor domains have increased such that the integration of the cooperative learning model with small group discussion methodology. The use of the Small Group Discussion Method with the Cooperative Learning Model can enhance student learning outcomes in class XI SMA in the DKI Jakarta Province, it can be inferred based on the findings of the study and discussion in the preceding chapter. The activity of teachers, students, and student learning outcomes in the cognitive, emotional, and psychomotor domains have all increased significantly as a result.

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394-Analysis of Risk Factors in Administering Online Exams: Case Study of the Indonesian Open University for 2021-2022

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Abstract

The World Economic Forum reports that the Covid-19 pandemic has disrupted education. More than 1.2 billion students in 186 countries have been affected by their school closures. In tertiary education, Covid has caused the closure of universities, many universities have increased tuition fees, students have been forced to take holidays or work part-time to cover tuition fees, most foreign students have returned to their countries, and research activities have stopped due to lack of funds or because of a lockdown. Indonesia's Open University (UT) is also experiencing the same thing, although the impact is not as big as a face-to-face tertiary institution. In dealing with the impact of Covid-19, UT made adjustments by changing academic and non-academic services from face-to-face to online. One of the adjustments made in transforming the implementation of the exam from a face-to-face to an online exam in the form of a take-home exam (THE). This research aims to explore the risks of transforming face-to-face exams into online exams. Conceptually risks are factors that have the potential to thwart the achievement of goals. This research uses the mixed method. The informants for this study were students, lecturers at the central and regional UTs, educational staff at the two regional UTs, and experienced researchers. Data were collected from a questionnaire of 999 respondents in 77 cities, interviews, and secondary sources. The data and information obtained are then processed using NVivo and the risk register table. The research shows that smartphones and laptops are most often used to access online tutorials. The quality of their access is generally good. From the results of interviews and document studies, researchers constructed TUWEB activities. From the results of the interviews, there were 9 (nine) steps, starting from what was done by students to the last step, what was done by the Regional UT. From the risk analysis carried out by the process of implementing THE, it has a small frequency of occurrence and impact. The big risks are found in step 8, namely (1) the possibility of server down, (2) there is cheating in exams that are done at home, and (3) students missing the deadline for uploading answers. Mitigation recommendations that can be given are that UT focuses on reducing risk in the 8th step by supervising students in doing THE using more than 1 camera.

Keywords: Covid-19, risk, take-home exam, Open University

1. Introduction

At the beginning of 2019 there was a Covid pandemic which became known as Covid-19. The pandemic quickly spread around the world. All sectors of life are affected. The sectors most affected are the health and education sectors. The World Economic Forum reports that the Covid-19 pandemic has disrupted education (Li, et al, 2020). All educational processes have stopped. Many students cannot study because the government prohibits citizens from interacting. More than 1.2 billion students in 186 countries have been affected by their school closures. Some students study from home, some cannot study because schools are closed.

In tertiary education, Covid has caused the closure of universities. The closure of tertiary institutions was due to the government closing student access to come to school. Most foreign students return to their countries, so universities, dormitories, and campus support activities are closed. Because the number of students decreased, the university increased tuition fees. To cover the increased expenses students are forced to work part-time.

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Research activities have also stopped due to the absence of research costs (Donleavy, 2020). The lockdown policies adopted by the governments of each country have stopped almost all campus activities.

Indonesia is also not free from the influence of the Covid-19 pandemic. The Indonesian government did not take a total lockdown policy, but these restrictions still required public places such as schools and markets to be closed. Life continues but is limited and the mode changes from face-to-face to online. In the education sector, even though it had stopped, in the end, the learning process was able to run again. The government, schools, and universities have changed the mode of face-to-face learning to online learning.

The Open University (UT) during the Covid -19 pandemic also had problems in the learning process. Even though UT in the UT learning process already uses the online learning mode, UT is still affected by the Covid-19 pandemic. The impact felt by UT is not as big as faced by universities with face-to-face learning modes. One of the impacts experienced by UT is in the field of exams. The exam, which was originally carried out online and face-to-face, now only has an online exam. In the pre-Covid-19 era, the majority of UT students took face-to-face exams, and only a small number took online exams. UT decides that the learning process will continue. In dealing with the impact of Covid-19, UT made adjustments by changing academic and non-academic services from face-to-face to online. UT adjusts the exam mode by changing the face-to-face exam to an online exam in the form of a take home exam (THE).

The transformation process from face-to-face exams to online exams involves many things such as the ability of students to download and upload exams, ownership of gadgets that can be used for online exams, availability of question writers and examiners, availability of regional officers, and a learning management system for online exams. UT student participants are more than 350 thousand people. UT students are scattered throughout Indonesia and in various cities abroad. Unequal gadget ownership, uneven internet network, and student competence in using gadgets and using the internet are also not the same. This inequality increases the risk of taking online exams from home. Another big risk UT faces is that testing from home increases the risk of cheating. This research aims to explore the risks of transforming face-to-face exams into online exams.

1.2. Conceptual Framework

During the Covid-19 pandemic, some universities were determined to continue providing education. Changes were made by changing the learning process from face-to-face to online. In this regard, Remenyi (in Donleavy, 2020) states that online learning is the main choice when face-to-face learning is not possible. Remenyi's statement was strengthened by Makhanya who stated that if a university wants to survive during the Covid-19 pandemic, then the university must change itself by adopting broadly participative leadership and management, collaborative business models, and fundamental commitment to sustainability through ethical stewardship.

The transformation from face-to-face learning to online learning carries a high risk. There has not been much discussion of risk management due to the implementation of policies at universities. Generally, the implementation of risk management in the education sector is limited to measuring economic risk (Yarullin, et al, 2016). The risk in the higher education sector also involves many aspects such as political and pedagogical aspects. Discussion of risks in education services needs to consider aspects of pedagogical quality, accessibility, sustainability, and level of competition. Meanwhile, Winthrop (2020) identifies the risks and challenges during a pandemic, namely distance learning tends to not work well, educators are less able to carry out their jobs properly, protecting children's safety tends to be more difficult, and school closures have an impact on the fairness factor. can widen the educational equity gap, and bad experiences in the use of educational technology tend to use educational technology in the future.

In addition to challenges, the Covid-19 pandemic has also created opportunities in the education sector, namely blended learning is increasingly being used, educators are appreciated more, learning materials are always being updated, collaboration between teachers is increasing, and the ability to collaborate across borders is increasing. Meanwhile, Shaw, et.al. (2020) stated that three things were being done in Japan to reduce disaster risk to education, namely; (1) mitigating covid impacts on educational programs and participants; (2) preventing exacerbation of covid transmission within and outside schools; and (3) maintaining educational program integrity despite covid. Japan's experience shows that for every disaster, mitigation needs to be prepared. Risk management enables top management to compile managers' private list of drivers and implementation policies to respond to risks and uncertainties. Thus risk management is important for managers to prepare a mitigation plan for each plan they draw up. (Tze and Ai, 2021). Another risk that can be identified is the use of ChatGPT in Education. academic integrity issues, unfair learning assessment, inaccurate information, and over-reliance on AI. (Sok and Heng, 2023).

2. Methods

This research uses the qualitative approach with qualitative and quantitative data. The informants for this study were students, lecturers at the central and regional UTs, educational staff at the two regional UTs, and experienced researchers. The data were collected from a questionnaire of 999 respondents in 77 cities, interviews, and secondary sources. The data and information obtained are then processed using NVivo and the risk register table.

2.1. Discussion

The researcher used a questionnaire instrument to identify the devices used by students in accessing the UT Online Tutorial (Tuton). Of the 999 respondents who filled out the questionnaire, the majority (541 people) answered that they used smartphones with good and excellent network quality. The next devices that provide good quality are laptops, namely 206 people out of 999 people. 48 people stated that the quality of their network is bad and very bad.

Evaluation of learning outcomes at UT is carried out with a take-home exam (THE). THE is implemented by students downloading the questions, then students work on the questions and then they upload their answers. Of the 999 respondents, the majority (826 people) accessed THE using their cell phones. Of these, the majority (640) stated that the quality of the internet network at their place of residence was very good (115) and 640 stated that it was good. 71 people stated that the internet network at their domicile location was bad and very bad.

Several studies in advance indicate that a risk analysis is necessary to prepare and mitigate if the risk does occur. Researchers identified the implementation of online exams carried out at home by students. There are 11 steps identified in the implementation of THE. The eleven steps are:

1. Dissemination of exam preparation, administration, and examination procedures.
2. Development of exam socialization materials for related parties
3. Outreach to related parties
4. Identification and mapping of students who have difficulties in taking exams along with a solution plan
5. Recruitment and selection of examination results examiners
6. Submission of application for a special permit to conduct the exam
7. Management's response and decision on the request for a special permit
8. Implementation of the exam
9. Examination of exam results
10. Grading
11. Payments to exam organizers and examiners

These steps were then tested by conducting observations and interviews at Central UT and Regional UT. Observation results were then analyzed using a risk registrar. The following is a summary of the results of risk analysis using the risk register for the implementation of online exams in the regions.

Table 1. Summary of risk analysis of THE implementation

| No | Activity | Frequency of Events | Event Impact | Level of risk |
|-----|---|----------------------|--------------|---------------|
| 1. | Dissemination of exam preparation, administration, and procedures | Low possibility | Low | Low |
| 2. | Development of exam socialization materials | Low possibility | Low | Low |
| 3. | Socialization Outreach to related parties | Low possibility | Low | Low |
| 4. | Identification of students who have difficulties in taking exams | Low possibility | Low | Low |
| 5. | Recruitment and selection of examiners | Low possibility | Low | Low |
| 6. | Submission of an application for a special permit to conduct the exam | Low possibility | Low | Low |
| 7. | Management's response to the request for a special permit | Low possibility | Low | Low |
| 8. | Implementation of the exam | High possibility | High | High |
| 9. | Examination of exam results | Moderate possibility | Moderate | Moderate |
| 10. | Grading | Low possibility | Low | Low |
| 11. | Payments to exam organizers and examiners | Low possibility | Low | Low |

From the results of the risk analysis in advance it appears that the dissemination of exam preparation, administration, and examination procedures, development of exam socialization materials to related parties, socialization to related parties, identification and mapping of students who have difficulties in taking exams along with a solution plan, recruitment and selection of examination results examiners, submission of a letter of application for a special permit to conduct the exam, and management's response and decision on the request for a special permit has a low probability of occurrence of the risk, has a low impact of events and has a risk The low one.

In activity 8, the implementation of the test, a high risk will appear with a high probability of occurrence, high event impact, and high risk. The risks that might be faced in step 8, namely (1) the possibility of a server or gadget down, (2) there is cheating in exams that are done at home, (3) students missing the deadline for uploading answers, and (4) students using artificial intelligence such as ChatGPT to work on the questions. In step 9, namely examining the results of the exam, the results of the researcher's analysis indicate that there is a moderate probability of occurrence of the event, the impact of the event, and the risk. Whereas in step 10, namely grading, and step 11, namely payments to exam organizers and examiners, it is estimated that the level of occurrence, impact, and risk incurred is low.

From the risk analysis to preparation, implementation, and assessment of exam results, great attention needs to be given to the eighth and ninth activities. Both of these activities are not fully under the control of UT. The eighth step is for students to carry out exams at home or elsewhere. Meanwhile, the ninth step is for examiners to carry out online examinations elsewhere.

2.2. Conclusions and Recommendations

The Covid-19 pandemic has created a disaster for humans, including higher education. Covid has caused many universities to close and carry out limited learning. Many students are unable to continue their studies. However, the Covid-19 pandemic has also spawned various innovations, including in education. As a distance university, during the Covid-19 pandemic, the Open University (UT) also faced problems in learning. To survive, UT carries out a transformation. One of the transformations is the transformation in the exam. UT changed face-to-face exams to online exams that are administered at home. From the results of the analysis, UT developed 11 steps to administer the exam. Big risks are faced in the eighth step, namely the implementation of the exam at home, and the ninth step, namely checking the exam results. This risk arises due to activities carried out at home that cannot be fully controlled by UT. From the results of the risk analysis, the recommendations given are to deepen the investigation of activities 8 and 9 and then carry out a risk analysis and develop a mitigation plan.

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399-Examining the Importance of Course Learning Outcomes in Higher Education in Terms of Different Roles in the Context of Evaluation Processes and Self-Regulation Skills

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Abstract

Educational activities are among the most important functions of higher education institutions. Learning is among the ultimate primary objectives of educational activities. The whole purpose of educational activities is to realize learning outcomes. Although the learning outcomes are structured differently in line with the education-training and quality policies of higher education institutions; in the context of institution, faculty, course and subject it is handled in a way that is related to the bottom-to-ceiling and top-to-bottom, like the unbreakable links of a chain. The robustness of this structure, which was established within the scope of education-instruction and quality policy; it is the level of interaction and compatibility of learning outcomes expressed at different levels with each other. The expansion of the domain of this level is important in terms of increasing the awareness of the learner's self-regulation skills. Such that, within the scope of a course for which the learner is responsible for a semester, the evaluation processes only include midterms, finals, homework, quizzes, practice, etc. expressed under evaluation activities; it is not possible to talk about its effectiveness within the scope of quality processes and learning support activities. However, these practices, which are considered within the scope of the evaluation processes, are only the type of the assessment to measure the learning outcomes of the course; more importantly, raising awareness of which assessment type will help measure, rather than what it is called. Learners are asked to answer the question "Where are we responsible for in the exam?" It is thought that they may be closer to developing a way to organize their learning with the awareness that what is expected from them at the end of the course is given as "course learning outcomes" rather than the question. This study focuses on the importance of Fundamentals of Mathematics course learning outcomes in enabling learners to self-regulate. Accordingly, in the study, learning outcomes based on different fields; to increase the awareness of the instructors on the one hand, of the importance of their presence in the evaluation processes. On the other hand, it is aimed to emphasize the ability of learners to develop their self-regulation skills. Within the scope of this purpose, by associating the course learning outcomes included in the information package of the course with the assessment activities to be carried out during a term and determining the assessment tool and associated assessment method to measure the relevant course learning outcomes. The importance of this process is revealed by collecting data of the views of the learners at the beginning and end of the period in order to evaluate the development of the self-regulation skills of the learners. This process will be completed by following the principles of the qualitative paradigm.

Keywords: *Course learning outcome, higher education, self-regulation, evaluation processes.*

1. Introduction

Educational activities are among the most important functions of higher education institutions. Learning is among the ultimate primary objectives of educational activities. Accordingly, it is possible to say that the whole purpose of educational activities is to realize learning outcomes. Although the learning outcomes are structured differently in line with the education-training and quality policies of higher education institutions; in

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the context of institution, faculty, course and subject it is handled in a way that is related to the bottom-to-top and top-to-bottom, like the unbreakable links of a chain. The robustness of this structure, which was established within the scope of education-instruction and quality policy; it is the level of interaction and compatibility of learning outcomes expressed at different levels with each other. The expansion of the domain of this level is important in terms of increasing the awareness of the learner's self-regulation skills. Self-regulation is the process of individuals planning, directing and executing their behaviors and thoughts towards their goals and expectations (Liew, Cameron, & Lockman, 2018). Self-regulation skills play an important role in individuals' ability to achieve the goals they have set (Berkman, 2016). Schunk and Zibberman (2012) define the concept of self-regulation as the process by which individuals produce their own thoughts and behaviors to achieve their learning goals. In this context, learning occurs as a result of the individual's own production of thoughts and behaviors. Students with high self-regulation skills are in a cognitive, socio-emotional and physiologically active position during the learning process (Skibbe, Montroy, Bowles, & Morrison, 2019). The multifaceted structure of self-regulated learning abilities incorporates the behavioral, motivational, and cognitive aspects of learning (Artino, 2008). According to Barnard-Brak, Paton, and Lan (2010), self-regulated learning is linked to voluntary and active behaviors such as time management, task strategies, goal-setting, environmental structuring, and metacognitive skills. The ability to control one's own learning procedures is necessary for self-regulated learning. In this sense, students' ability to see the relationship between learning outcomes and program competencies will provide them with the opportunity to organize their own learning. Such that, within the scope of a course for which the learner is responsible for a semester, the evaluation processes only include midterms, finals, homework, quizzes, practice, etc. expressed under evaluation activities; it is not possible to talk about its effectiveness within the scope of quality processes and learning support activities. However, these practices, which are considered within the scope of the evaluation processes, are only the type of the assessment to measure the learning outcomes of the course; more importantly, raising awareness of which assessment type will help measure, rather than what it is called. Learners are asked to answer the question "Where are we responsible for in the exam?" It is thought that they may be closer to developing a way to organize their learning with the awareness that what is expected from them at the end of the course is given as "course learning outcomes" rather than the question.

Accordingly, a mutually reinforcing cycle that promotes the achievement of desired learning outcomes is fostered by ensuring awareness of learning outcomes and strengthening students' self-regulation skills. Specifically, the cultivation of self-regulation skills plays an important role in the facilitation of student achievement of learning outcomes. Self-regulation skills have a critical role to play in the development of students' abilities to motivate themselves, set goals, manage time effectively, and formulate learning strategies. Additionally, possessing these skills enables students to oversee the process of attaining learning objectives and to confront obstacles more effectively by adjusting self-regulation strategies when required. High self-regulation skills allow students to consistently concentrate on learning goals, which enhances the process of achieving learning outcomes. Thus, developing self-regulation skills can make learning experiences more efficient and effective, thereby amplifying students' success in achieving learning outcomes. On the other hand, knowing the learning outcomes can enhance students' self-regulation skills and empower them to play a more active role in the learning process, highlighting the importance of established goals and objectives in academic settings. In fact, an awareness of learning outcomes plays a role in guiding students through the learning process in terms of what to learn and how to learn it, which ultimately contributes to the development of self-regulation skills. With this awareness, students are able to improve their ability to self-evaluate and plan the process in order to achieve their learning goals. In light of these factors, this research focuses on the importance of the learning outcomes of the Fundamentals of Mathematics course in enabling learners to self-regulate. Accordingly, in the study, learning outcomes based on different fields; to increase the awareness of the instructors on the one hand, of the importance of their presence in the evaluation processes. On the other hand, it is aimed to emphasize the ability of learners to develop their self-regulation skills. Within the scope of this purpose, by associating the course learning outcomes included in the information package of the course with the assessment activities to be carried out during a term and determining the assessment tool and associated assessment method to measure the relevant course learning outcomes. The importance of this process is revealed by collecting data of the views of the learners at the beginning and end of the period in order to evaluate the development of the self-regulation skills of the learners.

1.1. Research Questions

«What is the importance of being aware of the learning outcomes in terms of students for their self-regulation skills in the learning processes? »

«What is the importance of being aware of the learning outcomes in terms of instructors for structuring of teaching processes? »

2. Method

This process will be completed by following the principles of the qualitative paradigm. Although the sample has not been adequate for synthesizing the results, it is thought that the research questions which are handled among the candidate article will be taken into consideration in terms of the stakeholders with its importance in depth. Accordingly, the paper will still go on to collect the data in terms of the dynamics of the learning outcomes. It is also worth to note that at the end of the semester for the course of Fundamentals of Mathematics' learning outcomes; the data collection process will end, and the obtained data will be analyzed with the basis of qualitative research methods principles. So, the aim for increasing the awareness of both the instructors and students will be taken into consideration with a possible course content which is aligned by course learning outcomes and program learning outcomes. The way for the Check and Action cycles will be handled through the possible course information package for the course of Fundamentals of Mathematics.

2.1. Data Collection Tools

Table 1. Interview questions

| Interview questions for Instructor | Interview questions for Student |
|---|--|
| 1. What do you think course learning outcomes mean? | 1. What do you think course learning outcomes mean? |
| 2. What is the relevance of course learning outcomes to the course? | 2. What is the relevance of course learning outcomes to the course? |
| 3. What is the relevance of course learning outcomes to evaluation processes? | 3. What is the relevance of course learning outcomes to evaluation processes? |
| 4. Do you check the course learning outcomes before beginning in the course? | 4. Do you check the course learning outcomes before enrolling in the course? |
| 5. Have the learning outcomes of the Fundamentals of Mathematics course contributed to you professionally? How? Which program outcome was beneficial for students to achieve? | 5. What are your thoughts about the relationship between course learning outcomes and program outcomes? |
| 6. How do you think the learning outcomes of the foundations of mathematics course may have contributed to the students professionally? | 6. How did the learning outcomes of the Fundamentals of Mathematics course contribute to you professionally? Which program was helpful in achieving its output? What is the contribution of the learning outcomes of the Fundamentals of Mathematics course to you professionally? |
| 7. Do you take learning outcomes into consideration when designing the course? How?" | 7. Do you use course learning outcomes when preparing for classes or exams? |

2.2. Data Collection

The data was collected by using two different interview forms. The form which was prepared for instructors constituted seven open ended questions and the other form which was prepared for students constituted eight open ended questions. The form was given here below.

2.3. Data Analysis

The analysis of the data obtained from interviews was done with the content analysis technique. The findings obtained as a result of the interview can be seen in the findings part. It can also be seen as a way to increase the instructors and students' awareness which is related with the course and program learning outcomes in the findings part, too.

3. Findings

3.1. Instructor

1. What do you think course learning outcomes mean?
«These are expressions that explain how students can best gain knowledge in a lesson by observing which features they use, such as cognitive, visual and psychomotor, to understand the lesson better. It gives general information, examines the progress, and contains statements summarizing what to do. »
2. What is the relevance of course learning outcomes to the course?
«It ensures that the needs of the course, its purpose, and what it will bring to the student are clearly discussed. In this way, the course runs in an orderly manner. »
3. What is the relevance of course learning outcomes to evaluation processes?
«It can be used in evaluations as it will provide information about where the exam questions, assignments and projects prepared in accordance with the output will come from and how they will be measured. »
4. Do you check the course learning outcomes before beginning in the course?
«I usually check to understand the course of the lesson and to make preliminary preparations. »
5. Have the learning outcomes of the Fundamentals of Mathematics course contributed to you professionally? How? Which program outcome was beneficial for students to achieve?
«While program outcomes mostly reflect the profile of the desired student at the end; Course learning outcomes address the profile of the student for whom the knowledge is planned to be trained. As a result, they both create student models with certain qualities. »
6. How do you think the learning outcomes of the foundations of mathematics course may have contributed to the students professionally??
«In general, it benefits me in terms of course progress and preliminary preparation. It contributes to classifying the foundations of mathematics. It contributes to the progress of the lesson, whether the plan is followed, whether there are any deficiencies or whether sufficient information is given. We would have a preliminary idea about the person who prepared the course learning outcome. He would ensure that we were aware of the methods, techniques and practices he would use in the course. »
7. Do you take learning outcomes into consideration when designing the course? How?''
«It varies according to the prepared course learning outcome, because the course learning outcome, which contains basic information, does not give us sufficient information and cannot be used outside the beginning of the semester, but it is used in the course of the course. If it provides information about the methods and stages, it provides early study opportunities while preparing for the course and for the exam. »

3.2. Students

1. What do you think course learning outcomes mean?
«Course learning outcomes are the student's ability to use what she has learned from the course as a result of the lesson learned»
2. What is the relevance of course learning outcomes to the course?
« How the student interprets and applies what they learn in the course is taken into consideration. »
3. What is the relevance of course learning outcomes to evaluation processes?
« Professors can act based on these skills when preparing exam questions. »
4. Do you check the course learning outcomes before enrolling in the course?
« Program outcomes express the general characteristics that the department wants to impart, and this is indirectly related to the course contents. »
5. What are your thoughts about the relationship between course learning outcomes and program outcomes?
«He contributed to the lesson monitoring and question preparation. It is useful to be able to apply basic logic knowledge to mathematical reasoning, propositional logic proofs and applications. I define, analyze and interpret the basic concepts, theories and practices related to the field, and interpret the relationship between them and associate them with the program output. »
6. How did the learning outcomes of the Fundamentals of Mathematics course contribute to you professionally? Which program was helpful in achieving its output? What is the contribution of the learning outcomes of the Fundamentals of Mathematics course to you professionally?
« It enabled me to question the concepts and axiomatic method and to express the relationships at a level that students could understand. I think that students do not look at learning outcomes but only on the basis of achievements and whether they are successful in exams or not. It definitely happens indirectly, but they are not aware of it. »

7. Do you use course learning outcomes when preparing for classes or exams?
« Just reviewing. Course contents are already prepared in harmony. »

3.3. The Way to Increase the Awareness of Instructors and Students

It is recommended to follow these 9 steps while checking the course learning outcomes with the related program learning outcomes in terms of increasing the awareness of the instructors and students.

Step 1: Listing of Exam Grades on a Question-Based basis

Table 2. Listed Exam Grades on a Question-Based basis

| MIDTERM EXAM | | | | | | | |
|----------------------------------|----------|------|------|-----|------|------|-------|
| Related Course Learning Outcomes | 3 | 1 | 2 | 4 | 2 | | |
| Score of Provision | 20 | 20 | 20 | 20 | 20 | | |
| Student number | Students | Q1 | Q2 | Q3 | Q4 | Q5 | Total |
| 1***** | S1 | 20 | 8 | 0 | 12 | 11 | 51 |
| 1***** | S2 | 20 | 20 | 0 | 17 | 20 | 77 |
| 1***** | S3 | 20 | 20 | 18 | 12 | 20 | 90 |
| 1***** | S4 | 12 | 5 | 5 | 7 | 20 | 49 |
| 1***** | S5 | 20 | 7 | 0 | 3 | 0 | 30 |
| 1***** | S6 | 16 | 20 | 20 | 14 | 18 | 88 |
| 1***** | S7 | 14 | 15 | 10 | 3 | 0 | 42 |
| 1***** | S8 | 20 | 20 | 20 | 12 | 18 | 90 |
| 1***** | S9 | 20 | 20 | 0 | 18 | 0 | 58 |
| 1***** | S10 | 20 | 15 | 20 | 20 | 17 | 92 |
| | | 18,2 | 15,0 | 9,3 | 11,8 | 12,4 | 66,7 |

Step 2: Course Learning Outcomes – Creating the Exams Table

Table 3. Created Exam Table Based on Course Learning Outcomes

| CLO/EXAM NAME | 30%
MIDTERM EXAM | 10%
ASSIGNMENT | 10%
QUIZ1 | 10%
QUIZ2 | 40%
FINAL EXAM |
|---------------|---------------------|-------------------|--------------|--------------|-------------------|
| 1 | | | 1 | | 1 |
| 2 | | | 2 | | 1 |
| 3 | 1 | | 1 | | 1 |
| 4 | 1 | | | | 1 |
| 5 | | | | | 1 |
| 6 | 2 | | 2 | | 1 |
| 7 | 2 | 5 | | 4 | 4 |
| 8 | | 1 | | | |

Step 3: Calculation of Course Learning Outcomes Achievement Scores (CCLOAS)

Table 4. Calculated Achievement Scores of Course Learning Outcomes

| CLO/EXAM NAME | 30%
MIDTERM EXAM | 10%
ASSIGNMENT | 10%
QUIZ1 | 10%
QUIZ2 | 40%
FINAL EXAM | CCLOAS |
|---------------|---------------------|-------------------|--------------|--------------|-------------------|--------|
| 1 | | | 15 | | 15 | 7,5 |
| 2 | | | 40 | | 9 | 7,6 |
| 3 | 15 | | 20 | | 9 | 10,1 |
| 4 | 40 | | | | 1 | 15,6 |
| 5 | | | | | 1 | 4,0 |
| 6 | 30 | | 25 | | 1 | 15,5 |
| 7 | 15 | 85 | | 100 | 4 | 4,2 |
| 8 | | 15 | | | | 1,5 |

Step 4: Calculation of Course Learning Outcomes Reach Points (CCLORP)**Table 5.** Calculated Reach Points of Course Learning Outcomes

| CLO/EXAM NAME | 30%
MIDTERM EXAM | 10%
ASSIGNMENT | 10%
QUIZ1 | 10%
QUIZ2 | 40%
FINAL EXAM | CCLORP |
|---------------|---------------------|-------------------|--------------|--------------|-------------------|--------|
| 1 | | | 9,4 | | 14,3 | 6,66 |
| 2 | | | 18,0 | | 6 | 4,2 |
| 3 | 4,4 | | 10,3 | | 7,1 | 5,19 |
| 4 | 17,1 | | | | 6,2 | 7,61 |
| 5 | | | | | 8 | 3,2 |
| 6 | 18 | | 11,4 | | 7,8 | 9,66 |
| 7 | 6,3 | 74,3 | | 74 | 32 | 29,52 |
| 8 | | 14 | | | | 1,4 |

Step 5: Learning Outcomes – Preparation of Program Output Matrix**Table 6.** Prepared Learning – Program Outcomes Matrix

| The course outcomes of Fundamentals of Mathematics course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|
| 1. Will be able to explain the basic concepts of natural numbers. | 3 | 3 | 2 | 1 | 0 | 1 | 3 | 2 | 2 | 2 | 3 | 0 | 2 |
| 2. Will be able to explain properties of natural numbers. | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 3 | 2 |
| 3. Will be able to explain the basic concepts of fractions. | 1 | 1 | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 2 | 2 | 2 | 2 |
| 4. Will be able to explain the properties of fractions. | 1 | 3 | 1 | 3 | 1 | 3 | 0 | 2 | 2 | 0 | 3 | 0 | 2 |
| 5. Will be able to perform operations on rational numbers. | 3 | 2 | 3 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 2 |
| 6. Will be able to explain the concepts of the field of algebra. | 0 | 2 | 1 | 0 | 3 | 1 | 0 | 0 | 3 | 1 | 3 | 0 | 1 |
| 7. Will be able to explain the features of the field of algebra. | 3 | 2 | 1 | 3 | 3 | 0 | 3 | 2 | 2 | 0 | 0 | 3 | 0 |
| 8. Will be able to explain teaching methods related to the subject areas discussed. | 0 | 2 | 2 | 0 | 1 | 2 | 2 | 2 | 3 | 1 | 1 | 3 | 0 |

PO1 Have sufficient field knowledge regarding the field.; PO2 Have sufficient field knowledge regarding their sub-fields (Science, Physics, etc.); PO3 Have pedagogical knowledge about the teaching profession and field.; PO4 Has sufficient foreign language knowledge to be able to follow foreign sources related to his/her field.; PO5 Have the ability to use information and communication technologies effectively in teaching Mathematics.; PO6 Knows the developmental characteristics and learning styles of students in the second stage of primary education, and can make effective planning, material development and application in accordance with these characteristics.; PO7 Have sufficient knowledge about the structure and historical development of the Turkish Education System. PO8 Becomes a teacher who adheres to Ataturk's Principles and Revolutions, believes in democracy, is aware of Turkish national, spiritual, moral and cultural values and shows sensitivity to them in his/her profession.; PO9 Have scientific and analytical thinking skills, know scientific research methods and techniques and use them in classroom applications.; PO10 Knows the relationship between Mathematics-Society-Environment-History and uses it in his/her professional and daily life. PO11 Have the ability to use Turkish properly and effectively in accordance with its rules and to communicate healthy with students and colleagues. PO12 Has and uses the necessary knowledge and skills regarding students who need special attention and education. PO13 Knows and applies contemporary teaching methods and techniques and measurement and evaluation methods.

Step 6: Calculation of Course Learning Outcomes Reach Rates (CCLORR)

Table 7. Calculated Reach Rates of Course Learning Outcomes

| The course outcomes of Fundamentals of Mathematics course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 | CCLOAS | CCLORP | CCLORR |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|--------|--------|--------|
| 1. Will be able to explain the basic concepts of natural numbers. | 3 | 3 | 2 | 1 | 0 | 1 | 3 | 2 | 2 | 2 | 3 | 0 | 2 | 7,5 | 6,66 | 89% |
| 2. Will be able to explain properties of natural numbers. | 2 | 2 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 3 | 2 | 7,6 | 4,2 | 55% |
| 3. Will be able to explain the basic concepts of fractions. | 1 | 1 | 0 | 3 | 2 | 0 | 0 | 3 | 2 | 2 | 2 | 2 | 2 | 1,1 | 5,19 | 51% |
| 4. Will be able to explain the properties of fractions. | 1 | 3 | 1 | 3 | 1 | 3 | 0 | 2 | 2 | 0 | 3 | 0 | 2 | 15,6 | 7,61 | 49% |
| 5. Will be able to perform operations on rational numbers. | 3 | 2 | 3 | 0 | 3 | 1 | 0 | 0 | 0 | 1 | 0 | 3 | 2 | 4,0 | 3,2 | 80% |
| 6. Will be able to explain the concepts of the field of algebra. | 0 | 2 | 1 | 0 | 3 | 1 | 0 | 0 | 3 | 1 | 3 | 0 | 1 | 15,5 | 9,66 | 62% |
| 7. Will be able to explain the features of the field of algebra. | 3 | 2 | 1 | 3 | 3 | 0 | 3 | 2 | 2 | 0 | 0 | 3 | 0 | 40,2 | 29,52 | 73% |
| 8. Will be able to explain teaching methods related to the subject areas discussed. | 0 | 2 | 2 | 0 | 1 | 2 | 2 | 2 | 3 | 1 | 1 | 3 | 0 | 1,5 | 1,4 | 93% |

Step 7: Calculation of Program Learning Outcomes Achievement Scores (CPLOAS)

Step 8: Calculation of Program Learning Outputs Reach Points (CPLORP)

Step 9: Calculation of Program Learning Outputs Reach Rate (CPLORR)

Table 8. Calculated CPLOAS, CPLORP, and CPLORR

| The course outcomes of Fundamentals of Mathematics course | PO1 | PO2 | PO3 | PO4 | PO5 | PO6 | PO7 | PO8 | PO9 | PO10 | PO11 | PO12 | PO13 | CCLOAS | CCLORP | CCLORR |
|---|-----|-----|-----|-----|-----|-----|-----|-----|-----|------|------|------|------|--------|--------|--------|
| 1. Will be able to explain the basic concepts of natural numbers. | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 1 | 7,5 | 6,66 | 89% |
| 2. Will be able to explain properties of natural numbers. | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 1 | 7,6 | 4,2 | 55% |
| 3. Will be able to explain the basic concepts of fractions. | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 1 | 1,1 | 5,19 | 51% |
| 4. Will be able to explain the properties of fractions. | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 1 | 15,6 | 7,61 | 49% |
| 5. Will be able to perform operations on rational numbers. | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 1 | 4,0 | 3,2 | 80% |
| 6. Will be able to explain the concepts of the field of algebra. | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 1 | 15,5 | 9,66 | 62% |
| 7. Will be able to explain the features of the field of algebra. | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 1 | 40,2 | 29,52 | 73% |
| 8. Will be able to explain teaching methods related to the subject areas discussed. | 1 | 1 | 1 | 1 | 1 | 2 | 1 | 1 | 3 | 1 | 2 | 0 | 1 | 1,5 | 1,4 | 93% |
| TC | 8 | 8 | 8 | 8 | 8 | 16 | 8 | 8 | 24 | 8 | 16 | 0 | 8 | | | |
| CV | 2 | 2 | 2 | 2 | 2 | 3 | 2 | 2 | 3 | 2 | 3 | 0 | 2 | | | |
| CPLOAS | 34 | 34 | 34 | 34 | 34 | 68 | 34 | 34 | 102 | 34 | 68 | 0 | 34 | | | |
| CCLORP | 22 | 22 | 22 | 22 | 22 | 45 | 22 | 22 | 67 | 22 | 45 | 0 | 22 | | | |
| CCLORR | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | 66 | | 66 | | | |

TC: Total Contribution, CV: Contribution value, CPLOAS: Calculation of Program Learning Outcomes Achievement Scores, CPLORP: Calculation of Program Learning Outputs Reach Points, CPLORR: Calculation of Program Learning Outputs Reach Rate, CCLOAS: Calculation of Course Learning Outcomes Achievement Scores, CCLORP: Calculation of Course Learning Outcomes Reach Points, CCLORR: Calculation of Course Learning Outcomes Reach Rates, PO: Program Outcomes, CLO: Course Learning Outcomes

Accordingly, considering the relationship between the course learning outcomes and program learning outcomes of the Fundamentals of Mathematics course the 9 steps can be applied to evaluate the activities which is planned (P cycle of PDCA) at the beginning of the course, and applied teaching and learning strategies, method, techniques etc. (D cycle of PDCA) during the course, and finally evaluated and revised (C and A cycles of PDCA) by this method as seen the following table.

As a result, while measuring program learning outcomes the 3 main steps should be followed:

- 1) Listing of Exam Grades on a Question-Based basis (please see Table 1)
- 2) Creating the ‘Course Learning Outcomes - Exams’ Table

Table 9. Created 'Course Learning Outcomes - Exams' Table**Course Code:** MAT102**Course Name:** Fundamentals of Mathematics Course**Number of CLO:** 8

| The Measurement and Evaluation Table of MAT102 Course Learning Outcomes | | | | | | | | | |
|---|----|-----------|-----|-----------------|--------------|--------|--------|------------|-----|
| EXAM NAME | % | EXAM NAME | % | 30% | 10% | 10% | 10% | 10% | 40% |
| MID-TERM 1 | 30 | PROJECT | CLO | MID-TERM EXAM-1 | ASSIGNMENT-1 | QUIZ 1 | QUIZ 2 | FINAL EXAM | |
| MID-TERM 2 | | LAB | 1 | | | | | | |
| ASSIGNMENT 1 | 10 | PRACTICE | 2 | | | | | | |
| ASSIGNMENT 2 | | OTHER | 3 | | | | | | |
| QUIZ 1 | 10 | FINAL | 40 | | | | | | |
| QUIZ 2 | 10 | | 5 | | | | | | |
| | | | 6 | | | | | | |
| | | | 7 | | | | | | |
| | | | 8 | | | | | | |

Table 10. The Measurement and Evaluation Table of MAT102 Course Learning Outcomes**Course Code:** MAT102**Course Name:** Fundamentals of Mathematics

| The Measurement and Evaluation Table of MAT102 Course Learning Outcomes | | | | | |
|---|---------------|------------|-----------|----------|------------|
| CLO | 30% | 10% | 10% | 10% | 40% |
| | MID-TERM EXAM | ASSIGNMENT | QUIZ 1 | QUIZ 2 | FINAL EXAM |
| 1 | | | 1/15/9,4 | | 1/15/14,3 |
| 2 | | | 2/40/18 | | 1/9/6,0 |
| 3 | 1/15/4,4 | | 1/20/10,3 | | 1/9/7,1 |
| 4 | 1/40/17,1 | | | | 1/9/6,2 |
| 5 | | | | | 1/10/8,0 |
| 6 | 2/30/18 | | 2/25/11,4 | | 1/10/7,8 |
| 7 | 2/15/6,3 | 5/85/74,3 | | 4/100/74 | 4/43/32 |
| 8 | | 1/15/14 | | | |

*1/**15/**9,4: *Number of questions asked for the relevant CLO; **Total score of relevant questions; ***Average of scores obtained by students from relevant questions

- 3) With 'Calculate', the following operations are performed automatically (8 sub-steps);
 1. Calculation of Course Learning Outcomes Achievement Scores,
 2. Calculation of Course Learning Outcomes Reach Points,
 3. Calculation of Course Learning Outcomes Reach Rates,
 4. Preparation of Course Learning Outcomes-Program Learning Outcomes Matrix,
 5. Calculation of Program Learning Outcomes Achievement Scores,
 6. Calculation of Program Learning Outputs Reach Points,
 7. Calculation of Program Learning Outputs Reach Rates,
 8. Preparation of Course Evaluation Form (CEF) with Course Learning Outcomes Reach Rates. (the obtained data could provide for the continuous improvement of the system)

Table 11. Course Evaluation Form for the Check and Action Cycles

| Course Evaluation Form | | Course Learning Outcomes | | | | | | | | | | | | | | | | | | |
|------------------------|---|--|---------|------------|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|---|-----|
| Term: | 3rd | | | | | | | | | | | | | | | | | | | |
| Course Code: | MAT102 | 1. Will be able to explain the basic concepts of natural numbers. | | | | | | | | | | | | | | | | | | |
| Course Name: | Fundamentals of Mathematics | 2. Will be able to explain properties of natural numbers. | | | | | | | | | | | | | | | | | | |
| Lecturer(s): | Nazire Burcin HAMUTOGLU
Sule YILMAZ-OZDEN
Emine Nur UNVEREN-BILGIC
Fatma SAPMAZ | 3. Will be able to explain the basic concepts of fractions. | | | | | | | | | | | | | | | | | | |
| | | 4. Will be able to explain the properties of fractions. | | | | | | | | | | | | | | | | | | |
| | | 5. Will be able to perform operations on rational numbers. | | | | | | | | | | | | | | | | | | |
| | | 6. Will be able to explain the concepts of the field of algebra. | | | | | | | | | | | | | | | | | | |
| | | 7. Will be able to explain the features of the field of algebra. | | | | | | | | | | | | | | | | | | |
| | | 8. Will be able to explain teaching methods related to the subject areas discussed. | | | | | | | | | | | | | | | | | | |
| Number | Evaluations | | | | | | | | | | | | | | | | | | | |
| 1 | Level of reach to course learning outcomes (obtained from program) | | | | | | | | | | | | | | | | | | | |
| | | <table border="1"> <caption>Data for Figure 1: Level of reach to course learning outcomes</caption> <thead> <tr> <th>Outcome</th> <th>Percentage</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>89%</td> </tr> <tr> <td>2</td> <td>55%</td> </tr> <tr> <td>3</td> <td>51%</td> </tr> <tr> <td>4</td> <td>49%</td> </tr> <tr> <td>5</td> <td>80%</td> </tr> <tr> <td>6</td> <td>62%</td> </tr> <tr> <td>7</td> <td>73%</td> </tr> <tr> <td>8</td> <td>93%</td> </tr> </tbody> </table> | Outcome | Percentage | 1 | 89% | 2 | 55% | 3 | 51% | 4 | 49% | 5 | 80% | 6 | 62% | 7 | 73% | 8 | 93% |
| Outcome | Percentage | | | | | | | | | | | | | | | | | | | |
| 1 | 89% | | | | | | | | | | | | | | | | | | | |
| 2 | 55% | | | | | | | | | | | | | | | | | | | |
| 3 | 51% | | | | | | | | | | | | | | | | | | | |
| 4 | 49% | | | | | | | | | | | | | | | | | | | |
| 5 | 80% | | | | | | | | | | | | | | | | | | | |
| 6 | 62% | | | | | | | | | | | | | | | | | | | |
| 7 | 73% | | | | | | | | | | | | | | | | | | | |
| 8 | 93% | | | | | | | | | | | | | | | | | | | |
| 2 | Assessing the level of access to course learning outcomes (Check Cycle) | | | | | | | | | | | | | | | | | | | |
| 3 | Planned continuous improvement activities (Action Cycle) | | | | | | | | | | | | | | | | | | | |
| 4 | Evaluation of applied measurement and evaluation activities (Check Cycle) | | | | | | | | | | | | | | | | | | | |
| 5 | Evaluation of the activities of the applied teaching methods, techniques and strategies (Check Cycle) | | | | | | | | | | | | | | | | | | | |
| 6 | Best/Worst Practices (Check Cycle) | | | | | | | | | | | | | | | | | | | |
| 7 | Plans/suggestions for the next period (Action Cycle) | | | | | | | | | | | | | | | | | | | |

4. Conclusion and Suggestions

This study aimed to increase the awareness of faculty members about the importance of their presence in evaluation processes and emphasize that learners can improve their self-regulation skills with the basis of learning outcomes in different fields. Students who are active in the learning process are more successful than others in terms of academic success (Sandars and Clearly, 2011; Schunk and Zibberman, 2012). In their study, Skibbe et al. (2019) found that students who developed self-regulation skills contributed to their academic performance. In his study with preschool students, İvrendi (2011) found that individuals with high self-regulation skills were successful in their number sense. In their study with secondary school students, Çetin, Ceyhan and Öztürk (2017) found that self-regulation skills eliminated academic procrastination. Nota, Soresi and Zimmerman (2004), in their study with secondary school students, examined the students' self-regulation skills.

Although the sample size not to be seem adequate number in line the aim of the study, it is also important to associate the course learning outcomes in the information package of the Fundamentals of Mathematics course with the evaluation activities to be carried out during a semester and determining the measurement tool and compatible evaluation method that will measure the relevant course learning outcomes. Accordingly, the importance of this process is also revealed with the development and awareness of the learners' self-regulation skills. Hence, the path followed for measuring program outcomes in 9 Steps is seen as below to be increase the instructors and students' awareness:

The results obtained in this study, despite the sample limitation, show that there is a lack of awareness about the importance of learning outcomes among both students and instructors. In order for students to develop their self-regulation skills and instructors to structure their teaching processes, the need to increase awareness of

the importance of learning outcomes for both parties is clearly seen. In the light of this need and the emphasis in the literature, it can be said that awareness of learning outcomes will contribute to the development of students' self-regulation skills by providing guidance to students about which goals they should achieve and how to achieve them. Because self-regulation skills include the ability to direct an effective learning process, set their own learning goals, use time effectively and plan strategic learning methods. Students' understanding of the learning outcomes related to the courses and how to reach these goals enables them to develop their self-regulation skills. When a student realizes that he or she wants to learn a particular topic in a course, he or she can identify self-learning strategies, plan what to do about it, and monitor progress. This process also helps students to develop their ability to control their own learning process while achieving their goals. Awareness of learning outcomes gives students the ability to review their own progress and adjust their strategies when necessary. This enables students to learn more effectively and achieve success. For lecturers, therefore, awareness of learning outcomes plays a critical role in guiding students and planning how to achieve them. It is extremely important for instructors to clearly explain the learning outcomes for a particular course or program to students, guide students in achieving their goals, and provide support when necessary. This awareness also enables instructors to adopt a goal-based approach to planning, implementing and evaluating the educational process. Learning outcomes define the knowledge, skills and understandings that students are expected to have at the end of educational activities. Awareness of these outcomes helps instructors to structure course content, guide students and direct their assessment. Therefore, a learning outcomes-based approach guides instructors in assessing student achievement, improving teaching strategies and measuring the impact of courses. In this way, instructors can improve the quality of education and support student success by ensuring that students achieve the targeted outcomes. In this respect, awareness of learning outcomes for lecturers ensures quality and effectiveness in education by enabling them to follow a successful and effective strategy in education.

Based on all these above, the importance of learning outcomes for both students and instructors requires the implementation of an effectively structured course, seminar, or workshop. For evaluation of students' awareness process success, a research environment with a quasi-experimental design is essential. Utilizing interdisciplinary collaboration can be an efficient strategy to heighten students' consciousness of learning outcomes and enhance their self-regulation abilities.

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400-The Importance of Internal Quality Assurance Standards in Higher Education for Competitiveness and National Development

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Abstract

The concept of competition in higher education, together with globalization and internationalization, is among the words frequently used by higher education institutions almost every day. It is thought that the arguments behind these words are relatively weak. In fact, the opinions expressed that the quality remains as paperwork and the great resistance regarding the quality practices carried out in higher education institutions suggest that the intersection of the international equivalent of the “competition” issue in the context of internal quality assurance standards is not sufficiently emphasized. The intention towards the formation of behaviors towards internalizing quality practices in the face of the attitude developed regarding the perception of “benefits” and “usefulness”, which is at the point of resistance most applied by the instructors. This intention will play an important role in the individual acceptance and adoption of internal quality assurance standards. Revealing the importance of the expressed competition for Türkiye is possible with the representation of the existence of the internal quality assurance standards established by the institutions at the international level. This situation points to two important concepts: articulation and cooperation in quality, which are a global power in terms of international competition and national capital increase. In this study, the factors affecting the total quality and the importance of these factors for Türkiye at the international level will be emphasized. A roadmap will be presented through the concepts of articulation and cooperation in terms of mission-oriented differentiation strategy and the competencies of higher education institutions in terms of creating capital for international competitiveness and national development. With the presented roadmap, quality does not actually remain as a paperwork; It will be emphasized that it is the output of the activities carried out. This study aims to reveal the importance of quality in terms of global competitiveness and national development and to predict that awareness will be formed instead of the resistance observed regarding quality studies in higher education institutions.

Keywords: *Quality in higher education, articulation, cooperation, national development, competition.*

1. Introduction

When considered in the context of sustainability, the concept of agile leadership and IT-supported management, which emerges at the intersection of two polynomial curves that show the individual’s adaptation to technology and technology in an age where time cannot resist change. There is also an issue that concerns digital transformation processes, which is the mental transformation processes emphasized by Bozkurt et al. (2021). In this case, it can be said that in addition to the mission and vision of institutions, the fact that two basic structures, culture and resources, are handled from a strategic perspective with a more stakeholder-oriented approach and practices aimed at adding value, in implementing sustainable goals comes to the fore. In this regard, being competitive at the international level in terms of education and training requires establishing internal quality assurance standards in higher education and making the quality assurance cycle of these standards continuous and sustainable on a national scale; It needs to be structured in a way that supports development on an international scale. For example, within the scope of “Quality Education”, which is among the Sustainable Development Goals (SDG) and expressed as SDG 4, it is stated that “education enables upward socio-economic mobility; that it is the key to escaping poverty. However, despite this, the global epidemic also

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has consequences that endanger the difficult gains achieved in the field of education (UN, 2021) is thought to emphasize the importance of creating a continuous and sustainable ecosystem in the field of OSD within the scope of quality education (Ossiannilsson, 2021). As a matter of fact, SDGs offer a road map for 2030 for peace and prosperity for humanity and the world. The SDGs, which have a total of 17 targets, call on developed or developing countries to take action. These goals include ending poverty and other deprivations, improving health and education, as well as strategies to reduce inequality and stimulate economic growth; advocates the need to act together to combat climate change and protect our oceans and forests (Hamutoğlu, Bozkurt & Erdoğan, 2022). Similarly, one of the Millennium Development Goals (MDGs), which consists of a total of eight goals, is the Global Partnership (MDG-8). The digital transformation in question, quality education, global partnership, etc. When the issues are considered together. It can be said that higher education institutions that plan, implement, evaluate and continuously improve internal quality assurance standards in education and training, sharing their competencies and exhibiting agile and leading approaches to developing global collaborations contain dynamics that can also support national development.

This study will focus on the factors affecting total quality and the importance of these factors for Türkiye at the international level. With the mission-oriented differentiation strategy, a road map will be presented through the concepts of articulation and cooperation in terms of ensuring that the competencies of higher education institutions create capital for international competitiveness and national development. With the road map presented, quality is not actually on paper. It will be emphasized that it is the output of the activities carried out. With this study, which reveals the importance of quality in terms of global competitiveness and national development, it is envisaged that awareness will be created instead of the resistance observed regarding quality studies in higher education institutions.

1.1. Competitiveness in Line With a Regional Mission-Oriented Differentiation Strategy

Higher education institutions are expected to find solutions to the global problems we are experiencing today, such as pandemics, climate change, raw material shortages and economic difficulties, by using their research capacities. In order to solve these current problems, it is important for higher education institutions to manage an effective research process by establishing effective collaborations both at national and international levels and conducting Research and Development (R&D) studies with an innovative perspective. Realizing in every field with global trends, it has now become inevitable to manage these processes in line with the digital transformation and sustainable development goals that are being sought.

Another solution process that higher education institutions can implement in solving global problems and minimizing their bad effects is mission differentiation; that is, through intelligent specialization and research. Smart specialization means universities focus on thematically while being aware of their strengths. For example, it is thought that it is important for some universities to focus on research, some to focus on education, and others to focus on collaborations and studies that will contribute to the regional economy according to their strengths. It can be said that this situation may enable the company to reach the level of competitiveness more easily in the international arena.

In Türkiye, in 2016, the Council of Higher Education put mission differentiation in universities on the agenda (YÖK, 2020). In the established committee, it was stated that universities should differentiate from each other apart from their basic values and teachings, should be structured through different thematic areas and missions, and that higher education institutions should support local development with their studies in the fields of education, research and technology, the outputs of which we expect to see. In this context, YÖK carries out projects on both regional development-oriented universities and research universities, based on the diversity, specialization and mission differentiation of universities.

For example, on September 26, 2017, 11 universities were selected as Research Universities within the framework of the Regional Development-Focused Mission Differentiation and Specialization Program, and this number increased to 23 in the following years. Universities' awareness of their weaknesses, entering into the process of completing their shortcomings in these aspects and increasing their competitiveness in line with mission-oriented differentiation will serve both local regional development and the international development of the country. According to the YÖK report, it will be possible to both pave the way for these collaborations and increase research capacity by applying for and providing funds for universities to strengthen their research infrastructure, strengthening collaborations with industry, and increasing the mobility of academic staff (YÖK, 2020).

Quality and internationalization are one of the important issues emphasized in higher education. As a matter of fact, in the Field-Based Competency Analysis of Universities report published in 2023, TÜBİTAK comparatively reveals the weaknesses and strengths of universities according to their research fields. The competency analysis for this report was made according to volume and quality indicators, and we see that these indicators include international collaborations. These indicators also reveal the capacity of universities to become research universities. Achieving quality at international standards by considering the areas in which higher education institutions are strong increases their competitiveness; This will contribute to both regional and national development.

1.2. Articulation and Collaboration

In the context of global competition and internationalization, articulation and cooperation are very important. The basis for this is (1) Diplomas being replaced by certificates and supplements, (2) Opening the doors of universities to the outside world, (3) Offering accredited academic programs with the developing Information and Communication Technology infrastructure as MOOCs (Massive Online Open Courses), (4) The capital coming from contracted universities that place/integrate the programs within their own structures will create input for our country, etc. could possible to express as. In this regard, articulation and cooperation agreements need to be created and monitored within the academic partnerships center to be established. Developing collaborative partnerships of academic partnership centers with faculty, service recipients, and partners; coordinating the development and management of international campuses; collaborative, articulation, exchange and management for overseas partners, management of data and finance, etc. It may be possible for higher education institutions to develop provisions for sharing their responsibilities and competencies at the international level. In this regard, with the strategies that can be developed, it may be possible for higher education institutions to share all their other competencies at the international level, especially in line with regional mission-oriented differentiation strategies, and to implement applications that will enable them to gain micro-level competence within the scope of the program by integrating them into the programs of international higher education institutions. Similarly, collaborations with international higher education institutions, in addition to certificates. It can be put into practice with a diploma and/or diploma supplement at a different level that will certify national level competencies.

2. Conclusion and Suggestions

In this study, by looking at the importance of international competitiveness of higher education institutions for national development from the perspective of internal quality assurance standards in education and training, it has been tried to provide information and awareness about the collaborations and articulation strategies that higher education institutions can develop with other international higher education institutions in the context of both their regional mission-oriented differentiation strategies and their competencies. In this regard, it is important to ensure an understanding of the global scale of the studies conducted under the title of quality in higher education institutions. In addition to this, consideration should be given to ensuring an understanding of internal quality assurance standards in education and training. It is also worth noting that activities aimed at establishing internal quality assurance systems in institutions should not be limited solely to teaching and learning. They should also encompass other missions of universities, such as research and development and community service, and should not be regarded merely as paper-based workloads.

2.1. Collaborate and/or Articulate With Other Institutions

1. The University's approach to collaborations with other institutions (Mission, Vision, Basic Values, Institutional Outcomes)
2. Preliminary enquiries
3. Institutional approval
 - 3.1 Aim
 - 3.2 Scope
 - 3.3 Responsibilities (University/Institution)
 - 3.4 Procedure (The institutional visit/Reporting/Approval/Partnership Agreements)
 - 3.4.1 Approval of new sites or campuses of approved institutions
 - 3.4.2 Institutional approval without the need for a visit (Türkiye-based institutions/Overseas institutions)

4. Programme development, reliability and validation
5. Institutional monitoring
 - 5.1. Aim
 - 5.2. Scope
 - 5.3. Responsibilities (University/Institution)
 - 5.4. Procedure (Monitoring the financial viability of the partner institution/Monitoring the partner institution's status with the YÖKAK)
6. Institutional review
 - 6.1. Responsibilities (University/Institution)
 - 6.2. Scope
 - 6.3. Procedure
7. Institutional re-approval
8. Termination of partnerships
9. Management of collaborative partnerships
 - 9.1. Responsibilities (University/Institutional Development and Planning Directorate/Faculty Executive Dean/Deputy Dean/University Link Tutor/Academic Partnerships /Academic Quality Service/ Partner Institution/The Center for Teaching and Learning)
 - 9.2. Administrative and operational procedures
 - 9.3. Quality enhancement (Partnership quality enhancement review/Student feedback/Staff visits /Staff development)
 - 9.4. Partner Institution Forum (Terms of reference)
10. Collaborative programme contingency plans
 - 10.1. Aim
 - 10.2. Scope
 - 10.3. Responsibilities (Faculty /Academic Partnerships)
 - 10.4. Procedure (Agreeing/Reviewing plans/Guidance on writing contingency plans/Nature of the awards that will replace the award no longer supported by the partner)
 - 10.5. Broad categories of contingency plans that may be put in place

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404-Enhancing Self-Regulation through Expressive Arts among Online Learners

Sahitya MG¹

Abstract

The present study focussed on improving self-regulation among online learners through a medium of expressive arts. Online learner must be persistent with a good learning environment and self-determined to achieve his goals or complete a course. Online learning is effective and successful only when the concepts are practiced and revised through self-learning. There can be many hindrances in self-learning which causes distraction for learners from achieving their goals such as use of social media and procrastination, lack of motivation, stress. Self-learning can be improved by inculcating the habit of self-regulation to enhance the learning experience for online learners. Self-regulation is monitoring one's own learning and ways to learn without any interference by external factors. It involves self-goal setting, self-monitoring, and reinforcement. Self-regulation involves planning, performance, and reflection. This paper will focus on enhancing self-regulated learning through expressive arts. Expressive arts are a form of intervention that allows expression of feelings through various creative modes like movement, art, music, and drama. It aids to reduce stress, improve creativity, and expands productivity to learn efficiently and effectively. Unlike other traditional methods of therapy this is a fun and creative way to express and vent out feelings in a creative way which extends self-exploration and relieves stress. The major objective of the paper is to identify the areas for self-regulation in learning and provide a framework of expressive arts to enhance the identified domains for self-regulation by further improving the skill required. The framework will include activities with art, writing and movement which would cater learners' support and aid in better learning. The focus is to help learners to build self-regulation resulting in efficient learning and withstand the new learnt skill and utilize it when required. This would be helpful for both online learners and traditional learners as it is a creative and therapeutic approach which would bring effective changes in the learning process.

1. Introduction

Self-regulated learning is known to be a practice by which learners aim to modulate their tasks in an effective and an efficient way (Zimmerman, 1989). It includes meta cognitive skills, behavioural modification to improve intrinsic motivation like goal setting, designing strategies for learning, planning and extrinsic motivation like self-reinforcements, instructing self, self-time management, mind mapping and self-monitoring (Toro, 2021). Learners are habitually aware about their strengths and weaknesses and they formulate appropriate strategies to work on their concerns and apply the same to overcome challenges in their day-to-day academic tasks (Zimmerman, et al., 2015).

Zimmerman, et al. (2015), foremost researcher in the field of Self-regulated learning (SRL). Stated "It's not a mental ability or a skill for academic performance, relatively it is a self-driven process through which learners transform their mental abilities to academic skills." Zimmerman said that SRL does not only involve achieving comprehensive knowledge about an ability but also improves rest of the skillset like self-motivation, self-awareness.

Self-regulated learning is a process of identifying tasks, monitoring the performance, and later reflecting on the result. This procedure is tailor made for each learning task and students separately.

The three major stages in SRL are Planning, Monitoring and Reflecting. In the planning stage, also known as the forethought phase, the learners identify the goals for which they must work on and estimate a timeline

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within which they must complete a particular task, course, or session. This stage includes learners' awareness of their learning environment.

In the performance stage or performance phase the learners show their dedication towards the learning practice. They also regulate their own learning progress and compare it with goals they established in the planning stage.

In the reflection stage the learners evaluate and reflect upon their learning practice. This involves evaluating the feedback and identifying the places where they found difficulty to execute a particular task, they also record the hindrances which halted their performance in the middle of the task given.

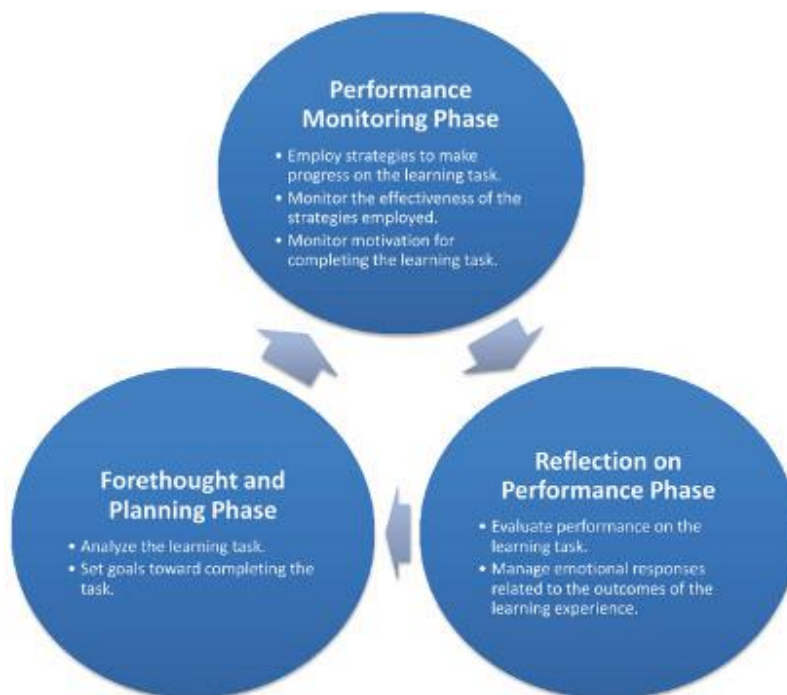


Figure 1. Self-Regulation Model

Source: https://www.researchgate.net/figure/Phases-of-Self-Regulated-Learning_fig-1:276956403

2. Models of Self-Regulated Learning

Zimmerman, et al. (2015) introduced a model of conceptual dimension of academic self-regulation. His model involves six vital questions which are Why, When, What, Where, Whom, and How. The “why” includes learners’ motives and intrinsic motivation for learning. The “how” includes the learner’s use of approaches and processes. The “when” includes management of time. The “what” includes strategies used to monitor their academic performance or the outcome. The “where” includes the place learners opt to finish their tasks and the “who” includes the teachers, classmates, guide which are primary in the learner’s learning environment.

Social Cognitive Model of Self-Regulated Learning by Bandura (1991) which emphasizes self-efficacy beliefs on self-regulated learning. This model includes four major processes:

Self-observation where learners regulate and scrutinise their behaviours, emotions, and thoughts in the process of learning. Judgemental process where learners assess their observation and make judgements about their abilities and analyse the efficiency of their learning approaches. Self-reactions where learners are involved in self-reinforcements or punishments.

Lastly, self-reflection where learners evaluate their outcomes and experiences and analyse. Process Model of Self-Regulated Learning (Winne, et al., 1998). This model is self-regulated learning focusing on four main phases. Task Perception in which the learners identify resources, goals, and requirements. They evaluate their previous awareness and formulate strategies to complete the task.

Goal setting and planning in which learners set both short- and long-term goals and create a plan of action. Strategy execution where learners implement the strategies, evaluate the progress and make appropriate alterations in their approach to learning.

Adaptation is where learners reflect on their performance and assess the effectiveness of the approaches. This phase includes metacognitive evaluation and control to improve future learnings.

Expressive art therapy is a form of therapy which is beyond talk therapy. It is a combination of several approaches which include music and movement therapy, drama, visual arts and writing which helps explore people's emotions and accomplish personal development. It is based on the hypothesis that individuals can rebuild through self-exploration towards their emotions. This creative process provides the therapist with various tools to tap clients' emotions, imagination, feeling, body sensation and thoughts (Cherry, 2021). These creative modulations help the client to push the resistance and barriers which might hinder their healing and improvement in conventional talk therapies.

Expressive arts therapy has been effective because it focuses on the process of creating rather than artistic results. Individuals who participate in expressive art therapy do not need to have any prior artistic knowledge (Shapiro, 2021). The motive is to give the participants chances to explore, improve and communicate thoughts in a creative way while engaging their imagination.

The Expressive Arts consists of three subjects i.e. Music, Visual Arts, and Performing Arts. Participants gain knowledge in each modality and practice expressive arts. Expressive arts therapy bridges the gap between unconscious and conscious mind. It helps to explore the areas which are resisted, reserved, and blocked alongside focusing on pressing concerns.

2.1. Types of expressive arts therapy

Even though talk therapy is the prime treatment style, expressive arts therapy tries to aid the way in which individuals communicate. Four main types of creative arts which are usually used in expressive arts therapy are:

- **Art therapy:** This method includes applying visual art like sculpting, drawing and painting in order to work with thoughts and emotions.
- **Dance therapy:** This kind of therapy includes dance and physical movement which helps individuals cope up with stress, anxiety and depression.
- **Music therapy:** This method includes creating and listening to music in order to improve mood and reduce anxiety.
- **Language Art:** This method includes tapping on emotions and thoughts with the help of writing. Like in the form of journaling or poems or stories.
- **Drama Therapy:** This method includes use of drama and theatre process to treat symptoms of mental illness.

2.2. Review of Literature

Puustinen & Pulkkinen, studied in 2001, latest models on Self-regulated learning which included the models developed by Borkowski, et al., 2000; Winne, 1997; Boekaerts, 1997; and Zimmerman, 1989. The model equated four attributes which are the theories, SRL definitions, Mechanisms of the model and work regarding it. The models that were similar were inspired by Zimmerman, (2015) and (Pintrich, 1999) which are based on social cognitive theory.

Theobald (2021) researched university students. It was a meta-analysis on self-regulated learning training programs to enhance academic performance and motivation. He stated that training programmes on metacognitive background had higher influence on academic achievement as compared to training based on cognitive theories and it was concluded that programmes on self-regulated learning enhanced academic performance and motivation in students.

Kizilcec & Maldonado (2017) wanted to predict learner behaviour and goal achievement through self-regulated learning in online courses. And found that goal setting and planning strategies projected achievement of personal goals and help seeking was connected with lower goal achievement. And learner with more SRL skills were mostly to get back to previous course materials and assessments

Saputra and Alhadi (2018) stated in their study creative solution focused counselling models for self-regulated learning. The development research contains three stages which was to identify self-regulated learning levels, create a proposed model to improve self-regulated learning and to conduct testing by experts. The results

indicated that the Creative solution focused counselling model with five stages of counselling was practicable to tool in the school.

Kostons, Van Gog & Paas (2012) stated in their study on training self-assessment and task selection skills as a cognitive approach for improving self-regulated learning. In their study they stated that self-assessment and task -selection skills play a crucial role in self-regulated learning. and if proper training is given to these skills the knowledge a student can have from self-regulated learning.

Cazan (2013) studied teaching self-regulated learning strategies for psychology students. They found that a combination of metacognitive and cognitive strategies can improve self-regulation and training on cognitive self-regulation had positive reflection on motivation and behaviour.

According to Lindsey (2018) in his study where they used expressive arts and mindfulness as a tool to understand and manage stress among adolescents. Study was an exploration of mask- making along with mindfulness training to help youth to understand and manage their stress. It was a 12-hour group intervention over 6 weeks. Pre and post-test were done along with a follow up after three weeks. It was concluded there is significant reduction of anxiety and stress.

Art therapy includes creative approaches like painting, drawing, colouring and sculpting which helps individuals to express themselves with the medium of art. Art therapy addresses trauma, depression, stress, anxiety, and eating disorders. (MediLexicon, 2020).

Kaya and Deniz (2020) studied psychological well being of college students with the help of psychodrama. 30 undergraduate students were divided into intervention and control groups. Data was collected through psychological wellbeing scale. The authors explored that there was a statistically significant difference between the pre-test and post-test among participants of psychodrama intervention on environmental mastery dimension and it was concluded that psychodrama can improve psychological wellbeing of students.

Triantoro and Astrid (2014) conducted an art therapy session in 5 sessions over two weeks. Ten students who have moderate anxiety were chosen. The participants were randomly allocated to a control group and experimental group and the Man Whitney test was used to see the effect of art therapy. Results showed that the experimental group showed less anxiety. But for the control group it was($p < 0.05$) and ($Z = -2610$) The study concluded that art therapy reduces anxiety in the experimental group.

Yue Li and Jun Peng (2022) studied Evaluation of Expressive Arts Therapy on the Resilience of University Students in COVID-19. 263 students from the University of China were selected for the therapy group. Students' resilience was assessed in a pre-post design. It was discovered that significant differences appeared between the paired networks before and after expressive arts therapy. Facets of self-efficacy, self-acceptance and problem-solving in resilience were notably improved after the therapy.

Beaumont (2012) studied art therapy with adolescents to tap on their identity problems and have identified that art can be used for self-exploration which gives more knowledge on self-acceptance. And art journaling can help adolescents as they tend to be emotionally unstable which can also help in self-awareness.

2.3. Objective of the Study

- To explore various Models on Self-Regulated Learning.
- To describe different modalities in Expressive Arts Therapy.
- To Design a framework for Self-Regulated Learning with Expressive Arts.
- To Apply the framework on a learner and analyse the result.

2.4. Methodology

Various models on Self-Regulated Learner were explored and studied through search engines and journals. The major model on Self-Regulated Learner was devised by a primary researcher named Zimmerman; his model was called the cyclic model of self-regulated learning which was introduced in 2002. There are three phases in this mode which are the four-thought phase, performance phase and self-reflection phase. There were various other models on self-learning by Bandura (1991) and Winne (1997). Moving forward Expressive arts Therapy was studied in detail and various interventions on each modality i.e., music, movement, art, writing, photography which could enhance self-regulation were studied. Based on the review of literature

on Models of self-regulated learning and modalities of expressive arts therapy, a framework was designed which contains various tools and activities on expressive arts that will enhance self-regulated learning. The framework is designed keeping in view of each phase of self-regulated learning devised by Zimmerman in his cyclic model of self-regulation. Later the designed framework was applied on a learner who was willing to try the framework to improve their self-regulation.

The outcomes were received from the learner in the form of feedback and analysed. Online learners must have the suitable learning environment and good self-regulation and control for them to achieve their goals and achieve effective learning. But doing so they might be faced with various hindrances like social media distraction, lack of motivation and procrastination resulting in them not being able to achieve what they envisioned for. This demotivates them and takes them far away from learning.

A successful learner should be persistent, have good time management skills and have a good study environment. For this to be attained the learner inculcates the habit of following a route map to accomplish his/her goals. According to Zimmerman, learning can be improved by self-regulation. He described four phases for self-regulation which are the Forethought phase which includes; planning and setting goals next is the performance phase which includes self-control. Self-motivation and self-observation and the last are the self-reflection phase where the learner evaluates his performance and makes a judgement. There could be difficulty in following these four phases due to lack of motivation, not being able to make goals, not having clear vision, boredom, or procrastination. To tackle this concern a framework has been designed. The framework has various tools and activities on expressive arts which can be used to enhance self-regulated learning.

2.5. Framework

Researchers identified the model on self-regulation which is frequently followed. Zimmerman cyclic model for self-regulation. Which has four phases each phase talks about the levels of progression towards the learning goals.

The researcher has designed a framework based on each phase and how each phase could be improved separately with the help of expressive arts for achieving the bigger goals set.

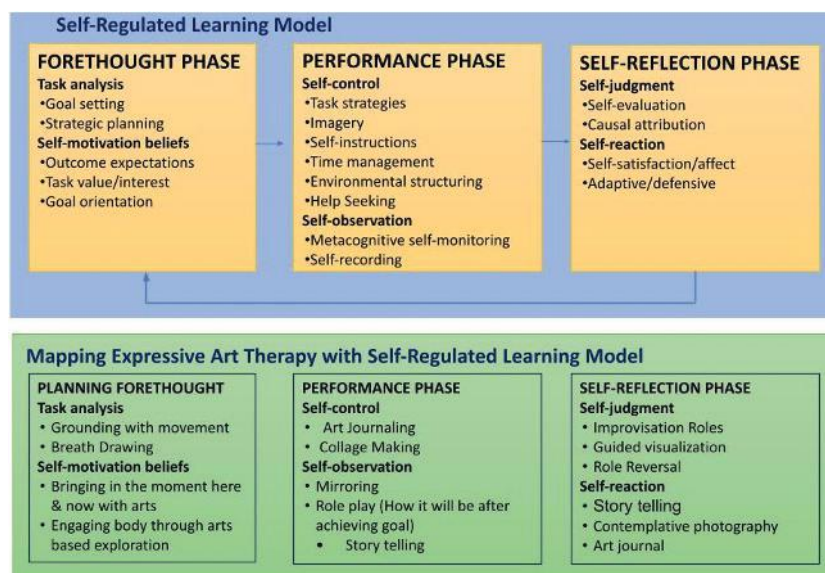


Figure 2. Mapping Expressive Art therapy with Self-Regulated Learning Model

2.6. Case Studies

Learner is a working adult who is pursuing their MBA from an open university. They procrastinate to complete their assignments as a result it gets piled up and later, they feel anxious when they have a deadline to submit. The framework was applied on them for one week and the results were analysed.

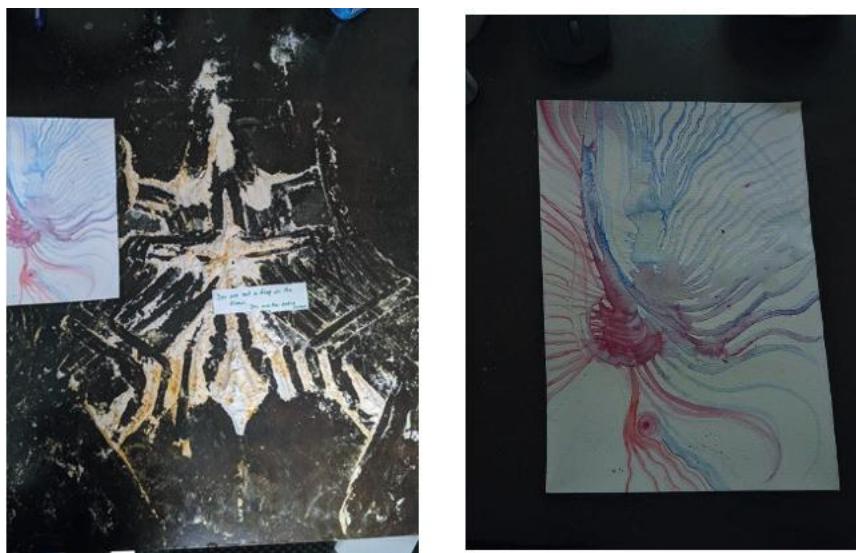


Figure 3. *Breath Drawing along with music*

ForeThought phase- This session was about creating a relationship with available resources (Flour). Creating shapes and forms according to the rhythm of music being played in the background. Moving on to visual arts and followed by writing a poem for self-reflection. The learner tried this activity by first opening the eyes and making forms on the flour and later by closing eyes while doing the same process. The learner was grooving to the rhythm of music entering a movement with flour. Visual arts helped them to crystalize what they achieved during the movement.

Poem written by Learner

In Swirls & Twirls a finger print.

Spread apart yet circle within.

Explore ahead but stay.

Safe within your trusted inner circle.

Figure 4.

Performance Phase- The session was about writing a story and enacting a role play. The learner wrote a story with a character who faced difficulty to follow a routine and would always procrastinate the work and had a very low self-esteem. How they challenged themselves is the rest of the story. Similarly, they felt very happy and excited to play the role of the person who has achieved their goals. This improved their motivation and their zeal to attain the goals.

2.7. Self-Reflection Phase



Figure 5. Contemplative Photography

This session was about identifying an object which was calling them. And moving forward with contemplative photography and weaving a story with clicked photographs and concluding it with visual arts and poems. The learner was doubtful about the process yet they trusted the facilitator. Finding an object and being with that object (Lollipop) was difficult for them but clicking photographs of the object gained more of their attention (Figure 5 and Figure 6). They were able to weave a story and reflected on their internal fear and had a major realization.



Figure 6. Art Journalling

3. Conclusion

The key aspects for an optimum learner are persistence and having a good learning environment along with intrinsic qualities like motivation, self-determination. Hindrances to achieve the set goal and achieve them have been identified. To tackle these obstacles many researchers gave various models on self-regulated learning. Each model describes a unique set of tools and approach to accomplish the goals. Zimmerman cyclic model of self-regulation is the base of the framework proposed. Step by step procedure on expressive arts on each phase of the model has been analysed and the results showed that expressive arts has been an effective tool to enhance self-regulated learning. It helps to declutter the thoughts and set goals, improves self-motivation and self-control and aids to have an effective self-reflection through various techniques on expressive arts. Learners who participated in the case study shared that grounding helped them to be in the present and breath drawing channelised their self-awareness. Story telling enhanced their self-motivation to complete the task.

Lastly contemplative photography aided them in having a good self-reflection. They shared that expressive arts did give them a sense of route map towards self-regulated learning in a creative and engaging way which was fun.

The researcher has investigated only one case study, this may be analysed with further case studies with different populations for making it a standardized framework.

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405-Challenges in Teaching Online: Voices from EFL Teachers in Vietnam

Thi Thuc Quyen Bui¹, Thi Thanh Thuy Do²

Abstract

Technology has long been an important part of education in general and the education of language in particular. Indeed, it has become even more popular as its advantages were evident during Covid-19 Pandemic. In today's new normal condition, the world has witnessed the inclusion of different forms of online instructional mode in educational systems at different levels in many countries in order to facilitate the learning of a wide variety of learners and to enhance the training quality as well. They can be synchronous, asynchronous, or blended learning which is a combination of the two other types, which enables more people to gain access to learning programs while at home, and allows more learners to learn according to their own schedule and their own pace. This paper investigated the challenges encountered by EFL teachers of a university in the South of Vietnam when they teach online to non-English major students. A survey following qualitative research was employed. Individual semi-structure interviews via Google Meet with six EFL teachers of non-English major classes were carried out. The participants were selected from the population through the use of stratified sampling method. For data analysis, first the interviews were transcribed; then thematic analysis of the qualitative data was used to identify emergent themes and patterns, allowing for insights into the difficulties facing the teachers in their virtual lessons. The findings showed that teaching online provided the teachers with some helpful experiences. However, a range of difficulties related to aspects namely Information & Communications Technologies (ICT) competence, classroom management, teacher's well-being, ICT infrastructure, teaching materials, and students' engagement were reported. Besides, the teachers also gave some suggestions to improve the situation. The findings have yielded implications for relevant parties. Since the online program at the research setting may be similar to English language programs in other contexts, the findings hopefully provide program managers, policy makers, curriculum designers, teacher training programs, and teacher trainers with ideas to develop effective strategies and support to empower EFL teachers and enhance the quality of online EFL instruction.

Keywords: EFL teachers' challenges, teaching online, non-English major students

1. Introduction

Online learning and teaching is not new to the field of education. Originated from distance education where teachers and students mainly communicate by postal services around 150 years ago (Taylor, 2001), with advancements in technology, online learning and teaching has been developed, accepted and promoted in many countries. To learners, online education is beneficial in different ways (Slimi, 2020), one of which is to have opportunities to pursue education beyond the boundary of distance, as the name distance learning says. To educational institutions, it enables them to offer courses to those who do not have the condition to go to class for offline lessons, so that they can better satisfy the increasing needs for high quality labor in society. What's more, we cannot deny that when classes are not organized on campus, schools can decrease the demands for facilities and services.

Ho Chi Minh City Open University (HCMCOU) is one of the institutes in the Vietnamese educational governmental system. The school is located in the South of Vietnam and is one of the two open universities in the country. At HCMCOU, English is a mandatory requirement for graduation to students of all disciplines rather than the language majors. Every year, the non-major English program welcomes 5.000 new students of all types: the in-service, distance learning, and on-line programs. They are placed into two main sections,

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the General English and the Academic English according to their placement test results. With the number of students increasing by years, the training of English requires a large number of rooms. Therefore, online instruction has been employed in the lower section - the General English.

We conducted the study with the aim to facilitate teachers' online teaching and enhance the English training quality. We decided to explore teachers' perceptions on their challenges in teaching online because teachers play an important role in teaching and learning. Moreover, there were few studies researching the topic in the new normal situation. Accordingly, there are two questions:

1. What are the challenges facing EFL teachers when they teach online?
2. What do they think can help them solve the problems?

2. Literature Review

2.1. Online Teaching and Learning

Online Learning has been defined in different ways by different scholars. Being called E-learning; Blended-learning; Online Education; Online Course; Distance Education; Distance Learning; Web-based Learning; Computer-assisted Instruction; Web-based Training; Web-based Education; Web-based Instruction; Computer-based training; Web-enhanced Learning; Resource-based Learning; E-tutoring; Computer-based learning; Distributed Learning; Computer-assisted learning, this form of learning involves the use of technology and the Internet to delivery lessons (Singh & Thurman, 2019). Also, using the internet and technology tools, learners who are far from the tutors or instructors can access the learning materials and to interact with their tutors, instructors and other learners (Ally, 2011).

Online courses can be delivered synchronously, asynchronously, or a combination of two forms (Means et al., 2013). In other words, they may vary in the amount of real-time face to face interaction between learners, their teachers, and other learners which can be conducted via applications such as Zoom, Microsoft Teams, Google Meets, BigBlueButton and so. To make teaching and learning happens, Course Management System (CMS) or Learning Management System (LMS) is often a platform for the teacher to post the syllabus, assignments, and lecture notes, as well as create discussions with learners or among learners (Carliner & Shank, 2008; and Hafez, Hazem & Dogan, 2022).

2.2. The Research Framework

Despite the advantages it may bring about, online learning may expose teachers with many difficulties. In general, teaching requires the teachers' knowledge and skills. However, Teaching online is more challenging than teaching offline classes. This is mainly due to the nature of teaching virtually: (1) the reliance on technological tools and (2) the teachers' limitation in observing the students as they often do in offline courses.

So far, various challenges have been reported facing teachers. These can be classified into teachers' internal (Teachers' ICT competence, their classroom management skills, and their well-being) and external factors (ICT infrastructure, teaching materials, and student engagement).

- *Teachers' ICT competence* is the capability to implement technology into the teaching practice (Katane, Aizsilam & Beitere, 2006; Venumadhav, 2022). Some research shows that teachers' ICT literacy contributes not only to operating the teaching platforms but also to mentoring colleagues and instructing students to interact through the learning applications (Evans, 2008; Kukulska-Hulme, 2009; Liu et al., 2008 as cited in Kanchai, 2021). We cannot agree more when it comes to online-learning, where technology is indispensable.
- *Teachers' classroom management skills*, as Akar et al. put it (2010), contributes to an effective learning environment. Marzano (2003) refers classroom management to the skills for "establishing and reinforcing rules and procedures, carrying out disciplinary actions, maintaining effective teacher and student relationships, and maintaining an appropriate mental set for management" (p. 88). Effective classroom management also reinforces "caring relationships, high expectations, and opportunities for engagement, participation, and contribution" (Egeberg et al., 2021, p. 121). According to Gold & Holodynski (2017), Kounin (1970), and Wolff et al. (2015); and Weber et al. (2018) there should be the teacher's observation and awareness towards all learning activities during classroom management (as cited in Farkhani, Badiei & Rostami, 2022).

While conducting online classes, online educators deal with a variety of issues. Not only do they need to provide a safe, supportive and collaborative environment to keep students comfortable to join the learning process but also they have to increase chances of students' interaction. While all of these need students' acknowledgement of all the related rules and regulations as well as teacher's observation of all activities throughout the teaching and learning process, it is the nature of online interaction that is likely to be a barrier for their ability to manage their classroom though they can do that quite well in offline face-to-face mode.

- *Teachers' well-being*: Oxford Learner 's Dictionaries defines well-being as general health and happiness inclusive of emotional, physical and psychological well-being. The Council of Europe (n.d) points out that well-being is one of the important factors to promote successful learning and teaching. A teacher cannot teach well when he is not in good health. Regarding online-learning, related factors found by Adedoyin & Soykan (2020); Ho & Ha, 2021; and Philips, Schumacher & Arif, 2016, Pham & Nguyen (2021) include heavy workload, stress, poor eye sight which partly the result of too much time investment for online lessons, quizzes and assignments. Teachers' well-being is worth the interest.
- *ICT infrastructure*: With ICT stands for informational communication technology, ICT infrastructure concerns range from the availability of and accessibility to the Internet, websites and relevant ICT facilities (Lomos, Luyten & Tieck, 2023). Online education cannot happen without or with poor Internet connection. As the condition of ICT infrastructure of different areas in Vietnam where the teachers and students stay, online teaching and learning may not be equally advantageous. Thus, this factor needs to be explored.
- *Teaching materials*: Similar to offline teaching, materials are quite important for teaching online. Ready-made online educational contents and activities, if appropriate, will facilitate online teaching and learning, and motivate students and teachers; meanwhile, inappropriate materials will lead to the teachers' workload in preparing alternative activities to do their job effectively. Teachers' opinions on materials should be listened to for that reason.
- *Student engagement* in the process of learning is an utmost requirement for successful learning in general and learning language in particular (Ginting, 2021). Learning engagement in the context of online learning refers to "learners' investment of time, energy, value/interest, attitude, learning strategy, or even creative thinking in e-learning environments and the motivational and action processes triggered by them" (Yang et al., 2018, p. 3).

3. Method

3.1. The Research Design and Instrument

In order to answer the research questions, a qualitative research design was chosen. This is because according to Creswell (2009), qualitative research helps the researcher to approach each individual or group to study social or human problems. A semi-structured interview was constructed based on the framework. Semi-structure interview is the most popular form of interview for qualitative research. On the one hand, it makes use of the interviewee's knowledge and experiences shared during the conversation, offering chances for the interviewer to be seen as a knowledge-producing participant, not behind a preset interview guide (Leavy, 2020).

3.2. The Research Setting

As mentioned above, at HCMCOU, EFL online program makes use of a course book which is popular in the market. The teachers teach the course following an outline designed by the department in charge. Each online class session lasts 3.45 hours with a fifteen minutes' break in between, similar to an offline face-to-face lesson. The school has set up its learning management system where the teachers have to upload announcements, course related materials, PowerPoint slides for every meeting, exercises, and midterm assignments. Except for the differences in delivering mode, an online lesson through Zoom, MS TEAMS, or Google Meet is supposed to happen like in offline conditions.

3.3. The Participants and Sampling Method

The study involves the participation of six teachers, five females and one male, recruited through stratified sampling from the population of 23 teachers who are teaching online for the program. All of them hold a master's degree in TESOL and have been teaching English for at least 2 years. All of them had experiences teaching online during the Covid-19 pandemic. As the online-teaching competence may vary according to ages (Guillén-Gámez, F.D., Mayorga-Fernández, M.J., Bravo-Agapito, J. *et al.*, 2021). The teachers' age ranges

from 20s to over 50s (1: over 50s; 3: between 30s and 40s; and 1: 20s). This is to ensure all the teachers teaching online in the program have an equal chance to share their opinions and representatives of all the strata were listened to.

3.4. Data Collection and Data Analysis

The teachers were contacted by email in which they were informed about the aims of the study. The researchers also promised that their private information and their answers would be kept confidential and that they were allowed to reject the invitation if they did not feel comfortable to participate in the study.

The interviews were conducted online in Vietnamese through Google Meet. The audio was recorded, transcribed and coded by the two researchers. As emerged through data analysis, the reported challenges relevant to teaching online were revealed.

4. Findings

The analysis of the interview showed the challenges teachers have to cope with: students' attitudes towards learning and integrity, students' infrastructure, and teachers' well-being. As most of the teachers reported, they were confused with new technology and new applications that accompany the textbook at first but with the effort to self-improve and support from colleagues and technicians, they gained confidence in teaching online. They often use ICT tools and incentives to motivate student learning; they know how to handle online activities, make the instructions clear to the students, keep students engaged in the lesson, create online conversations between teachers and students and between students and students, and adapt the textbook for virtual classes. Meanwhile, the inappropriate attitudes of the student towards learning appeared to be a common obstacle for their teaching. When teaching online, it is very difficult for a teacher to observe all the students' behaviors. Without the teacher's "real" presence, students who are not serious about learning might be distracted from their studies by other activities; for example, they may play games or listen to music during class time. And this gives online teachers a hard time getting students engaged in the lessons.

The second theme appeared is the student infrastructure. Not all students stay in areas where internet connection was stable. Furthermore, some students do not have their private study room at home or own a computer with a camera and a microphone installed. This may negatively affect their learning. Therefore, poor infrastructure may be a challenge for remote teaching and learning.

In addition to students' attitudes and the unfavorable infrastructure, teachers' workload while teaching online is a concern. As reported by the teachers, compared to the conventional teaching mode, online teaching requires more time and effort for designing activities, managing the classroom while delivering the lesson content. Besides, staying in front of the computer screen may cause stress and physical problems, such as backache, eye strain, and tiredness.

Last but not least is the students' lack of practice of integrity. All teachers shared their concern that many students take advantage of being online without the sight of the teacher when doing exercises and tests. With the help of the Internet, many students have committed dishonesty by copying the answers from different sources. This has become a great concern about teaching online because while it is against morality, teachers are not confident in how to find it out.

Together with the four challenges facing EFL teachers mentioned above, the teachers expressed that it is their responsibility to keep themselves updated with the technology knowledge. They also need support from the school. First in terms of regulation and policy. There should be clear regulations for online classes in which penalties for violations of integrity are announced. Second, they would like to have opportunities to attend workshops and seminars on ICT use so that they can have new ideas for teaching online.

5. Discussion and Conclusion

The findings of challenges for EFL teachers when teaching online were in line with previous study. Obstacles have been found in forms of students' unfavorable attitudes towards learning (Nalliveetil, Pusuluri and Al-Rubaat, 2019; Rahmawati & Wirza, 2022) and integrity (Duong, Nguyen & Vu, 2020), teachers' mental and physical health (Pham & Nguyen, 2021) and infrastructure (Habiba & Ahmed, 2020).

The findings have given our school insights about the teachers' obstacles when teaching General English classes online so that we can provide support to facilitate their teaching and improve the quality of student learning. As a result of a qualitative study, these findings cannot be generalized to other contexts. However, it can be an informative reference for relevant institutions and teachers. Furthermore, based on the findings, research with a wider population and more research instruments can be conducted in the future.

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407-Investigation of Pre-service Teachers' Artificial Intelligence Anxiety Levels

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Abstract

The rapid progress in artificial intelligence (AI), which is one of the technological developments that affect every aspect of our lives, brings dangers and anxieties as well as benefits to mankind. The aim of the study is to examine the views of pre-service teachers on AI anxiety levels in terms of various demographic variables. The population of the research, which was in the survey model, consisted of a total of 3922 pre-service teachers studying at a state university and a private university in the spring semester of the 2021-2022 academic year, and the sample consisted of 221 pre-service teachers. The data of the study were collected with "Personal Information Form" and "Artificial Intelligence Anxiety Scale". The results of the research showed that pre-service teachers' AI anxiety levels were at a medium level. When the sub-dimensions of the AI anxiety scale were analyzed, it was found that the scores of the pre-service teachers were at a medium level in the sub-dimensions of job replacement, sociotechnical blindness and AI configuration, and at a low level in the learning sub-dimension. According to the gender variable, it was concluded that the AI anxiety of female pre-service teachers was higher than male pre-service teachers. According to the age variable, it was concluded that the participants between the ages of 19-20 had higher AI anxiety than the participants aged 23 and over. According to the university type variable, it was determined that the AI anxiety levels of the students studying at state university were significantly higher than the students studying at private university. According to the grade variable, it was determined that the AI anxiety levels of pre-service teachers studying in the sophomores were higher than the pre-service teachers studying in the freshmen, juniors and seniors.

Keywords: *Artificial intelligence anxiety, pre-service teachers, demographic variables.*

1. Introduction

The ability of computers to display intelligent behaviors like perception, reasoning, learning, communicating, and acting in complicated situations is known as AI (Karabulut, 2021). Another definition of AI states that it is the capacity of a computer or a machine that is controlled by a computer to carry out operations related to higher mental functions like reasoning, inference, generalization, and learning from prior experiences, which are typically thought to be characteristics that are unique to humans (Nabiyev, 2016). According to McCarthy (2007), AI is the science and engineering of making machines intelligent. Although there is no universally accepted definition, AI can be summarized as the ability of machines to imitate human abilities (Ünal & Sezgin, 2021). The reason for this situation is that the concept of intelligence itself has hundreds of definitions (Cevher & Aydın, 2020).

Starting in 1950 with Turing's question "can machines think?", the adventure of AI has gained great momentum with the implementation of many AI applications. The rapid progress in AI, which is one of the technological developments affecting every aspect of our lives, brings dangers and anxieties as well as benefits for human beings (Seren-İntepeler et al., 2022). For example, Nilsson (1998) states that the long-term goal of AI technologies is to develop machines that will even exceed the capacity of humans. With the rapid progress of studies in the field of AI and the development of different applications in various sectors, it is seen that people's job and future concerns have increased. This phenomenon, characterized as AI Anxiety in the literature, is used to refer to the fear and anxiety expressed about uncontrolled AI (Akkaya et al., 2021). The causes of anxiety about AI, which can be traced back to technophobia, include not being able to adapt, having to learn

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new things, losing one's job, not fully understanding how technological developments work, and the negative consequences they may cause (Takıl et al., 2022).

In this study, artificial intelligence anxiety is analyzed in terms of 4 different dimensions. The sociotechnical blindness dimension refers to the possibility of artificial intelligence getting out of control; the AI configuration dimension refers to the fact that people find the coexistence of robotic features and humanoid features frightening. The learning dimension refers to concerns about having to learn new things; and the job replacement dimension refers to changes in the way some jobs are practiced and the need for adaptation and job change (Wang & Wang, 2019).

One of the social institutions that AI has an impact on is education. In the current Industry 4.0 era, when technology is evolving at an astounding rate, it's critical to recognize and address the AI concerns of stakeholders in education. Since future teachers will be the ones in charge of educating the nation's youth, it is critical to comprehend their concerns about artificial intelligence (AI) technology. Artificial intelligence applications are crucial because of the growing usage of educational technologies in open and distance learning settings as well as traditional face-to-face education. Additionally, pre-service teachers must be open to using artificial intelligence systems because it will be used for professional growth. Considering the close relationship between education and technology, it is clear that pre-service teachers will need to benefit from AI technologies in the coming years. In this regard, it is important to look into pre-service teachers' AI anxiety levels. As a result, it was decided that the primary goal of the study would be to examine pre-service teachers' perceptions of AI anxiety levels in light of several factors. The following are the research's secondary goals:

- How anxious are pre-service teachers about artificial intelligence?
- Do gender, age, university type, and grade level characteristics significantly affect the degrees of AI anxiety in pre-service teachers?

2. Method

2.1. Research Model

The research was designed using the survey model. The reason why the survey model was preferred is that it is aimed to describe the views of pre-service teachers on AI anxiety levels as they exist.

2.2. Population and Sample

3922 pre-service teachers who were enrolled in a state university and a private university during the spring semester of the 2021–2022 academic year make up the study's population. The sample was selected using a simple random sampling procedure. 221 pre-service teachers made up the sample. Table 1 lists the demographic data for the research sample's pre-service teachers.

Table 1. Demographic Data about the Research Sample's Pre-Service Teachers

| Feature | Variable | f | % |
|-----------------|--------------|-----|-------|
| Gender | Male | 146 | 66,06 |
| | Female | 75 | 33,94 |
| Age | 17-18 | 14 | 6,34 |
| | 19-20 | 88 | 39,82 |
| | 21-22 | 86 | 38,91 |
| | 23-24 | 21 | 9,50 |
| | 25 and above | 12 | 5,43 |
| University type | State | 194 | 87,78 |
| | Private | 27 | 12,22 |
| Grade Level | 1 | 42 | 19,00 |
| | 2 | 84 | 38,01 |
| | 3 | 83 | 37,56 |
| | 4 | 12 | 5,43 |
| Total | | 221 | 100,0 |

When Table 1 is analyzed, it is seen that 146 (66,06%) of the pre-service teachers are female and 75 (33,94%) of them are male. When the pre-service teachers were analyzed in terms of their ages, 14 (6,34%) were 17-18, 88 (39,82%) were 19-20, 86 (38,91%) were 21-22, 21 (9,5%) were 23-24 and 12 (5,43%) were 25 and over. It is seen that 194 (87,78%) of the pre-service teachers are studying at state university and 27 (12,22%) of them are studying at private university.

2.3. Data Collection Tools

The “Personal Information Form” and “Artificial Intelligence Anxiety Scale” were used to collect the study’s data. Wang and Wang (2019) created the AI Anxiety Scale, which Terzi (2020) then translated into Turkish. Learning, job replacement, sociotechnical blindness, and AI configuration make up the scale’s four sub-dimensions and its 21 items. Terzi (2020) did a factor analysis using the data collected from 301 students as part of the validity research of the 7-point Likert-type scale and found that the scale is composed of 4 elements. In order to confirm the four-factor structure of the scale discovered as a consequence of exploratory component analysis, confirmatory factor analysis (CFA) was also carried out on a data set gathered from 222 students.

As a result of CFA, $\chi^2/df=2.57$, TLI=.93, CFI=.94 and SRMR=.069 were found from the fit values of the model and it was determined that the factor structure of the scale was confirmed. In addition, the structure of the scale was also confirmed by second level CFA [$\chi^2=286.60$, $df=115$, $p=.00$], RMSEA=.074, GFI=.96, AGFI=.92, CFI=.97, NFI=.96, NNFI=.97 and SRMR=.048]. Calculating the internal consistency coefficient using the data from 222 students, Terzi (2020) found that it was .96 for the entire scale, .89 for the learning sub-dimension, .95 for the job replacement sub-dimension, .89 for the sociotechnical blindness sub-dimension, and .95 for the AI configuration sub-dimension.

The reliability and validity values of the AI Anxiety Scale were recalculated for this study. The fit indices (χ^2/sd)= 2.369, RMSEA=0.079, CFI=0.942, TLI=0.929, SRMR=0.078) obtained as a result of CFA to determine the validity of the scale showed that the four-dimensional structure of the scale was valid. The internal consistency reliability (α) of the scale was calculated as .942 for the whole scale, .884 for the learning sub-dimension, .918 for the job replacement sub-dimension, .885 for the sociotechnical blindness sub-dimension and .920 for the AI configuration sub-dimension.

In the *Personal Information Form*, there were questions about the characteristics of the prospective teachers such as age, gender, grade level, and the university they studied at.

2.4. Analysis of the Data

Descriptive statistics, the independent sample t test, and one-way analysis of variance procedures were applied during the data analysis. The data were checked for normal distribution prior to analysis, and the appropriate tests were chosen in accordance. Parametric tests were performed in the data analysis because the data’s kurtosis and skewness values ranged from -1 to +1. Data from the investigation were analyzed using the SPSS 24.0 program.

Arithmetic means, standard deviations, minimum and maximum score values were calculated in accordance with pre-service teachers’ scores on the AI Anxiety Scale in order to acquire findings for the first sub-objective of the research. The independent sample t test was employed in the study to examine whether there is a relationship between pre-service teachers’ perceptions of anxiety levels related to AI and variables related to gender and type of institution of higher education. To ascertain the magnitude of the impact producing the differences in the independent sample t test, Cohen’s d (Fritz, Morris, & Richler, 2012) value, the effect size value recommended in the literature, was also determined. In the study, one-way analysis of variance (ANOVA) technique was used to determine whether there was a significant difference between the views of pre-service teachers on AI anxiety levels and age and grade level variables. Scheffé test was used as a post hoc test when the variances were homogeneous. The eta squared (Ialongo, 2016) value was also calculated as the effect size value recommended in the literature.

3. Findings

The first sub-objective of the study was determined as “How anxious are pre-service teachers about artificial intelligence?”. Descriptive statistics of pre-service teachers’ scores from the AI Anxiety Scale are given in Table 2.

Table 2. Descriptive Statistics Values for Pre-Service Teachers' AI Anxiety Levels

| Variable | n | \bar{X} | sd | Min | Max |
|--------------------------|-----|-----------|------|------|------|
| Learning | 221 | 2.23 | 1.04 | 1.00 | 6.00 |
| Job replacement | 221 | 3.94 | 1.66 | 1.00 | 7.00 |
| Sociotechnical blindness | 221 | 4.08 | 0.25 | 1.00 | 7.00 |
| AI configuration | 221 | 3.67 | 1.91 | 1.00 | 7.00 |
| Total | 221 | 3.28 | 1.21 | 1.00 | 5.86 |

It was determined that the pre-service teachers' views on the level of AI anxiety were at the "Medium" level ($\bar{X}=3.28$, $sd=1.21$). When the AI anxiety levels were analyzed in terms of the sub-dimensions of the scale, it was determined that the pre-service teachers' views on the sub-dimensions of job replacement ($\bar{X}=3.94$, $sd=1.66$), sociotechnical blindness ($\bar{X}=4.08$, $sd=0.25$) and AI configuration ($\bar{X}=3.67$, $sd=1.91$) were also at medium levels, while their views on the sub-dimension of learning ($\bar{X}=2.23$, $sd=1.04$) were at a low level. The second sub-objective of the study is "Do gender, age, university type, and grade level characteristics significantly affect the degrees of AI anxiety in pre-service teachers?". The results of the independent sample t test are presented in Table 3.

Table 3. The Results of T-Test Analysis Pre-Service Teachers' AI Anxiety Levels According to Gender Variable

| Variable | Gender | n | \bar{X} | sd | t | df | p | Effect size |
|--------------------------|--------|------|-----------|-------|-------|-----|-------|-------------|
| Learning | Female | 146 | 18.70 | 8.67 | 2.211 | 219 | .028* | 0.323 |
| | Male | 75 | 16.12 | 7.23 | | | | |
| Job replacement | Female | 146 | 24.65 | 9.78 | 2.179 | 219 | .030* | 0.307 |
| | Male | 75 | 21.59 | 10.12 | | | | |
| Sociotechnical blindness | Female | 146 | 17.01 | 6.56 | 2.088 | 219 | .038* | 0.294 |
| | Male | 75 | 15.03 | 6.90 | | | | |
| AI configuration | Female | 1468 | 12.04 | 5.76 | 3.820 | 219 | .000* | 0.552 |
| | Male | 75 | 9.03 | 5.13 | | | | |
| Total | Female | 146 | 72.49 | 25.84 | 2.988 | 219 | .003* | 0.435 |
| | Male | 75 | 61.76 | 23.47 | | | | |

According to the results of the independent sample t test conducted between the views of pre-service teachers on AI anxiety levels and gender variable, it was determined that the scores of female and male pre-service teachers differed significantly in terms of both total score and all sub-dimensions, and this difference was due to the fact that the scores of female pre-service teachers were higher than male pre-service teachers.

According to this finding, it was concluded that female pre-service teachers' anxiety about AI was higher than male pre-service teachers. It was determined that the gender of the pre-service teachers had little effect on AI anxiety (Cohen's $d=0.435$). The effect of gender of pre-service teachers on the sub-dimensions of learning (Cohen's $d=0.323$), job replacement (Cohen's $d=0.307$) and sociotechnical blindness (Cohen's $d=0.294$) was also determined as little. The effect of gender on AI configuration (Cohen's $d=0.552$) was found to be moderate. The ANOVA method was employed to assess whether there was a statistically significant relationship between pre-service teachers' perceptions of AI anxiety levels and age. Table 4 displays the findings of the analysis on the association between the age variable and the pre-service teachers' levels of AI anxiety.

Table 4. One-Way ANOVA Results Analyzing Pre-Service Teachers' AI Anxiety Levels According to Age Variable

| Variable | Age | n | \bar{X} | sd | df | F | p | Difference | Effect size |
|--------------------------|--------------|----|-----------|-------|-------|-------|-------|--------------------|-------------|
| Learning | 17-18 | 14 | 18.86 | 8.05 | 4-216 | 2.480 | .045* | 19-20>23-24 | 0.044 |
| | 19-20 | 88 | 19.06 | 8.73 | | | | | |
| | 21-22 | 86 | 17.87 | 8.11 | | | | | |
| | 23-24 | 21 | 13.33 | 6.03 | | | | | |
| | 25 and above | 12 | 15.08 | 7.55 | | | | | |
| Job replacement | 17-18 | 14 | 24.36 | 11.20 | 4-216 | 3.457 | .009* | 19-20>23-24 | 0.060 |
| | 19-20 | 88 | 25.67 | 9.15 | | | | | |
| | 21-22 | 86 | 23.35 | 10.29 | | | | | |
| | 23-24 | 21 | 17.43 | 9.66 | | | | | |
| | 25 and above | 12 | 20.33 | 8.56 | | | | | |
| Sociotechnical blindness | 17-18 | 14 | 17.14 | 6.57 | 4-216 | 3.051 | .018* | 19-20>23-24 | 0.053 |
| | 19-20 | 88 | 17.50 | 6.32 | | | | | |
| | 21-22 | 86 | 16.17 | 6.84 | | | | | |
| | 23-24 | 21 | 12.00 | 6.60 | | | | | |
| | 25 and above | 12 | 15.58 | 6.95 | | | | | |
| AI configuration | 17-18 | 14 | 10.86 | 6.26 | 4-216 | 4.145 | .003* | 19-20>23 and above | 0.071 |
| | 19-20 | 88 | 12.02 | 5.66 | | | | | |
| | 21-22 | 86 | 11.32 | 5.67 | | | | | |
| | 23-24 | 21 | 6.86 | 3.86 | | | | | |
| | 25 and above | 12 | 8.92 | 5.74 | | | | | |
| Total | 17-18 | 14 | 71.21 | 29.60 | 4-216 | 4.678 | .001* | 19-20>23 and above | 0.079 |
| | 19-20 | 88 | 74.25 | 24.22 | | | | | |
| | 21-22 | 86 | 68.72 | 25.37 | | | | | |
| | 23-24 | 21 | 49.62 | 20.89 | | | | | |
| | 25 and above | 12 | 59.92 | 23.15 | | | | | |

According to the results of the ANOVA test between pre-service teachers' views on AI anxiety levels and age variable, it was determined that the AI anxiety scores of pre-service teachers aged 19-20 were higher than those of pre-service teachers aged 23-24 and 24 and over. Accordingly, it was concluded that the participants between the ages of 19-20 had higher AI anxiety than the participants aged 23 and above. When the sub-dimensions of the scale were analyzed, it was determined that there were significant differences between the scores of pre-service teachers aged 19-20 and 23-24 for the sub-dimensions of learning, job replacement and sociotechnical blindness, and the scores of pre-service teachers aged 19-20 were higher than those of pre-service teachers aged 23-24. In the sub-dimension of AI configuration, similar to the result in the total scale, it was concluded that the scores of the participants aged 19-20 were higher than the scores of the participants aged 23 and over. The effect of pre-service teachers' age on AI anxiety ($\eta^2=0.079$) was found to be medium. The effect of pre-service teachers' age on the sub-dimensions of learning ($\eta^2=0.044$), job change ($\eta^2=0.060$) and sociotechnical blindness ($\eta^2=0.053$) was found to be small. The effect of age on AI configuration ($\eta^2=0.071$) was found to be moderate. The results of the t-test analysis to examine whether there is a significant difference between the AI anxiety levels of pre-service teachers and the university type variable are presented in Table 5.

Table 5. T-Test Results Analyzing AI Anxiety Levels of Pre-Service Teachers According to the University Type Variable

| Variable | University type | n | \bar{X} | sd | t | df | p | Effect size |
|--------------------------|-----------------|-----|-----------|-------|-------|-----|-------|-------------|
| Learning | State | 194 | 18.22 | 8.23 | 1.902 | 219 | .058 | |
| | Private | 27 | 15.00 | 8.24 | | | | |
| Job replacement | State | 194 | 24.07 | 9.78 | 1.852 | 219 | .065 | |
| | Private | 27 | 20.30 | 10.97 | | | | |
| Sociotechnical blindness | State | 194 | 16.68 | 6.53 | 2.062 | 219 | .040* | 0.396 |
| | Private | 27 | 13.85 | 7.70 | | | | |
| AI configuration | State | 194 | 11.37 | 5.70 | 2.487 | 219 | .014* | 0.520 |
| | Private | 27 | 8.48 | 5.33 | | | | |
| Total | State | 194 | 70.34 | 25.05 | 2.453 | 219 | .015* | 0.493 |
| | Private | 27 | 57.63 | 26.47 | | | | |

As a result of the analysis, it was seen that the AI anxiety levels of pre-service teachers differed according to the type of university. It was determined that the AI anxiety levels of the students studying at state university were significantly higher than the students studying at private university. When the sub-dimensions of the scale were analyzed, it was determined that the scores of pre-service teachers studying at public and private universities differed only in the dimensions of sociotechnical blindness and AI configuration, and this difference was due to the higher scores of the students studying at the state university. It was found that the effect of the university type that the pre-service teachers studied at on the total AI anxiety (Cohen's $d=0.493$) and sociotechnical blindness (Cohen's $d=0.396$) sub-dimension was little, while the effect on the AI configuration (Cohen's $d=0.520$) was moderate. One-way ANOVA technique was used to determine whether there was a significant difference between pre-service teachers' AI anxiety levels and their grade levels. The results of the analyses regarding the relationship between the pre-service teachers' grade levels and their AI anxiety levels are presented in Table 6.

Table 6. One-Way ANOVA Results Analyzing Pre-Service Teachers' AI Anxiety Levels According to the Grade Level Variable

| Variable | Grade level | n | \bar{X} | sd | df | F | p | Difference | Effect size |
|--------------------------|-------------|----|-----------|-------|-------|--------|-------|---------------|-------------|
| Learning | 1 | 42 | 15.88 | 7.08 | 3-217 | 4.526 | .004* | 2>4 | 0.059 |
| | 2 | 84 | 19.81 | 8.61 | | | | | |
| | 3 | 83 | 17.63 | 8.29 | | | | | |
| | 4 | 12 | 12.08 | 5.74 | | | | | |
| Job replacement | 1 | 42 | 22.52 | 10.26 | 3-217 | 8.908 | .000* | 2>3 and 4 | 0.110 |
| | 2 | 84 | 27.25 | 9.27 | | | | | |
| | 3 | 83 | 21.77 | 9.29 | | | | | |
| | 4 | 12 | 14.67 | 9.49 | | | | | |
| Sociotechnical blindness | 1 | 42 | 15.21 | 6.37 | 3-217 | 8.113 | .000* | 2>3 and 4 | 0.101 |
| | 2 | 84 | 18.63 | 6.46 | | | | | |
| | 3 | 83 | 15.46 | 6.45 | | | | | |
| | 4 | 12 | 10.25 | 6.09 | | | | | |
| AI configuration | 1 | 42 | 10.19 | 5.67 | 3-217 | 8.203 | .000* | 2> 1, 3 and 4 | 0.102 |
| | 2 | 84 | 13.20 | 5.66 | | | | | |
| | 3 | 83 | 9.78 | 5.22 | | | | | |
| | 4 | 12 | 7.17 | 4.97 | | | | | |
| Total | 1 | 42 | 63.81 | 23.66 | 3-217 | 10.615 | .000* | 2> 1, 3 and 4 | 0.128 |
| | 2 | 84 | 78.89 | 24.54 | | | | | |
| | 3 | 83 | 64.64 | 23.86 | | | | | |
| | 4 | 12 | 44.17 | 21.77 | | | | | |

The one-way ANOVA test results showed that pre-service teachers' AI anxiety levels varied depending on the grade level. Pre-service teachers studying in the 2nd grade had higher test results than those studying in the 1st, 3rd, and 4th grades, which is what caused this difference. The distinction in the sub-dimension of AI configuration was found to be the result of the 2nd grade pre-service teachers' superior test scores to those of the 1st, 3rd, and 4th graders. It was determined that the difference in the sub-dimensions of job replacement and sociotechnical blindness was caused by the fact that the scores of the pre-service teachers studying in the 2nd grade were higher than those of the pre-service teachers studying in the 3rd and 4th grades. It was found that the difference in the learning sub-dimension was brought about by the fact that the 2nd grade pre-service teachers' scores were higher than the 4th grade pre-service teachers' scores.

It was determined that the effect of pre-service teachers' grade level on AI anxiety ($\eta^2=0.128$) was small. The effect of pre-service teachers' class levels on the sub-dimensions of learning ($\eta^2=0.059$), job replacement ($\eta^2=0.110$), sociotechnical blindness ($\eta^2=0.101$) and AI configuration ($\eta^2=0.102$) was also found to be small.

4. Discussion and Conclusion

The first result obtained from the research is that pre-service teachers' AI anxiety levels are at a moderate level. Similarly, Takıl et al. (2022) examined the AI anxiety levels of university students and found that the AI anxiety scores of the students were at a moderate level. In studies conducted with teachers in the education sector, it was also found that teachers' AI anxiety levels were at a moderate level (Sevimli-Deniz, 2022; Terzi, 2021). However, it was also determined that different results were found in different sectors in the literature. For example, in a study conducted on nurses in Turkey, it was determined that the average level of nurses' anxiety about AI was below the scale average (Seren İntepeler et al., 2022). Filiz et al. (2022) concluded that the anxiety level of health professionals about AI is also at a moderate level. In their qualitative study conducted with participants in the textile sector, Yıldız and Taşhan (2023) determined that employees are not sufficiently familiar with AI technologies, and that they have a positive attitude towards AI technologies, but also have concerns about them. In this sense, it can be said that the number of studies in the field should increase in order to make clearer inferences about the direction of sectorial trends in the field of AI anxiety, which is relatively new in the literature.

Another result obtained from the descriptive statistics of the study is that the scores of pre-service teachers in the learning sub-dimension of AI anxiety are low. Similarly, Terzi (2021) conducted a study with 222 teachers and found that the scores of teachers in the learning sub-dimension were lower than the other sub-dimensions of AI anxiety. This dimension is related to learning the usage, working mechanisms, features, and functions of techniques/products related to AI. In this sense, it is possible to say that pre-service teachers do not have any anxiety about learning techniques or products related to AI. It is also possible to say that this result is an expected result in the sense that pre-service teachers who will perform a profession related to education and training are closely related to the learning activity. It is also possible to say that this result is an expected result because pre-service teachers who will perform a profession related to education and training are closely related to the learning activity.

Another result of the study is that female pre-service teachers have higher AI anxiety than male pre-service teachers. Similarly, Terzi (2021), in a study conducted with teachers, found that female teachers had higher AI anxiety than male teachers. In another study, in which the study group was also composed of teachers, it was determined that the average AI anxiety of female teachers was higher than male teachers, but this difference was not statistically significant (Sevimli-Deniz, 2022). In a study conducted in Turkey on technophobia, the finding that women have a higher level of technophobia than men supports this finding of our study (İbrahimoğlu et al., 2015). However, it can be said that the reasons for this result should be examined with further research to be conducted with pre-service teachers.

As a result of the research, it was also determined that the AI anxiety levels of students studying at a public university were significantly higher than those of students studying at a private university. In the literature, there is no research examining the relationship between the type of university where pre-service teachers study and their AI anxiety levels. However, the finding that students' degrees of AI anxiety fluctuate depending on the faculty they study (Takıl et al., 2022) raises the possibility that the type of university students attend also affects their AI anxiety levels. The fact that different institutions have varying degrees of openness to technology could be the cause of this outcome. However, it should be highlighted that this outcome, which is one of the study's ground-breaking findings, needs to be clarified by additional investigation.

The study's final result is that pre-service teachers studying in their second year are more anxious about AI than those studying in their first year, second year, or final year. Nearly every subject whose data were gathered for this study is a digital native. In this regard, it might be advised to investigate why second-year students experience higher levels of AI anxiety in future studies. Research draw attention to the importance of awareness (Yıldız & Taşhan, 2023) and education (Othman et al., 2021) in reducing AI anxiety. Therefore, it can be ensured that the level of AI anxiety of 2nd grade students can be reduced by increasing their level of knowledge about AI.

In light of the research, it is recommended that pre-service teachers receive training on AI in order to allay their concerns about AI. Othman et al. (2021) stated in their study that training employees on AI may cause a decrease in anxiety levels. Qualitative research can be conducted to obtain information about the causes of pre-service teachers' anxiety about AI. Various studies can be conducted not only with learners studying in traditional face-to-face environments, but also with learners studying in open and distance learning environments where artificial intelligence technologies can be integrated. Other stakeholders in education besides pre-service teachers can also be studied to learn how anxious they are. In this regard, it can be advised to conduct research on AI phobia with academics from higher education as well as with teachers and administrators from various levels of education.

The study also has some limitations. The first one is that the research data is limited to pre-service teachers studying at a public and a private university. In order to overcome this limitation, it may be recommended to conduct survey research on larger samples. Another one is that the data collection tool is based on self-report. For this reason, studies that adopt experimental designs that can prevent self-reporting can be designed.

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408-The Use of Podcast Technology in Open and Distance Learning Environments: A Literature Review

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Abstract

Open and distance education technologies have gained a new dimension with the development of communication tools such as podcasts. Listening to digital sound files asynchronously and/or offline are the main differences from radio broadcasts. Podcasts offer learners the opportunity to listen to educational materials at their own pace, regardless of time and location, thereby enhancing the flexibility of the learning process. In this study, the main features of podcast technology in the context of open and distance learning are examined and the studies conducted in this field are investigated using the literature review method. In addition to notification, replaying, adjusting listening speed, RSS tracking, streaming/downloading and online/offline usage, podcast technology can be used anywhere, anytime with simple devices. Thanks to the new music platforms (Spotify, Youtube Music, etc.) offering podcasts that use mobile devices, seamless learning, personalization and omni-channel access have become possible. Through podcasts, learners can access lecture notes, presentations, or expert opinions to acquire knowledge. Additionally, podcasts serve as a communication and sharing platform among learners. The literature review shows that podcast technology can be used to motivate learners, produce understandable and accessible content, and enrich students' learning experiences. This technology is also helpful for disabled students and language learners. It has been observed that issues such as educational podcast formats, field-format relationship, recording length and storyboarding have not been researched precisely. In addition, it is thought that the development of technologies such as searching, highlighting and note-taking will make podcasting a much more effective environment in open and distance learning.

Keywords: *Podcast, Audiobook, storytelling, elearning materials, mobile learning*

1. Introduction

Distance education is a flexible way of learning that provides learners to access a variety of learning resources wherever or whenever they want. Thanks to the development in technology, the potential and popularity of distance education is increasing. McLendon and Cronk (1999) emphasized that utilizing technology tools is very important to improve the quality of education. It is crucial to take into account how smoothly the administrative, technological, educational, and pedagogical components work together.

According to Bates (1995), intergenerational changes have shaped the history of distance education. The development of distance education has progressed in parallel with the development of technology. The first generation of distance education programs was based on delivering knowledge to learners through printed materials. With the use of audiovisual technologies, second generation distance education applications emerged as a result of this strategy. The third generation of distance education gave learners the chance to communicate simultaneously through distance communication technology. The fourth generation of distance education programs was developed as a result of the increasing use of the Internet. During this period, flexible learning was encouraged and anytime, anywhere access to information was emphasized. The fifth generation of distance, which is an extension of the fourth generation, has been called "intelligent flexible learning" (Taylor, 2001).

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The use of technical tools to improve the quality of education is recognized as a key strategy and both formal and informal educational resources are regularly updated with the addition of new technological developments. In this environment, the primary goal of distance education is to develop high quality teaching programs that effectively meet learners' educational needs. However, when evaluating the effectiveness of distance education, it is crucial to examine the effectiveness of educational, pedagogical, administrative and technological components. These factors contribute to overall effectiveness because they work well together. Considering all these factors, technology and effectiveness are two key components in the success of distance education (Bates, 1984).

The effective use of technology also depends on the media. According to Holmberg's research, the medium is a basis for communication used to convey information, each with its own unique characteristics. Right combination of technology and media have a great influence in distance education in terms of communication, interaction, and capacity. According to Moore (1989), the right choice of technology and level of participation can influence the interaction between learners, instructors and educational materials. Audio is one of the media formats that technology offers much wider usage possibilities.

There is a difference between using audio alone as a media and using it together with other media formats. The influence of audio on our visual perception has often been undervalued (Hilmes, 2005). However, when we consider how audio affects our interactions with people and our perceptions, the importance of audio cannot be ignored (Bliss-Moreau et al., 2010). Consequently, we can conclude that audio is very important, especially in educational contexts. Even if unnecessary use of audio and noise pollution can negatively affect learners' cognitive capacities (Clark & Stansfeld, 2007), it should not be forgotten that audio plays an important role in the learning process (Kim et al., 2004).

There are different environments in which the audio format is used. Radio programs have long been seen to benefit learners in distance learning (Bozkurt, 2017). However, radio programmes have limitations in terms of time and schedule. The development of technology has led to the diversification of the tools and applications used, and the importance of tools that allow learners to shape their own learning experiences has increased. The practice of spreading audio content over digital networks is known as podcasting (Kidd, 2011). Podcasting provides an option for educational institutions and instructors to disseminate information both online and offline. It also has significant potential to foster an offline learning culture. Distance learners are particularly interested in advanced podcasts and the delivery of courses in podcast format (Walsh & Villiers, 2015; Zawachi-Richter, 2021). Due to these preferences, online courses help distance learners to be more motivated and deepen their social ties (Bolliger et al., 2010; Brown et al., 2009). Moreover, the use of podcasts in online learning environments encourages the development of learner communities (Brown et al., 2009). Additionally, podcasting can be successfully used in distance learning environments and represents an important milestone in the evolution of speech. As a result, podcasting methods in the world of distance education stands out as a desirable option for both learners and educational institutions.

The research on the use of podcasts in distance education is limited; instead, the majority of studies have concentrated on the use of podcasts as teaching tools in traditional classroom settings. This study aims to share a perspective on using podcasts as distance learning material. For this purpose, the place of technology in communication and interaction, multimedia principles, technology acceptance model and mobile learning frameworks were examined and then the findings in the literature were discussed.

1.1. The Impact of Technology on Environment, Interaction and Communication

In distance education, communication technologies are used for various activities and levels of engagement. When we talk about communication, we mean the act of communicating effectively. Additionally, interaction includes the interaction of students with resources, teachers and other students. Technology used in distance education ranges from one-way audio recordings to tools such as video conferencing that allow online synchronous interaction. These learning technologies facilitate learners' acquisition of learning materials.

Media, on the other hand, serves as a communication environment for the dissemination of information. Each environment has particular features for organising and presenting information. Two-way technologies allow communication between learners as well as between learners and instructors, while one-way technologies allow asynchronous interaction. Face-to-face interaction, written materials, auditory materials, visual materials and computer technologies are the five stages in which interaction can occur (Bates, 1995). With technological

advances, it is possible to incorporate more interactive technologies into distance learning (Holmberg, 1986). In Table 1, main interaction types are summarized with media dimensions.

Table 1: Interaction Relationship by Learners

| Media/Material | Interaction | | |
|-----------------------|--|--|--|
| | Learner - Learner | Learner - Content | Learner - Instructor |
| Text | Synchronous /Asynchronous | Real Time Interaction | Time Delayed Interaction |
| Audio | Real-time interaction with live broadcast programs or teleconference technologies. | Real-time interaction with sound recording technologies. | While there is time-delayed interaction with audio recordings, there is real-time interaction with live television programs and video conferencing technologies. |
| Visual | There is real-time interaction with video-conferencing technologies. | Real-time interaction with visual e-learning materials is available. | While one-way and time-delayed interaction is provided by using visual recording technologies, real-time interaction is obtained with live programs and video-conferencing technologies. |
| Computer Technologies | Real-time, time-delayed interaction over e-mail is available through computer-based conferences. | There is real-time interaction with computer technologies. | There is time-delayed interaction in real-time, multimedia and computer-assisted education platforms with the occasion of computer-based conferences and internet technologies. |

It can be seen that audio has broad advantages for different interaction types. Furthermore, audio can be utilised by learners with basic technology and in diverse ways compared to video. Learners can focus on the content just by listening without screen dependence.

1.2. Multimedia Principles and Design Process in Learning Environments

Richard Mayer's book "Multimedia Learning", published in 2009, focuses on the importance of five cognitive processes for effective learning. These processes include categorizing similar words and images, categorizing specific words and images, and combining verbal and visual presentations. Mayer identifies twelve principles for multimedia design and provides guidance for technology-based and educational multimedia design. These principles are grouped under three categories of determining basic procedures, operating within the boundaries of a specific subject matter, and facilitating the production procedure (Mayer, 2005).

Table 2: Mayer's Multimedia Design Principles

| Principles of Identifying Core Processes | Working and Simplifying Principles within a Specific Topic | Principles for Improving the Manufacturing Process |
|--|--|--|
| Segmentation | Consistency | Multimedia |
| Pre-Training | Attracting Attention | Personalization |
| Format | Redundancy | Audio |
| | Positional Proximity | Visual |
| | Temporal Proximity | |

"Voice, attention, coherence and redundancy" principles have the potential for podcast technologies in educational settings.

As learners have different levels of perception, instead of using long narratives to convey multimedia communications, messages can be broken down into smaller chunks and delivered at the speed determined by the users. It would be helpful for learners to practice before the session and have access to relevant supplementary materials so that they can learn more deeply. It may be more beneficial to combine verbal and visual storytelling for learning.

The principle of coherence in multimedia presentations emphasizes the elimination of redundant material and the use of relevant, connected words and images. The principle of attractiveness aims to capture the learner's attention by emphasizing important information. Learners are advised to avoid information overload through the principle of redundancy. These guidelines can provide direction for the effective implementation of podcast technology in educational settings.

1.3. Technology Acceptance Model in The Framework of Learning Environments

Fred D. Davis introduced the Technology Acceptance Model in 1989. This approach was presented to measure and improve user acceptance of computer-based information systems. The factors of perceived usefulness and perceived usability are hypothesized to influence people's propensity to use technological systems. As a result of numerous studies to improve the explanatory power of the model, it has been recognized as one of the most valid models for studying technology acceptance at the individual level (Davis, 1989).

Technology-based solutions enable distance education and provide learners with a flexible learning environment. Therefore, it is important to increase the use of technology in distance education systems. The efficiency of a learning environment is determined by factors such as quality attributes like service, technical system, and information quality. Furthermore, factors such as perceived usefulness and perceived ease of use affect how well learners respond to and use the system. In this context, updating and improving existing learning environments will be possible by diversifying instructional resources and producing new educational content.

1.4. Mobile Learning

Learners can access educational resources over wireless networks using mobile learning systems (Quinn, 2000). Through the use of portable, convenient tools, this system can enhance the educational experience. Mobile learning, a new opportunity for distance learning and e-learning, utilizes both computer networks and mobile devices. Lightweight and portable mobile devices offer ubiquitous access.

In mobile learning, devices with the characteristics of portability, spatial independence and time independence stand out. Tools such as laptops, tablet computers, portable media players, mp3 players and cell phones are used in mobile learning (Jones and Jo, 2004). Mobile learning has a number of benefits such as mobility, unintentional learning through assistive functions and anywhere and anytime learning. It also includes disadvantages such as memory limitations, screen size concerns, disconnectivity, short battery life, distraction and security issues. But in general, mobile learning extends the learning environment using portable wireless technology and brings the benefits of e-learning (Riva & Villan, 2005).

1.5. Podcast Technology

While the Internet offers a more open and diverse platform for communication than traditional media, firms that have emerged as major players often impose their own regulations on content creators and users. These attempts at centralization introduce new features different from RSS feeds. Communications firms now offer simultaneous storage, discovery and consumption, especially given the opportunities provided by Web 2.0 technology. These three key components are combined to provide services on many digital platforms such as YouTube, Netflix, Amazon Prime and Spotify. These businesses create their own content while making it available to their customers by acquiring the licensing rights to third-party content, either permanently or for a set period of time, for a monthly fee, or by advertising. In this way, with the emergence of Web 2.0 technology and social media platforms, the decentralized RSS-based structure of the internet at its inception began to transform into a centralized structure. Content began to be hosted by the new social media platforms and content providers on their own servers or in cloud-based storage facilities. As a result, it is now easy to browse material, find new content and enjoy it on the same platform without having to switch players. Text-based RSS access has led to a disjointed method of storing files online at many different service providers and accessing them on devices using file readers. But with the emergence of large, closed digital media companies, these procedures were consolidated under a single platform, ushering in the era of subscription-based paid content distribution. Podcast publishing has undergone similar changes. The number of businesses offering services to host and deliver podcast audio files has increased along with the growth in podcast listeners (Morris & Patterson, 2015).

The widespread use of mobile devices is one of the most important reasons for the commercial value of podcasts. When it comes to content consumption options, desktops lag behind portable devices. Mobile devices

have become a component driving demand for podcasts due to their ability to access and consume material from anywhere. As a result, apps that offer personalized, closed-loop and paid content consumption have grown in popularity, particularly on mobile platforms. Podcasts now have a higher economic value due to the centralization of materials and increased consumption through mobile devices. In particular, Apple's release of the "Podcasts" app with iOS 8.0 in 2014 significantly increased the use of podcasts. Since 2004, when Apple added a podcast tab to iTunes, it has made innovative attempts to position itself as a major global podcast platform. According to Locker (2018), Apple exceeded 50% of podcast usage in the US in the late 2010s.

Mobile apps that offer podcasts can monetise their publishers. While most mobile apps are free to download, some of the content or apps can be charged for. Through these sites and apps, podcasters often earn money. In order to maintain their independence and not be dependent on any one platform, many podcasters have created and released their own podcast apps. Free-to-download podcasts are often supported by sponsors or in-podcast advertising. In order to generate sponsorship and advertising revenue, it is critical that the podcast series has a large audience and that past episodes are downloaded in large numbers (Morris & Patterson, 2015, p. 225).

In addition to Apple Podcasts, a number of other programs such as Stitcher, Pocket Casts, Overcast, Podcast Addict, BeyondPod, DoggCatcher, Downcast, Castbox, SoundCloud, Spotify and others allow users to access podcast material (Sullivan, 2019). Podcasts are also available on the YouTube platform with only one image. Users can listen from YouTube or listen from YouTube Music platform.

The world of podcasting is always full of new discoveries and ideas. YouTube, where video content is often shared, offers creators a wealth of information about user demographics and content consumption patterns. For this reason, podcasters have suggested developing a similar platform for themselves (Morris & Patterson, 2015). The podcast industry is expected to benefit from the new opportunities and analytical tools that this possible platform will provide.

2. Method

The method of the research is literature review, one of the qualitative research designs. Within the scope of the research, the keywords "podcast, audiobook, storytelling" in distance education and elearning were used for research.

3. Findings

The following sections of the study present the findings from the literature review. Following the literature review, it was found that there are not many studies that disagree with the usefulness of podcasting. Numerous studies show that the majority of people view podcasting technologies as positive and useful. In the literature analysis, there are not many studies on the use of podcast materials as distance education materials; it has been observed that the studies are mainly related to the use of podcast materials as an educational material in the classroom environment.

In this section, studies about podcast technology as a supportive material in traditional environments are analysed and then podcast usage in distance education is evaluated.

3.1. Podcast Technology as a Supportive Material

The use of podcast technology and relevant studies can underline the potential of this technology. Especially after Covid-19 pandemic, most of the traditional educational institutions need supportive technologies for learners. According to a comparative study by Carle, Jaffee and Miller, podcasts work well as a supplement to classroom instruction. In this study, learners who supplemented their education by listening to audio recordings of group discussions in addition to lectures had higher test scores and increased levels of student engagement. These findings suggest that podcasts encourage student engagement and add an interactive component to the learning process (Carle, Jaffee and Miller, 2009). In another study by Kurtz, Fenwick and Ellsworth, podcasts are a useful tool for problem solving and project work. This study found that students performed better and teachers gave higher grades when podcasts were used instead of traditional course materials. Students reported feeling more motivated with this new teaching strategy, indicating that podcasts increase students' motivation to learn (Kurtz, Fenwick, & Ellsworth, 2007).

The use of complementary and creative podcasts in the classroom can benefit from the use of podcast technology. Podcasts such as lecture recordings have benefits of providing learning opportunities regardless

of time and place, and making up for missed sessions (Gannod, Burge & Helmick, 2008). Furthermore, producing podcasts with translation can be a useful tool for learners who speak different languages.

The use of podcast technologies can also be seen as a transformation of the classroom environment. For example, podcasts can replace full lectures, allowing for more hands-on learning in the classroom. Podcasts allow learners to communicate their understanding and can be used in assessment processes (France & Wheeler, 2007; Maag, 2006).

There are also innovative use cases such as learners creating new podcasts, explaining concepts through them or summarizing lessons. Learners' capacity to communicate and transform knowledge can be enhanced in this way. By combining traditional lectures with online learning components, podcast technologies increase the effectiveness of teaching and offer students more learning opportunities (Frydenberg, 2006).

Podcasts have the potential to enhance students' learning and complement their skills (Fernandez, Simo & Sallan, 2009). Going beyond simple knowledge transfer, integrating students into the podcast process has produced better learning outcomes (Forbes, 2015). It also encourages teacher-student interaction and group work while increasing student engagement (Stoltenkamp, Khumalo and Kies, 2010). This shows that students' participation in the podcast process benefits their social and cognitive development.

According to Gourley (2010) and Tapscott & Williams' (2010) studies, numerous factors, especially in the context of information and communication technologies, have pushed universities to adopt podcasting practices. In 2010, Guertin stated that most of the learning environments using podcast technology are related to undergraduate education. In the same year, Heilesen (2010) evaluated three main perspectives in the literature on the impact of podcast technology on learning. The study also highlighted the importance of studies that aim to measure learners' general reactions to podcasts.

Podcasts have the ability to combine traditional learning approaches with distance learning techniques (Manca & Ranieri, 2016; Parson et al., 2009). This also mean that podcasts support both blended learning and distance learning in higher education.

3.2. Podcast Technology in Distance Education

Podcasting has a number of uses in distance education, online and offline using and screen independence. These advantages include providing accessible materials despite time and space constraints, requiring little work for adaptation, allowing flexible use within the curriculum, and giving learners freedom of movement (Nie et al., 2010). Moreover, podcasting supports a culture of sharing open educational resources and can be used in massive open online courses (Rosell-Aguilar, 2013; Rueda et al., 2016).

In addition to supporting the online professional development of various experts and educators, podcasting also serves various functions for learners. According to Burns, it is especially noteworthy that programs with sample applications are presented in podcast format (Burns, 2011). In addition, podcasts that provide content for professional development processes are said to help better understand the topics (McNamara, 2018). Therefore, it is very important to use podcast technology especially in professional development training programs provided by learning and training centers and distance education institutions.

Hoskyns-Long's (2009) study reveals how podcasts are especially valuable for distance learning processes. Podcasts improve students' learning experiences in this process, which proves to be more effective when mobile learning tools are used. According to the findings of this study, podcasts give learners more options for autonomous study at different times and places.

There are also some rare studies that mention the negative aspects of podcasts. Podcasts in distance education can potentially have some drawbacks (Jham, et al., 2008):

- **Incompatibility with Technology Infrastructure:** Podcasting might cause issues when integrated with current technology infrastructure. It's possible that some schools or students lack the technology needed to access or use podcasts properly.
- **Lack of Academic Content and License Agreement Issues:** Since podcasts sometimes come from commercial sources or independent producers, there may not be enough academic content and license arrangements may be too complicated. For access to and use of this content, schools may need to seek authorization.

- **Technical Restrictions and a Deficient of Educational Resources:** There may be some technical restrictions with podcasting. It's possible that faculty members or students don't have the appropriate podcasting-related skills or educational resources.
- **Lack of Functional Awareness and Knowledge:** Faculty and students may have issues if they are unable to use podcasting efficiently or are unaware of its potential benefits. It's critical to comprehend and use podcasting properly in the educational setting (Bruno, 2008).

These disadvantages highlight the challenges of using podcasting in education and indicate the need for planning and resource allocation to deal with these challenges.

All of these studies show that podcast technology has a beneficial impact on learning environments and this is what unites them. The benefits of podcasts, such as adaptability, engagement and encouragement, can enhance students' learning processes and increase their achievement. It is crucial to keep in mind that these results depend on educational elements such as student engagement, recent changes and the audiovisual environment.

4. Conclusion

Distance education stands out as an educational paradigm that provides access and flexibility to learners. Distance education has been greatly influenced by technological developments that have also changed the way people communicate, connect and learn. In this perspective, podcast technologies stand out as a useful tool to enhance educational opportunities.

Based on the literature review and data collected, we argue that podcasts have evolved and spread more widely by adapting to technology infrastructures. When podcasts first started, they were a type of media whose audio files could be accessed through free RSS feeds. Initially, this was interpreted as a representation of the idea of the information society and the internet's prediction that information would flow democratically to all levels.

Initially developed as a radio extension, podcasts attracted a large number of amateur broadcasters due to their affordable production costs and various methods of financing. The result is a platform where a wide range of content can be freely shared.

In addition to all this information, podcasters and hosts are free to record their programs wherever they see fit, and listeners are free to listen on their own, often with headphones, while exercising, walking or engaging in other activities. Factors such as the proliferation of mobile devices and improved quality of internet connections have strengthened and improved podcasts. As a result, podcasts have become a media format that is both more widely accessible and packed with diverse material.

Podcasts are online tools that combine audio narration and visual materials to present learning content in the form of stories, lectures and discussions. This technology can be used to engage learners, improve understanding of the material and create an interactive learning environment. Podcasts allow learners to access information in a timely manner and learn at their own pace.

There are not many studies in the literature on the use of podcasts as distance learning resources; instead, most studies have focused on the use of podcasts as teaching aids in traditional classroom settings. Based on the predominance of positive factors of podcast materials as teaching aids in these examined studies, this study aims to put forward a view on the use of podcast materials as distance learning materials.

The use of podcasts in distance education comes with certain drawbacks. First, certain institutions or learners may have access concerns with the current digital infrastructure. Furthermore, securing permissions for commercial or independently generated content can be challenging, and podcasts sometimes lack academic value. Challenges may also come from technical restrictions and a lack of podcasting-related learning materials. Last but not least, a lack of understanding about the potential advantages and usefulness of podcasting may cause issues between instructors and learners. It's critical to comprehend podcasting's role in education and execute it successfully.

The use of podcast technologies can help learners understand content more easily and encourage engagement. Podcasts enable more flexible learning opportunities because learners can access them anytime and anywhere. Also, through podcasts, learners can experience many styles of presentation, each appealing to a different learning style. For instructors to use podcasts effectively, content design and delivery methods are crucial. Student engagement can be increased by speaking in a clear and entertaining way, providing visual aids and creating interactive podcasts.

Therefore, podcasts can be a useful teaching tool in distance education. This technology can help educators to deliver course material efficiently while increasing educational opportunities for learners. Podcasts can increase the success of distance education as they allow for more interactive and contextualized learning.

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Abstracts

72-Determinants of Commitment Towards Inclusive Education Programmes Taught Through Open and Distance e-Learning

Olufemi Timothy Adigun¹, Omobosola Oladipupo ‘Wumi², Raveenthiran Vivekanantharasa³

Abstract

Open and Distance Learning (ODEL) has evolved over time. While ODL has significantly promoted the policies of Education for ALL (EFA), it has metamorphosed into a crucial global strategy for providing equitable access to education. Nevertheless, despite the various opportunities presented by the ODeL, the concept, programmes and participants therein have equally experienced several challenges which have been reported in past studies. These challenges could be exacerbated by the abrupt move to online learning and assessment. Irrespective of the challenges thereof, some ODeL students in various programmes have shown appreciable commitment towards completing successfully. Arguably, until now, there is a paucity of evidence-based research assessing factors responsible for commitment towards an ODeL taught Inclusive Education programmes. Therefore, anchored on choice theory, this study is instituted to examine and determine the implications of academic commitment, online learning environment, online learning satisfaction and online learning readiness on the commitment of adult learners towards ODeL programme in an inclusive education programme in Nigeria. A six-sectioned structured questionnaire was designed for data collection. Data collection is currently ongoing through a structured questionnaire which is being shared with respondents through Google Forms and paper-pencil options. Data generated will be analysed using descriptive statistics involving frequency counts, simple percentages and measures of central tendencies as well as inferential statistics involving the Pearson’s Product Moment Correlation and the Structural Equation Modelling (SEM) with the IBM SPSS 22 and IBM AMOS 26.0 package at 0.05 level of significance. All the fit measures of the SEM will be checked for assumptions and acceptability. Findings will be carefully reported and appropriate recommendations will be presented based on the findings made.

Keywords: *Inclusive education, open and distance e-learning, academic commitment, online learning satisfaction, online learning readiness*

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75-Emergence of Chat GPT-4 and the Role of Teachers

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Abstract

One of the topics that shook the world of academia earlier this year is the appearance of chat GPT-4, an artificial intelligence developed by open AI. Even before that, AI technology existed and was used in various educational fields, but chat GPT-4 proved its outstanding intellectual level enough to appear as a co-author of an academic paper. In fact, several universities have struggled with how to respond to chat GPT-4 technology. Even if many students submit assignments using chat GPT-4 and get excellent grades, there is no way to prevent it in advance. Universities' main response to chat GPT-4 can be summarized in two ways. The first is to have instructors give students tasks to actively utilize artificial intelligence technology. And the second is to restrict students from using chat GPT-4 for ethical reasons. It can be said that artificial intelligence has already surpassed human intelligence. So, what role should teachers play in this reality? If AI can provide most of the answers, why should we continue to study? This will be similar to the next question. A calculator does all the math for you, so why do we keep learning math? The short answer is students need to learn how to use a calculator. That means students have to learn how to use artificial intelligence. This doesn't just mean dealing with artificial intelligence technically. How to use artificial intelligence will include how to properly command artificial intelligence and how to accurately ask questions to get the answers you want. The importance of asking questions has been emphasized since the time of Socrates, but teaching students how to ask questions is equally important today, with the momentum of artificial intelligence great. In particular, it would be one of the important virtues of instructors how to cultivate the ability of questions in learners in universities that implement distance education. Through this study, I will reflect on the meaning of questions in the age of artificial intelligence and explore how to cultivate questioning skills through distance education.

Keywords: *Chat GPT-4, teacher, question*

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85-Implementation of Learner-Centered Learning Interaction Service Mobile App With Push Messages

Kwang Sik Chung¹

Abstract

The dependence on classes in an online learning environment is constantly increasing. In particular, after COVID-19 ended, a lot of research and commercial investment was made on the efficiency and possibility of online classes in the endemic situation, and various types of online class services could be provided. However, there are many problems with student management, learning interaction and learning communication methods with students, learning contents and teachers in the online learning environment. Online classes are basically conducted on the premise of self-instructed learning. That is, in the aspects of student management, learning interaction and learning communication methods, the online learning environment is a situation in which only passive methods can be provided. Second, the learning interactions between students and instructors in the online learning environment lacks the mutual learning respect and the mutual learning trust that could come from face-to-face interactions. These problems lead to a situation in which the distance between students and instructors increases in the online learning environment, and it will make it difficult to operate learning efficiently in a hyper-personalized learning environment. In this research, in order to create close mutual learning trust and intimate interaction between instructors and students, smartphones, which students always carry with them, were used as a medium learning device. In addition, a learning service, that can send push messages to students in a group designated by the instructor, was developed and implemented. Instructors can classify students based on campus region, grade, and course or subject that students take. That is, students can be classified into about 160 groups, and push messages can be sent to the students classified in this way through the Learner-centered Learning Interaction Service Mobile App. Students can have learning trust that they receive learning management push messages from the instructor through the Learner-centered Learning Interaction Service Mobile App, enabling more intimate learning interactions.

Keywords: *Blended mobile learning, push messages, learning mobile app*

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101-Unlocking the Learning Revolution: AI's Transformative Role in Open Education

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Abstract

The advent of Artificial Intelligence (AI) has sparked a learning revolution, propelling open education to new frontiers of accessibility and scalability. AI's innovative applications have redefined the educational landscape, empowering learners and educators alike. This abstract explores the groundbreaking role of AI in accelerating and scaling open learning, revolutionizing the way we acquire knowledge. Harnessing the power of AI, open learning is transformed into a personalized, dynamic, and engaging experience. AI algorithms analyze vast amounts of learner data, enabling the creation of personalized learning paths tailored to individual needs, preferences, and learning styles. This personalization ensures optimal engagement and learning outcomes for every learner, paving the way for unprecedented educational achievements. AI-driven content creation has become a game-changer in open learning. By leveraging natural language processing and machine learning, AI automates the production of interactive learning materials, such as quizzes, tutorials, and assessments. This streamlines content generation, allowing for rapid scalability and widespread dissemination of educational resources, transcending traditional limitations. Adaptive assessments powered by AI revolutionize the evaluation process. These assessments dynamically adapt to learners' performance, tailoring question difficulty and type. Through precise identification of knowledge gaps, adaptive assessments optimize learning efficiency, providing personalized feedback and enabling timely intervention strategies. Learners are guided towards mastery, accelerating their progress and enhancing the learning experience. The collaboration between AI and open learning extends beyond content and assessments. AI-driven intelligent tutoring systems act as virtual mentors, offering personalized guidance, explanations, and recommendations. Learners benefit from interactive and responsive support, mirroring the advantages of human mentorship, while simultaneously scaling access to quality education. Furthermore, AI's analytical prowess and predictive capabilities drive continuous improvement in open learning. Advanced data analytics identify learning patterns, predict success or risks, and guide instructional design decisions. The knowledge gained fuels ongoing enhancements, ensuring open learning remains relevant, effective, and future-ready. In conclusion, AI emerges as the catalyst for transforming open learning into a truly innovative and inclusive educational paradigm. Through personalization, automation, and data-driven insights, AI accelerates the acquisition of knowledge and scales open learning to unprecedented heights. The learning revolution is here, and with AI at its forefront, the possibilities for open education are limitless.

Keywords: *AI, artificial intelligence, machine learning, open education, open learning, OER, scale learning, adaptive learning, personalized, catalyst*

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107-Early Childhood Teachers' Digital Competency in South Korea

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Abstract

The requirements for digital competency in a society of the world increased these days. For young children, the digital world is not a new approach anymore. However, early childhood teachers are not used to being educated in a digital environment. Therefore, it needs to investigate early childhood teachers' digital competency. This study examined the concept of digital competency and early childhood teachers' digital competency level in South Korea. We investigated the change of concept about current digital literacy and digital competency. We also examined the differences in early childhood teachers' digital competency based on teachers' backgrounds. Digital competency is an extended concept compared to digital literacy because it includes digital thinking, critical thinking, ethics, citizenship, making content, using platforms, and digital pedagogy. Two hundred sixty-six early childhood teachers in South Korea participated in the survey for this study. Park & Suh (2002) developed the instrument to evaluate digital competency based on the ICT framework (UNESCO, 2018). The collected data were conducted using the SPSS 21.0 program. We conducted a descriptive analysis of teachers' background variables. Cronbach's α value coefficient was calculated to verify the reliability of the measurement tool. The Scheffe post-test was conducted after the t-test and one-way ANOVA to find out the differences in digital competency according to the background variables of early childhood teachers. The backgrounds were workplace, the type of preschools, age, class year, teaching years, academic degree levels, and digital education experiences. There were significant differences in digital competency according to the background variables of early childhood teachers. Especially, preschool types and digital education experiences showed notable differences in all four categories of digital competency. The digital education experiences include online learning in teacher education programs. The results of this study provided meaningful insights to preschool teacher educators and preservice teacher education.

Keywords: *Digital competency, digital literacy, early childhood teacher*

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120-Learning in the Age of Discord: How a Gaming Chat App is Changing the Way we Learn

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Abstract

In response to the COVID-19 pandemic restrictions, many educational institutions have shifted to an online setting. This has prompted educators to look for fresh and creative approaches to online education delivery. While traditional approaches through learning management systems have already been in place, this approach tends to be centered on academics, and the need for more interaction on a non-academic level between students becomes an increasingly alarming issue in a class where students that never met personally, many students do not know one another, which significantly impacts their ability to collaborate in future activities. To address such, educators have looked into various platforms such as Facebook Groups, Gather, and even Discord for facilitating classes and delivering instructions alongside learning management systems. Each platform has its unique advantage in collaboration, ease of use, and optimized meeting experiences. This research aims to evaluate the different learning platforms and provide a comparative analysis of what works best in a digital learning center in the Philippines. The use of supplemental platforms such as Facebook Groups, Gather, and Discord shall allow the collaboration of students in an academic setting, enhance socialization through out-of-school activities, and promote academic inquiry through programmable tools within these platforms. After a thorough comparative analysis, Discord, as a supplemental platform, works best for the identified digital learning center. The adoption of Discord alongside learning management systems in online education holds the potential to revolutionize traditional approaches and significantly improve the educational experience for students. With its ability to bridge the gap between academics and socialization, Discord provides a versatile tool that enriches the virtual classroom environment, enabling educators to create an interactive and engaging learning atmosphere. By leveraging the benefits of Discord and combining them with established educational practices, educators can foster a more stimulating and dynamic online learning experience that caters to the unique needs of students in the digital era.

Keywords: *Gather, learning management system, online education, virtual classroom*

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124-HKU Space: A Hybrid Way Forward

John Cribbin¹

Abstract

In addressing the Conference theme: “The Future of Open Universities in the Age of Digitalized Higher Education”, the HKU School of Professional and Continuing Education (HKU SPACE) may serve as an exemplar. HKU SPACE is an Associate Member of AAOU, as it is not a purely distance learning institution. Rather, it offers a mix of face to face and distance provision in its portfolio. HKU SPACE is an external arm of the University of Hong Kong offering lifelong learning opportunities to the wider community. It offers Certificate and Diplomas of the University at all levels, from foundation to postgraduate and, in addition, partners with overseas universities to offer their Bachelor, Masters and Doctoral degrees in Hong Kong. This latter encompasses some 4,000 students annually while the School’s overall enrolments exceed 90,000 (57,000 by headcount) and a full time equivalent of over 23,000. The School has an e-learning strategy which aims for all courses to have an e-learning component, ranging from a modest percentage to fully online. During the covid period, 2020-2022, it was necessary to move to completely online delivery as face to face teaching had to be suspended. This involved extensive training for full time and part time teachers (the latter on a paid basis) to prepare them for online delivery as well as investment in upgraded teaching rooms to facilitate online delivery. These can also support both physical and virtual attendance to give students a choice once covid restrictions eased. Assessment has been a challenging issue in maintaining integrity in an online environment in terms of both continuous assessment and examinations. Reliable solutions to this are still ongoing. This is made more complex by the rapid and recent development of AI tools such as ChatGPT. The immediate response is to treat use of such tools as plagiarism but to recognise that AI must be incorporated in the curriculum from 2023/24 so that students may apply it ethically and be capable of using AI so as to meet employer expectations. There has also been development of MOOCs with FutureLearn in areas such as Buddhism and Chinese Medicine while the School has also introduced a Microcredentials scheme involving some 150 courses in 20 themes which are topical and stackable. In other words, HKU SPACE offers a case study involving a wide span of options which range from traditional face to face delivery to open and distance learning delivery in order to meet student needs and react to changing circumstances and technologies.

Keywords: *Hybrid, online, e-learning*

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128-Inclusion in Open Higher Education: Qualitative Content Analysis of Meanings in the Literature Stemming From Different Social Contexts

Asu Altunoğlu¹

Abstract

Inclusion in Open Higher Education: Qualitative Content Analysis of Meanings in the Literature Stemming from Different Social Contexts. Inclusion in higher education is increasingly being recognized as essential and also as a challenge since many higher education systems are launching efforts to improve diversity and inclusion in order to respond to the global and social needs. Open and distance higher education has long been the most influential of these efforts to reach a more inclusive learning atmosphere. However, how varying institutions of higher education shape their efforts to this aim is also diversely different from one another because the meaning of inclusion and inclusive higher education is understood differently across cultural, political, and social contexts. While there is an increasing interest in studies trying to define and measure inclusion in tertiary education, what is being meant by inclusion in open and distance higher education remains obscure as different perspectives exist in the literature as to which groups or individuals are excluded from higher education and which are included. General inclusive education literature has recently developed into a more ‘inclusive’ nature in terms of defining the disadvantaged; but there is a need to identify whether the same expansion pertains to inclusivity in open higher education, too. Maintaining the fact that exclusion and inclusion from higher education are social mechanisms reflecting the overall accessibility of disadvantaged individuals to being a potentially useful member of the society, the meanings loaded to inclusion in the literature might also be a reflection of social meanings attached to it in a variety of institutional, political and cultural contexts. With this in mind, this study will conduct a qualitative content analysis of papers published on inclusivity in open and distance higher education in order to reveal different meanings attached to inclusion and disadvantage on the part of the individual as an obstacle to access and succeed in higher education in different social and cultural contexts.

Keywords: *Inclusive education, open and distance higher education, increasing access to higher education*

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142-Who Drops Out Among Stop-Outs in an Open University?

Eun Kyung Lee¹

Abstract

This study aims to analyze the stop-out behavior of adult learners at open universities and to see how it leads to dropout. Stop-out refers to behavior that temporarily does not enroll in college, and this research wants to explore how the stop-out of adult students at open universities has a relationship with their dropout. Little is known about the influencing factors and effects of adult learners' stop-out. In KNOU, about 40,000 students stop out every semester, and about 30,000 students (22% of the total) drop out every year. About half of the dropout students were stopped from the first semester of enrollment. In KNOU academic affairs, students taking a consecutive three-term leave of absence will be dropped out. This study would like to examine the stop-out and dropout experiences of adult learners who entered KNOU in the spring of 2021 (about 32,000 people). Online learning and registration data of KNOU students were collected for five semesters. These data are analyzed based on time series in order to see how they relate to students' stop-out and dropout processes. Learning and registration data includes the progress and time of online classes, participation in mid-term and final evaluations, grades, scholarships, enrollment for each semester, the number and duration of stop-outs, and dropouts. The research also looked at how individual variables such as gender, age, region, past academic background, transfer, grade, and major have a relationship with the stop-out of adult learners. Dropout means that students stop studying at the individual level, and from the school's point of view, the student who entered the school disappears. It is very important to reduce dropout at the personal and institutional levels. By analyzing the patterns of stop-out and related factors known as a precursor to dropout in some students, the researcher would like to suggest ways to support students to continue their studies who are likely to drop out.

Keywords: *Stop-out, dropout, drop-out, online learning, adult learner*

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146-Gamification in Open and Distance Learning: A Meta-Synthesis Study

Cem Işıkcı¹, Kamil Çekerol²

Abstract

Gamification has rapidly emerged as one of the most widely used persuasive technologies to promote a positive change in the user's behavior by incorporating game-like elements into non-game contexts. As a valuable tool to keep users motivated, engaged, and active, there is a broad interest in adopting gamification solutions to support and encourage positive behaviors and behavior change. Gamification has progressed from fundamental questions such as what and why to gamify to how and when to gamify or not. Gamification is frequently used in education to improve the teaching-learning process. According to the Web of Science database, the most frequently studied area of gamification in education and educational research. Gamification can be used in different fields, such as language education, instrument playing, art, etc. It offers learners different open and distance learning options, such as mobile, blended, and virtual classrooms. When the literature is examined, it is seen that open and distance learners have problems in course participation and motivation, and gamification applications have been developed to solve this problem. This research is a meta-synthesis study. This research, which is a compilation of qualitative studies, focuses on gamification applications in the field of open and distance learning. Within the scope of the research, qualitative studies published in English and studies in the field of gamification were included. All articles published and indexed in the Web of Science database in gamification between 2011 and 2023 were examined. The Web of Science database was searched using the keywords 'gamification,' 'qualitative analysis,' and 'higher education.' The data will be subjected to content analysis. Methods, applications, and studies used in gamification will be analyzed. Themes and application areas will be revealed. The study will reveal how and how gamification applications are applied to open and distance learning environments. The research will provide ideas for gamification studies and applications to be prepared in open and distance learning.

Keywords: *Gamification, open and distance learning, meta-synthesis, higher education*

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153-Innovating Thesis Student Research Presentation: Videoconferencing as an Alternative Mode

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Abstract

The COVID-19 pandemic necessitated significant changes in education, particularly in the completion of program requirements. With the limitations imposed on physical gatherings and face-to-face interactions, virtual platforms have become essential tools for conducting classes, thesis presentations, and collaborative activities. This paper explores the affordances of a videoconferencing platform in fulfilling a program requirement during those challenging times. In particular, it shall share how a video conferencing platform provided affordances in order for the graduating students of a graduate program to fulfill their final requirement in the time of pandemic. In particular, it aims to examine the specific benefits and opportunities provided by a videoconferencing platform in meeting program requirements, such as research presentations, group projects, and seminars from the perspective of the students. The study shall surface the challenges and potential solutions associated with utilizing a videoconferencing platform to ensure the successful completion of program requirements by analyzing the narratives of the students of the ASEAN 299 Colloquium offered from the Mid-Year Term of Academic Year 2019-2020 until the Second Semester of the Academic Year 2022-2023. The colloquium is the only portion of the program that is conducted face-to-face, thus an opportunity for the students to meet their teachers and classmates in person. It will answer the following questions: Would a videoconferencing afford the same experience that a face-to-face colloquium allows? What are the features and functionalities of the platform that enable effective communication, collaboration, and knowledge sharing among participants between graduating students and the program faculty? And would the students be able to fulfill the requirements on this platform? By focusing on the experience of the ASEAN Studies Graduate Program on the adjustments it made for the program not to be hampered by the difficulties brought about by the pandemic, this paper contributes to the understanding of the effects of Covid-19 period on open and distance learning practices particularly how educational institutions can adapt and leverage digital tools to facilitate the fulfillment of program requirements.

Keywords: *COVID-19 pandemic, video-conferencing platform, innovation*

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165-Learner Support in the Age of Digitalized Higher Education: The Case of the Asean Studies Program

Jean Saludadez¹, Dona Lyn Piamonte²

Abstract

Learner support is an essential component of open and distance education. In this age of digitalized higher education, open universities have shifted to virtual platforms in the delivery of instruction. By shedding light on the affordances of this technology and the learner support it requires, this paper aims to contribute to the understanding of how open and distance education can leverage digital tools to facilitate the fulfillment of program requirements. The ASEAN Studies Graduate Program is a multidisciplinary program whose framework was collaboratively developed by five open universities in the ASEAN region. The ASEAN 299 Colloquium is the final requirement of the Program where the students defend their thesis. This paper will share the experiences of the Program in providing learner support in the conduct of the colloquium using a conferencing platform in order for its graduating students to fulfill their final requirement. What learner support was required for the platform to enable effective communication, collaboration, and knowledge sharing between graduating students and the program faculty? What learner support was required in order for the students to complete the requirements in this type of platform? These questions will be answered within the autoethnographic framework of qualitative research. Autoethnography is a qualitative research methodology which generates knowledge grounded on the researcher's experience. The data in the form of email exchanges between the program and the students of the ASEAN 299 Colloquium offered from the Mid-Year Term of Academic Year 2019-2020 until the Second Semester of the Academic Year 2022-2023 were collected and analyzed thematically. Analysis showed that guidance 1) on the students preparation for their presentation; 2) on the technological requirements including linking students to resources that can be of help in navigating the platform; and 3) on the students time management. The paper shall conclude by addressing the optimum learner support in utilizing a videoconferencing platform to ensure the successful completion of program requirements.

Keywords: *Learner support, conferencing platform, autoethnography*

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173-Revisiting Sri Lanka Easter Attack: Investigating Social Media as a Pedagogical Instrument for Fostering Social Transformation and Mass Enlightenment

Sameera Tilakawardana¹

Abstract

In April 2022, Sri Lanka defaulted on its foreign debt, and subsequently, on July 5 of the same year, the Sri Lankan prime minister officially declared that the nation is bankrupt. While the economic crisis in Sri Lanka was significantly exacerbated by the COVID-19 pandemic, the pre-pandemic sociopolitical instability had already disrupted the influx of foreign currency and created notable macroeconomic vulnerabilities within the nation. These underlying factors can be identified as the primary catalysts that ultimately led to the nation's downfall. Accordingly, the immediate causes of the crisis starts with the drop in local tourism industry and foreign investments as a consequence of the series of coordinated bombings on Easter Sunday 2018, making Sri Lanka an unsafe travel destination for foreigners. The common conception was that the tragedy could have been prevented if the warnings from the international intelligence agencies were taken seriously. But the biggest warning was clearly visible on the online public domain for everyone to see. This paper looks at the causes and consequences of the Easter attack through Social Media (SM) activism. Further, this paper explores SM as a new pedagogical tool to enlighten the masses on democratic performance and sociocultural pluralism by fostering collaborative learning and knowledge construction. This study is a theoretical and textual analysis of SM activism, with emphasis on YouTube. The research examines the ongoing crisis in Sri Lanka as a crucial moment of change. Drawing inspiration from the concept of Habermasian Public Sphere, the paper investigates the potential of SM activism to promote democratic tendencies. Additionally, it explores how SM activism aligns with the Adornonian framework of the Culture Industry complicating its Habermasian intentions. In line with this argument, the research views this phenomenon as a significant aspect of late modernity, as discussed by Stuart Hall, Benedict Anderson and Mahmood Mamdani, within the context of cultural formation, representation, and imagination. Subsequently, the study delves into the subject at a time when digital convergence is more established, conceptualized, and actively shaping the public sphere. It aims to explore the pedagogical potential of SM and investigate the issues and limitations of web 2.0 based platforms in the context of open and distance learning. The study assesses the potential of SM to create a functional learning environment outside the walls of traditional institutionalized educational structure to instigate mass enlightenment and to prompt democratic readiness among the publics.

Keywords: *Social media, pedagogy, democratic readiness, mass enlightenment, social change*

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175-Role of Massive Open Online Courses (MOOC's) in Indian Open Universities: Opportunities and Limitations

Payal Mago¹, Ajay Jaiswal², Deekshant Awasthi³

Abstract

Massive Open Online Courses (MOOC's) are the new and upcoming trend in the field of education. Post the pandemic, it has gained momentum and has changed the field of education. It has diversified learning and has benefitted learners widely. They offer an online platform for delivering high-quality educational information and interactive online learning to people worldwide. Video lectures, readings, quizzes, and forums constitute MOOCs. Many universities collaborate MOOC's where content is created for the relevance of the learners. In this qualitative research, the purpose is to understand the role of MOOC's in Indian Open Setting. It investigates the function of Massive Open Online Courses (MOOCs) specifically in Open Universities. It has drawn a lot of focus as a type of online education that encourages lifelong learning and provides open access to educational resources. MOOCs is recognized for its inclusive and flexible education, to improve their course offerings. To successfully integrate MOOCs into the Indian Open University system, it is essential to grasp their unique opportunities and constraints. In the present study, the role of MOOC's is observed in Indian Setting. Using systematic literature review, using the experiences and opinions of the stakeholders in the field of education this research will explore the role of MOOC's and explore its opportunities for the learners. Using qualitative methods, the data shall be collected using interviews and focus groups discussion to examine how it impacts education in Indian setting and in higher education by encouraging self-paced learning and encouraging the development of digital skills. It also looks at the limitations of MOOCs, including the requirement for strong learner support, reservations about accreditation and certification, and difficulties with technological infrastructure and the digital divide specific to the Indian Setting. The purpose of this study will aid in providing clarity towards the role of MOOCs in Indian Open Universities and aim to fill or reduce the knowledge gaps.

Keywords: MOOCs, open universities, chances, restrictions, Indian setting, qualitative study

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176-Understanding Learners Psychology: A Comparison Between Traditional and Distance Learning in Indian Context

Nupur Gosain¹, Projes Roy², Payal Mago³

Abstract

Psychological factors critically impact a student's ability to learn. In this present research, the aim is bringing comparison between the psychological factors in traditional learning and distance education learning environment. Each of these platforms of education are widely different from each other in the way of delivery, learning environment, student interaction and assistance, engagement etc. While distance learning ensures flexibility for learning and provides an innovative learning environment with the help of technology. On the other hand, a traditional learning environment provides social interaction. The present research aims to understand the difference between each of these platforms on the various parameters of learning including learner motivation, contentment, engagement, and emotional intelligence. It will be observed how these factors differentiate between the two platforms of education. Comparison between these factors will be taken into observation, specific to the Indian Scenario. By examining these factors under investigation, this research aims to gain insights into the psychological experiences of learners that are similar or different from one another, as well as the effect that these experiences have on the outcome of education. Educational stakeholders can better understand the requirements and problems faced by learners in each setting and design effective ways to enhance educational experiences and outcomes if they take into consideration the characteristics listed above and consider how learners are affected by each setting. In this research, a systematic review of existing literature was conducted. A comparative analysis approach has been used to serve the study's objectives. The research information was gathered from a variety of sources, including the internet, research articles etc. By focusing on the psychological components of motivation, contentment, engagement, and emotional intelligence in learners, this research helps to improve knowledge of the psychological dynamics at work in traditional and distance education settings in India. The goal of this research is to provide guidance for educational practices, policies, and interventions that can support students' psychological health and foster successful learning environments in both contexts.

Keywords: *Learners' psychology, traditional education, distance education, comparison, motivation*

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210-Determinants of New Learners' Decision to Enroll in the Master's Degree Program of Entrepreneurial Economics at Sukhothai Thammathirat Open University

Padcharee Phasuk¹, Ronnakron Kitipacharadechatron²

Abstract

Technology disruption is an important cause of the fierce competition in educational services. Following the outbreak of COVID-19, many universities had adopted online teaching as an alternative to classroom meetings which is the primary strength of open universities. This new normal blurred the line between open and regular universities resulting in competition among both categories of universities especially in higher education. The open university should develop teaching and learning management to meet the needs of the students. This research focuses on the means to counter the continuing decline of new learners in higher education by exploring mixed online and offline teaching based on learner demand utilizing the random forest technique to determine the factors affecting the decision of new learners to enroll in the master's degree program of Entrepreneurial Economics at Sukhothai Thammathirat Open University. The data was collected by using a questionnaire from a sample of 400 people who graduated with a bachelor's degree in economics and other related fields from central, northern, northeastern, and southern regions of Thailand with the proportion corresponding to the size of the population in each region. Data were analyzed by descriptive statistics, including frequency, percentage, mean and standard deviation. The determinant for a new learner's decision to enroll in the program was analyzed by employing the machine learning method of random forest. The result indicated that the consulting system on thesis and independent study and the need of new learners to be able to develop business plans are likely to influence the decision to enroll in the master's degree program of Entrepreneurial Economics while the rest has minimal influence. Considering the minimal depth of variables which represents the important determinants of enrollment to the program, Leadership and daring to bring new business opportunities, ability to develop business plans to access funding sources, consulting system on thesis and independent study, the need to be able to develop business plans, the need to be able to design product and packaging, and business ethics and social responsibility are the most important variables for enrollment.

Keywords: *Determinant of enrollment decision, entrepreneurial economics, random forest, open university*

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212-Transformation of Art Learning Through the Tiktok Application Students of the Open University Elementary School Teacher Education Program

Pamela¹, Tatang², Ana³, Nia⁴

Abstract

As a pioneer of distance education in Indonesia, the Open University has a big responsibility in providing learning assistance services adapted to current developments, including utilizing various popular applications to be used as learning resources, for example, the TikTok application. The Open University understands that Higher education is increasingly shifting towards digitization, and the TikTok application has become a popular platform among students that can be used as a learning resource. However, there still needs to be more research explaining the potential of the TikTok application in the context of learning art in the Arts Education course in Elementary Schools, the Elementary School Teacher Education Study Program, especially in the Open University environment. Therefore, this research aims to investigate the transformation of art learning that occurs through the use of the TikTok application in Elementary School Teacher Education students at the Open University. The research method used is qualitative research with a case study approach. Data was collected through interviews, in-depth document analysis, and participatory observation of many Open University Elementary School Teacher Education students who took the Online Tutorial study assistance service using the TikTok application in art learning. Data analysis was performed through a thematic coding process. The study revealed that using the TikTok application in art learning at the Open University resulted in a significant transformation. Based on the results of interviews and the distribution of questionnaires to 354 PGSD students, it was shown that 84.5% of students stated that the TikTok application could increase their creativity, engagement, and learning motivation in learning arts. They can easily share their art with peers and get real-time feedback, encouraging them to keep learning and improving their understanding of the Art Education course in Elementary School. In addition, interaction and collaboration through the TikTok application also allow students to learn from one another and develop a positive learning community. This research provides valuable insight into the potential of the TikTok application as a practical learning tool in the context of art learning for Elementary School Teacher Education students at the Open University. This research implies the need for proper digital technology integration in art learning, primarily through the TikTok application, to enrich student learning experiences and improve future art learning quality. Keywords: Art Learning Transformation, TikTok Application, Elementary School Teacher Education Students

Keywords: *Art learning transformation, TikTok application, elementary school teacher education students*

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215- Investigating the Effectiveness of Blended Learning in EFL Classes at the K-12 Level

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Abstract

Blended learning, combining traditional face-to-face instruction with online learning elements, is a flexible and adaptive solution that caters to the evolving needs of students and educators, especially during the COVID-19 pandemic. The COVID-19 pandemic has significantly impacted the education sector, particularly for K-12 students. In response, many schools and educators have turned to blended learning as a solution. Blended learning allows for seamless transitions between physical and virtual classrooms, fostering engagement, collaboration, and personalized learning experiences while equipping students with necessary digital skills to navigate the modern world. This quantitative study investigates the effectiveness of blended learning in English as a Foreign Language (EFL) classes, in the context of the shift towards blended learning caused by the COVID-19 pandemic. The study was conducted with 41 ninth-grade students from a state high school in Istanbul, Türkiye, who had no prior experience with blended learning. Students were offered diverse learning opportunities through a combination of online instruction and in-person classes. The utilization of the Learning Management System (LMS) facilitated interactive learning activities, access to digital resources, and seamless communication. Additionally, the on-site classes incorporated the rotation model and its corresponding sub-models; station rotation, lab rotation, flipped classroom, and individual rotation. To measure the effectiveness of blended learning environments, the “Effectiveness of Blended Learning Environments Scale” was used. The scale consists of 55 items and four factors: “Face-to-Face Learning Environments,” “Online Learning Environments,” “Blended Learning Environments,” and “Technical Dimensions.” An arithmetic mean and standard deviation analysis of the scale items was conducted to measure the effectiveness of a blended learning environment based on features of face-to-face and online environments. The results provide insights into the potential of blended learning to enhance student learning outcomes in EFL classes. These findings suggest that blended learning can be an effective solution for educators and students looking to adapt to the changing landscape of education.

Keywords: COVID-19, blended learning, K-12, blended language learning, the rotation model

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217-Embracing Metaverse Technology With Game Principles for Online Learning and Practice: A Preliminary Study

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Abstract

The issue of dropping out or not wanting to continue studying is a common problem in open universities. These problems have led to the development of metaverse courses, which are able to support online education. In particular, the metaverse helps create more interesting lessons in which learners will recognize their usefulness, convenience to use, and ease of understanding. With the principles of gaming, the metaverse lessons can encourage learners to have the desire to learn online by themselves. It is very important to make learners continually learn by themselves. The rules of learning and activity in metaverse lessons are created to resemble those of a successful game. Making an experience for students is similar to playing a game through interactive activities. It functions to support learning and promote self-learning. Additionally, the learners will get rewards and constructive feedback for further learning progress. Teachers recognize the value of using metaverse to support the creation of virtual lessons. Instructions and study stages are included in the classes so that students can choose their own learning routes and make their own judgments. The students can monitor their own learning progress. Moreover, the teacher can monitor the students' academic development at exactly the same time in order to maintain close communication and encouragement. Not only can metaverse technology encourage learners to have a desire for self-development, but it also increases interaction from collaborative learning through well-designed and step-by-step lessons. It was also found that by using metaverse technology, learners could learn along with peers through competitions to reach the goals of each topic. By doing so, success in learning happened as a result of learners being automatically rewarded and willing to learn. However, the development of the metaverse to support online practical learning should be supported by planning the development of metaverse lessons for subjects that can hardly be understood in two dimensions. It seems that the 3-dimensional virtual environment of metaverse possibly helps students visualize the lessons through an educational institution's learning management system.

Keywords: *Metaverse technology, game principles, online learning and practice*

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222-Effect of Cross-Disciplinary Courses in Promoting Multiple Perspectives to Lifelong Learners

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Abstract

Lifelong learning encompasses a wide variety of learning modalities, including pursuing higher education to obtain degrees or qualifications, as well as engaging in informal learning through work-related training, self-study utilizing online resources, and more. As a result, the outcomes achieved through lifelong learning are also diverse. The Open University of Japan, based on open and distance learning, plays a significant role in facilitating lifelong learning. We offer a wide range of opportunities for lifelong learning through undergraduate and graduate courses, as well as qualifications, delivered via online, broadcast, and face-to-face classes at study centers. In addition, a variety of courses is offered to cater to the needs of lifelong learners. One such type of course focuses on enabling individuals to acquire specialized knowledge and skills. Numerous courses are already available in this category, and they are actively pursued by a substantial number of students. While these types of learning are indeed necessary, it is also highly beneficial to explore a broader array of academic disciplines. Learning about diverse fields of study may provide fresh motivation for learning, enable individuals to perceive things from multiple perspectives, and enhance their understanding of the interconnectedness among various disciplines. To engage in lifelong learning and sustain it over time, it is helpful to find new interests and maintain curiosity. Therefore, it is worth considering offering courses that delve into a single theme from multiple disciplines, as they may provide such learning opportunities. Following this concept, several courses have been offered. Here, I will introduce a course where experts from various disciplines, including natural science, psychology, communication, clothing, art, and urban design, provide explanations and insights into the topic of “color”. Based on the course content and student feedback from a similar course’s evaluation, I will discuss the effect of this course in promoting multiple perspectives and other benefits for students.

Keywords: *Lifelong learning, interdiscipline, open and distance learning*

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223-A Critical Analysis of Up Open University Learning Platforms' Usability Status and Innovation Requirements in the Age of Artificial Intelligence

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Abstract

The University of the Philippines Open University (UPOU) has been at the forefront of online education since the mid-2000s, conducting all its classes in a fully online format. UPOU employs two major learning platforms, primarily based on Moodle, to cater to its diverse range of programs. MyPortal serves as the platform for formal degree programs, while MODeL facilitates massive open online courses (MOOCs). As educational technology continues to evolve rapidly, it is of utmost importance to analyze the perspectives of various stakeholders, including students and teachers, regarding these learning platforms and effectively address the resulting challenges. Therefore, this paper undertakes a comprehensive investigation of two crucial aspects of these platforms: usability and innovation. The study begins by evaluating the usability status of MyPortal and MODeL to determine how end-users discern them and identify areas for improvement. This is accomplished by employing two tools: the System Usability Survey (SUS) and a general feedback mechanism that gathers users' experiences with the platforms. Furthermore, this study delves into the end-users' expectations for innovation in the context of artificial intelligence (AI). With AI gaining prominence and widespread adoption, there is a growing interest in leveraging this technology in the field of education. Hence, the study employs two additional tools: the General Attitude Toward AI (GATA) questionnaire and an AI in Education questionnaire. These instruments provide an understanding of their perceived requirements for innovative solutions. The data collected from the four aforementioned tools are then analyzed using data mining and machine learning algorithms, which the author of this study has specifically designed. This approach ensures that the insights obtained from the data are collated and transformed into valuable insights into the needs of various stakeholders. Ultimately, this study discusses the implications of the findings for UPOU and offers recommendations that can guide policymakers in enhancing the learning platforms of UPOU and other educational institutions.

Keywords: *Artificial intelligence, usability, innovation, learning platforms*

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229-The Impact of Interaction on Achieving Intended Learning Outcomes in an Online Teaching-Learning Context

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Abstract

Interaction is a core element of the best practices in online education. It becomes a more crucial factor when teaching and learning a language online. According to Jheengut, interaction is a kind of action that occurs between two or more ‘objects’ where the action creates an impact. He further states that the effectiveness of an online course depends upon a high level of interactivity in the learning process. The Open University of Sri Lanka had been offering “Sinhala as a Second National Language” course for Tamil medium students in blended mode but due to the Covid pandemic, the course was converted into fully- online, keeping the same Intended Learning Outcomes (ILOs). This study aims at examining how learner-teacher interactions and learner-learner interactions affect achieving ILOs of “Sinhala as a Second National Language” in an online teaching-learning context. The data were collected through questionnaires, in-depth interviews, and participatory observations. The study employed a qualitative and quantitative research design. The data were analyzed thematically and quantified when they were presented. The findings show that, during the synchronous learning sessions, learner-learner interactions were less than teacher-learner interactions but during asynchronous learning times, learner-learner interactions were higher than teacher-learner interactions. Twenty-four percent (24%) of the research sample mentioned that they often contacted the teacher when they wanted any clarifications, instead of contacting their peers because they believed that the teacher provides the best guidance and the teacher corrects the language errors and mistakes made by them. The findings also revealed that the students often used Sinhala which was their target language when they interacted with the teacher but they used Tamil which was their first language when they interacted with peers. But that practice does not help to achieve the ILOs of the course. Therefore the study recommends that the learners should be motivated to use Sinhala language when interacting with others, for achieving the ILOs of the course. Moreover, the study revealed that keeping learner-learner interactions and teacher-learner interactions in an online context is challenging. Hence, the teacher and the instructional designers should take measures to enhance the interactions in the teaching-learning environment. Though the Covid pandemic is over, and no restrictions to conducting the course in blended mode currently, the course is still offered in an online context. Therefore, the findings of this research help to enhance the quality of the course for the upcoming batches.

Keywords: *Interaction, intended learning outcomes, online learning*

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234-Automated Evaluation and Feedback of Pre-Service Mathematics Teachers' Problem Posing Skills: A Comparative Study of Generative AI and Human Expert Analysis

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Abstract

Advances in the realm of education have been made feasible with the development of generative artificial intelligence (AI) tools, particularly in the evaluation of problem-posing skills. This research explores the practical application of one such AI tool, the chatGPT-4 model, to evaluate the problem posing skills of pre-service mathematics teachers. The research involved a cohort of 30 pre-service mathematics education teachers, who were engaged in a series of structured problem posing activities. The problems created by these participants were subjected to a dual-method evaluation process. The first method involved an automatic evaluation by the chatGPT-4 model, while the second method was a manual assessment conducted by a seasoned expert in the field of mathematics education. Both methods of evaluation were based on a scoring rubric that had been rigorously examined and validated by field experts to ensure validity and reliability. This study's main goal was to determine whether there was a relationship between the manual evaluations performed by the human expert and the automatic evaluations conducted by the generative AI. The findings were enlightening and indicated a significant high correlation between the two evaluation techniques. This finding suggests that generative AI tools, such as chatGPT-4, can effectively mimic human evaluators in assessing problem posing skills, thereby offering a promising avenue for automated assessment in education. Beyond the evaluation of problem posing skills, the study also delved into the impact of feedback provided by the generative AI on the participants. The findings from this aspect of the study were equally insightful. The AI-provided feedback was found to contribute to a more advanced and holistic perspective in the problem posing process for the participants. This suggests that generative AI tools can not only evaluate but also enhance the problem posing skills of pre-service mathematics teachers, providing them with valuable insights and guidance. The current research provides valuable insights into the potential uses of generative AI tools in the field of mathematics education, particularly in the context of problem posing. It emphasizes that AI may enhance educational evaluation and feedback processes, advancing current methods of instruction in this regard. The results of this study are particularly applicable in the context of online learning, where the integration of AI can greatly improve the experience of both teaching and learning.

Keywords: *Generative artificial intelligence, pre-service mathematics teachers, problem posing skills, online education, educational assessment and feedback*

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237-Student Assessment in Distance and Online Learning System: Experiences of Graduate Students

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Abstract

The purpose of this study was to explore the experiences of distance learners about the student assessment system in distance and online learning system. For this purpose, a phenomenological research method was employed to conduct the study. The sample of study consisted of 11 graduate students enrolled in the distance and online education program for at least 2 semesters. The data were collected through semi-structured interviews about their experiences with the student assessment system employed in their programs. The data were analyzed through constant comparison analysis. For this purpose, open, axial and selective coding was used. Themes emerged after data analysis included the purpose of assessment tasks, nature of assessment tasks, quality and quantity of feedback, study approach to prepare for assessment tasks, and their overall satisfaction with the student assessment system. The results of the study stated that the students received oral feedback most of the time however they preferred written and frequent feedback on their assessment tasks. There were a variety of assessment tasks in their programs but they found those assessment tasks more useful where they received immediate feedback and applied their learning in some practical situation. They assessed their work before submitting it to their teacher for grading. The assessment tasks were mostly based on what they were studying in their courses but the classroom discussion helped them to get a detailed insight of the topic and the classroom presentations helped them to improve their learning. The timings of the feedback were very important as suggested by one student that if feedback is provided in time then it is more useful for us because we can improve our learning for the upcoming tasks. The students were strategic in their study approach most of the time while preparing for the assessment tasks depending upon a number of factors. The study recommended the use of authentic assessment tasks for assessing student learning and more frequent use of written feedback for the work of the students.

Keywords: *Student assessment; authentic assessment; formative assessment; distance and online learning*

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240-Teaching Legal Education in the Open and Distance Learning in Sri Lanka: A Critical Inquiry Into the Pedagogical Practices

Janaka Selvaras¹, Kathirgamathamby²

Abstract

Having a century old history, Open and Distance Learning involves its unique different teaching pedagogies and those pedagogies have been evolved till date. Similarly, legal education being one of oldest professional education in the world has its own traditional teaching pedagogies from its inception. The traditional teaching pedagogies predominantly used in legal education have been a subject for moot with its positive and negative impacts and it has created a call for revisiting the teaching pedagogies of legal education at the present educational environment to include the constant developments in teaching pedagogies. In this context, teaching legal education in Open and Distance Learning poses a question on the teaching pedagogies involved; whether teaching pedagogies of Open and Distance Learning in legal education or traditional teaching pedagogies employed in the Legal Education is dominant and how the traditional teaching pedagogies employed in the legal education are placed in the Open and Distance Learning. Against this background this paper aims to investigate the above mentioned interesting questions in order to learn the present teaching pedagogies of legal education in Open and Distance Learning in general and with special focus to Sri Lanka and to examine the blended usage of teaching pedagogies of both Open and Distance Learning and traditional Legal Education in general mode. In the light of this investigation, the research intends to critically discuss the teaching pedagogies used to deliver legal education and Open and Distance Learning highlighting its good and adverse practices with the purpose of recommending a way forward to enhance the usage of teaching pedagogies. To carry out this investigation the research adopts qualitative research methods including doctrinal, interpretive and analytical. In addition to this, to propose the way forward this research intends to employ a comparative analysis with an examination on the jurisdictions of India and the United Kingdom as they have progressive systems of legal education in general and Open and Distance Learning. Also it is expected the outcomes of comparison with Indian jurisdiction would be pragmatically approachable by Sri Lanka. The rest of the paper will document the analysis and findings arising from the mentioned research questions to reach a conclusion with recommendations.

Keywords: *Legal education, open and distance learning, Sri Lanka, teaching pedagogies*

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296-Challenges of Employing ODL Teaching Methods Into Law Teaching: A Case Study of the Open University of Sri Lanka

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Abstract

In general, teaching law is a challenging task and it would be more challenging and a rigorous exercise in Open and Distance Learning (ODL) mode due to many reasons. The ODL mode associates with a limited number of face-to-face teaching, course material-based studies and the use of online teaching and learning platforms such as MOODLE. On the contrary, law teaching in conventional universities is highly dependent upon extensive face-to-face teaching, in class activities and mooted and debating engagements. Further, the inherent theoretical nature of law discipline warrants longer discussions and activities in teaching to impart students the knowledge of real-world application of law. In this context, offering a Bachelor of Laws Degree (LLB) in an ODL setting and achieving the prime objectives of law teaching, producing a quality law graduate have always been challenges for the Department of Legal Studies of the Open University of Sri Lanka (OUSL). Thus, the main objective of this research is to analyze the challenges of employing ODL teaching methods into law teaching while appraising the novel and innovative ways and means adopted by the Department of Legal Studies of the OUSL in tackling such challenges. This research is structured upon critically analyzing the use of three important ODL teaching methods such as course materials, Day Schools and MOODLE while offering the law degree by the Department of Legal Studies. The authors adopt a mixed methodology which comprises a qualitative approach and a quantitative approach based on a survey in this research. The selected sample of the research is based on final year students of the LLB Degree Programme of the Open University of Sri Lanka. The research argues that the optimum use of ODL teaching methods would also have a versatile impact in teaching law and achieving the intended outcomes of legal education similar to the conventional law teaching universities.

Keywords: *Law teaching, ODL, Open University of Sri Lanka, teaching methods*

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302-Unlocking Language Proficiency: Harnessing the Potential of AI for Language Learners

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Abstract

This paper explores the integration of artificial intelligence (AI) tools to revolutionize English language learning in third world settings. It highlights the benefits of AI technologies in supporting the acquisition and mastery of English language skills, providing learners with personalized and adaptive learning experiences. In the realm of language learning, AI tools have paved the way for innovative approaches. Intelligent language tutors, such as chatbots, offer interactive and immersive practice, allowing learners to engage in conversational English within a supportive environment. For instance, popular language learning app Duolingo utilizes AI algorithms to deliver adaptive exercises and real-time feedback tailored to learners' proficiency levels. AI-powered speech recognition and pronunciation assessment tools, including Babbel and Rosetta Stone, assist learners in refining their oral skills by offering instantaneous feedback on pronunciation accuracy. These tools enable learners to hone their English pronunciation and develop natural speaking abilities. Additionally, AI-based language learning platforms like Lingvist and Memrise leverage machine learning algorithms to analyze learners' progress, identify knowledge gaps, and provide targeted vocabulary and grammar exercises. These platforms offer personalized learning paths and adaptive content, enabling learners to focus on specific areas requiring further development. The integration of AI tools in English language teaching and learning empowers learners in Anglophone settings, providing them with personalized instruction, interactive practice, and immediate feedback. From conversational practice with chatbots to pronunciation assessment and adaptive content delivery, AI technologies offer a diverse range of activities. By harnessing the power of AI, learners can effectively acquire and master the English language, fostering a transformative language learning experience. This abstract will provide a comprehensive examination and analysis of the potential of AI in English language learning, shedding light on its transformative impact on enhancing learners' proficiency and facilitating their transformative journey towards language fluency, particularly in resource-stricken contexts where access to traditional language learning resources and opportunities may be limited.

Keywords: *Artificial intelligence, foreign language learning, English language acquisition, blended and online teaching and learning*

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307-Using Machine Learning Classification for an Early Warning System of E-Learning Students at Open University

Purwoningsih¹

Abstract

Online higher education continues to grow rapidly in today's digital age. Universitas Terbuka is a university in Indonesia that implements higher and distance education facing challenges in ensuring student success and retention. To improve the online learning experience and identify students at risk of learning difficulties, this study aims to develop an early warning system using machine learning techniques to classify e-learning students at the Open University. This early warning system is designed to provide early warning to students who have the potential to experience academic difficulties or difficulties in online learning. In this study, log data from the Open University's Learning Management System platform was used. The data includes information on student participation, interaction with learning platforms, exam results, and demographic factors. The respondents in this study were students of the Faculty of Teacher Training and Education who took the Environmental Education course in 2022/2023. The initial stage of this research involves descriptive analysis and exploration of analytical data to understand the profile of e-learning students at the Open University. Next, we applied machine learning techniques, including decision trees, naïve Bayes, and k-nearest neighbors, to build classification models that could identify behavior patterns and characteristics of students who could potentially have difficulty learning. The classification model is evaluated using accuracy, precision, recall, and F1-score metrics. The results of this study provide insight into student behavior patterns related to the level of engagement, progress, and success in online learning. The implementation of this machine learning-based early warning system is expected to assist the Open University in identifying at-risk students and providing timely interventions to improve their retention and academic success. With this system in place, the Open University can take proactive measures to provide the necessary support to students facing difficulties in online learning. The research also has far-reaching implications for other higher education institutions that provide online learning. By combining data analysis and machine learning, higher education institutions can develop effective strategies for classifying students and implement early warning systems to improve the online learning experience and student success.

Keywords: *Classification, e-learning, exploratory data analysis, machine learning, early warning system.*

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322-The Stakeholders' Perception of the Learning Outcomes of the Master of Nursing Science Program in Community Nurse Practitioner, School of Nursing, Stou Thailand

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Abstract

The Stakeholders' perception of the Learning Outcomes of the Master of Nursing Science Program in Community Nurse Practitioner, School of Nursing, STOU Thailand This study is a survey research aimed to study about opinions on admission system and teaching & learning activities of the master of nursing science program in community nurse practitioner at school of nursing, Sukhothai Thammathirat Open University. The researcher also focused on the students' learning outcome by the perception of the stakeholders. Data were collected from the 2 groups of the stakeholders as 20 colleagues and 12 bosses of the graduated students. The closed-ended and opened-ended questionnaires were used to collect data. The research results found that samples were two groups of stakeholders, the average age was 41.35 years old, minimum age was 28, and maximum age was 47. The highest educational level was master degree (61.94%). Most of the samples worked in the northeastern area (67.52%), and worked in both the health promotion hospital and the community hospital, 46.02% and 39.82%, respectively. After completing the program for 1 year, the stakeholders perceived that the graduated nursing students provided better health care in the community on health promotion and disease prevention with the applying higher knowledge at the most level (mean = 4.58). The samples presented nurse practitioner skills included history taking, health assessment, differential diagnosis and intervention, as well as drug administration to the clients in a good level (mean = 4.50). The perceptions about having knowledge and capability in communication and information management were in a good level (mean = 4.43). The results showed that the samples had opinions on the program and teaching-learning activities in a good level and the graduated students could apply knowledge to practice very well. Also, the master of nursing science program in community nurse practitioner should add more topics about professional law related to nurse practitioner, emerging disease, national drug use, global health, and alternative medicine should be included in the program.

Keywords: Perception, learning outcomes, community nurse practitioner, stakeholders

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344-How Open are the Open Universities

Cengiz Hakan Aydın¹

Abstract

The goal of this presentation is to reveal the results of a study in which the extent of openness in the open universities of the World was investigated. Openness in open universities refers to the philosophy and approach of providing accessible and flexible higher education to individuals regardless of their background, location, age, or prior academic experience. Open universities operate on the principle of open access, which means that anyone who meets the basic admission requirements can enroll in courses and programs without traditional academic barriers such as minimum grade point average, prior academic experience, or residency requirements. Open universities also emphasize open learning, which means that students have the flexibility to study at their own pace and in their own time, often with the help of online learning resources and technologies. In addition, open universities often offer open content, which refers to the free and open availability of educational resources and materials to anyone with an internet connection. These resources can include textbooks, course materials, and other learning resources that are openly licensed and available for use and reuse by anyone. A group of PhD students in the Distance Education Doctorate Program at Anadolu University along with their advisor, myself, have first worked on the definition and dimensions of openness and come up with 4 major dimensions and a list of performance indicators for each dimension based on extensive literature. The dimensions are entitled as flexibility, social justice, lifelong learning and transparency. Later these dimensions and the performance indicators were used to rate 17 open universities of the world. These universities are the National Open University of Nigeria, UNINETTUNO, Athabasca University, Western Governors University (WGU), UNED, Open University of Japan (OUJ), Arab Open University, Fern Universitat, Penn State World Campus, the Open University, Indira Gandhi National University, Payame Noor University, Hong Kong Metropolitan University (HKMU), Universitas Terbuka (UT), University of South Africa, Universitat Oberta de Catalunya, Sukhothai Thammathirat Open University (STOU). This paper proposes to present these findings as well as recommendations for the open universities.

Keywords: *Openness, flexibility, social justice, lifelong learning, transparency, open universities*

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351-Online Assisted Remote Practical Session in Conducting Biology Experiments During the Covid 19 Pandemic

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Abstract

This paper discusses how an Online Assisted Remote Practical Session (OARPS) was conducted in a Plant Physiology, level four course in the Bachelor of Science degree programme of the Open University of Sri Lanka. Traditionally this course conducted its practical component as a five-day onsite laboratory session. Due to the difficulty of physical gathering imposed by COVID 19 pandemic, it was decided to conduct one day's experiments at home with online assistance. In selecting the experiments for OARPS, it was carefully considered the suitability of experiments to be conducted in remote locations, access to resources by the learners, and achievement of learning outcomes. Thus, it was decided to conduct a set of eight selected experiments remotely by the learners at home, assisted online by the teachers through ZOOM. Unlike in the conventional mode, students had to do the preparation of materials and flow charts for each experiment prior to this session. The day's activities were conducted with 1) an introduction, 2) practical demonstration by teachers, 3) checking and providing feedback to pre-prepared flow charts and materials of experiments, using breakout rooms in ZOOM. Afterward, 4) learners conducted the experiments under the observation of teachers online, with 5) a discussion about the practical at the end. Same schedule was repeated in the morning and afternoon sessions, with a lunch break. Finally learners had to submit the practical reports online within a week. The research design employed a mixed approach of quantitative and qualitative methods, by administering a questionnaire among all learners, followed up with an interview with a random group of learners. Results indicated learners' active engagement in organizing the experiments, identifying alternative ways to conduct experiments, learner autonomy and creativity in conducting the experiments, and learners' engagement in inquiry learning. Moreover, they indicated maintaining of a lab corner at home with this novel experience. Learners also commented on the drawbacks in relation to connectivity issues in online sessions, expensive nature of some materials, uncondusive home environment, lack of peer support and team work as at the university. In conclusion, learners successfully engaged in biology scientific experiments at home with live instructional support through OARPS, and can be extended even after the pandemic with a careful review of reducing the drawbacks.

Keywords: *Remote learning, COVID 19 pandemic, distance learning of science, biology experiments, online assisted learning*

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355-Using AI in Open Education

Cengiz Hakan Aydın¹, Damla Muştu Yıldız², Yusuf Yıldırım³, Ayşegül Şahin⁴, Özlem Oktay⁵, Emre Ev Çimen⁶

Abstract

Artificial Intelligence (AI) has been one of the main topics not only in education but in all fields and aspects of human life. AI can be defined in different ways, including as a machine, a way of thinking, or even a replacement artifact of humans. According to a more realistic definition, AI refers to a system that can learn, make decisions, and take actions in previously encountered or never been faced situations. Open.ai and its tool GPT should be considered as a milestone in AI implementations because before the open.ai initiative a big majority of the research and implementations were not open to the public and open.ai helped anyone interested in developing AI based tools access it easily. Using AI in educational processes has been around for some time. A systematic review published in 2019 has shown the 17 implementation ways categorized into four groups: (1) Profiling and prediction, (2) assessment and evaluation, (3) adaptive systems and personalization, and (4) intelligent tutoring systems. Based on these implementations, a group of doctoral students examined how to integrate AI implementations into open universities. This panel proposal intends to reveal the results of this examination. In other words, each panelist will first summarize a literature review concerning one AI implementation in education, then elaborate an AI implementation model to solve the one or more problems of open universities. The panel will focus on recommendations about how to provide personalized feedback to the students to improve their learning right after the exams; to predict the at-risk students in terms of drop-out and recommend actions to increase their retention ratio; to offer adaptive learning opportunities for the students from vulnerable groups; and, to create a recommendations system for teacher training. The panelist will provide prescriptive recommendations on these topics to the open and distance learning providers.

Keywords: *Artificial intelligence, profiling and prediction, assessment and evaluation, adaptive systems and personalization, intelligent tutoring systems*

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363-Sway as a Tool for the Dissemination of a Project: The EMLT AI Case

Figen Ünal Çolak¹, Serap Şişman Uğur², Tugay Yılmaz³

Abstract

The Education-Work Conflict Resolution Proposal using Artificial Intelligence Algorithms (EMLT AI) project is an internationally partnered project, carried out by Anadolu University, European Union Affairs, and Turkish National Agency. The main goal of the project is to draw a career map for young people to employ their owners and to get help from artificial intelligence in this regard. Employing artificial intelligence in the project, it is aimed to match young people with the most appropriate field related to their own education based on their biographies, to obtain a career map for them, and to accumulate jobs in order to consume the young people more. In addition to developing an artificial intelligence algorithm, the project also has research and dissemination dimensions. One of the dissemination objectives of the project is to prepare bulletins in cooperation with national and international stakeholders. The bulletins can be diversified in various formats, printed and digitally. Sway, which is the application offered to users for the production of interactive reports, personal stories, presentations, etc. of Microsoft Office, can also be used to create e-Bulletin. The application, which has built-in design groups, works in the cloud system and offers collaborative working opportunities. The application is also suitable for platform-independent use. For Sway, for which the distribution usage decision is made regarding this usage and the specified features, the users will be determined and the bulletin preparation process will be planned regardless of time and place. In the research; bulletins to be prepared with project parts; Preparation processes, usage experiences, user opinions, and opinions on the contribution and sustainability of impression bulletins to project promotion and archiving operations will be evaluated. Research results; It is expected to provide an example for project teams, public and private institutions, and organizations on how cloud system promotion applications can be used in the communication and promotion process purposes.

Keywords: *Sway, e-bulletin, Microsoft Office tool, project dissemination*

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369-Evaluation of Online Proctoring Manager Training

Cengiz Hakan Aydın¹, Tim Brueggemann², Dairo Assante³, Serpil Koçdar⁴, Sonja Intveen⁵, Olga Zubikova⁶, Mesut Aydemir⁷, Patriks Morevs⁸

Abstract

The ongoing digital transformation as well as the current debate on equity and accessibility of higher education revealed the relevance of online assessment and of Online Proctoring as a flexible solution for taking a fair online supervised exam from anywhere and anytime by means of a specialized proctoring software. Admittedly, Online Proctoring is not widely used yet at Europe's higher education institutions due to many reasons, such as missing legal framework, low awareness of relevant stakeholders or lack of professionals capable of implementing and coordinating Online Proctoring services at their organizations. To support digital transition at Europe's HEIs and their strategies towards offering education for all, the Erasmus project "Online Proctoring Manager – further education program for supporting digital transformation at HEIs (PROWIDE)" was carried out aiming at promotion of Online Proctoring services through creating and testing an innovative training program Online Proctoring Manager including developing an associated qualification profile. The project ended just recently (June 30, 2023). The Fachhochschule des Mittelstands (FHM) - University of Applied Sciences from Germany was the coordinator HEI while UNINETTUNO from Italy, University of Liepaja from Latvia and Anadolu University from Türkiye were the partner HEIs. The partnership also included a for-profit sector representative, Proctorio GmbH from Germany. After developing the profile of online proctoring manager role and competencies, the partnership collaboratively developed an international online training targeting to help participants acquire these competencies. Fthe piloting, the online guided study mode was employed to get better insight from the participants and the teachers about the effectiveness, efficiency, engagement, and sustainability of the training. During the piloting phase that lasted from October 17, 2022 to March 5, 2023, one or two trained teachers from each PROWIDE country took the facilitator role and supported the participants' learning progress in their countries. The facilitators communicated with the participants in local languages. At the end of the training all the participants asked to fill out an online evaluation form. This form and a focus group interview session conducted with the participation of the facilitators helped the partnership to evaluate the training. The goal of this paper is to reveal the results of the evaluation study of the Online Proctoring Manager Training. It also provides an insight about the curriculum development process as well as objectives, content, instructional and assessment strategies employed in the training. The evaluation is as indicated above based on the End of Training Evaluation Form and the focus group with the facilitators. So both quantitative and qualitative data were used to get a better understanding about the participants and facilitators' experiences about the effectiveness, efficiency, appeal and sustainability of the online training. The results have shown a great satisfaction and perceived learning with the course as well as the learning resources and activities. On the other, the length and the assessment strategy of the training were the aspects criticized by the participants. This paper might grab the attention of those who are interested in online assessment and exam proctoring as well as those who are willing to learn collaborative online training design and implementation in international settings.

Keywords: *Online proctoring, online assessment, e-assessment*

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386-PDSA Model and NICs Approach for School Leaders Towards Equity and Inclusion: A Case Study of AIOU Pakistan

Zahid Majeed¹, Zia Ul-Qayyum², Nasir Mahmood³

Abstract

Schools play a critical role in promoting inclusion by creating a welcoming and supportive environment for all students, regardless of their backgrounds, abilities, or identities. School leaders can play a critical role in driving positive change in schools. They have the power to shape the educational experiences of students and create a learning environment that supports the growth and development of all the students including differently abled children. Allama Iqbal Open University, Pakistan is working on a project “Networked Improvement Communities for School Leaders Towards Equity and Inclusion” utilises an innovative approach (PDSA) with school leaders to bring about sustainable improvements in school practices which address inequalities in student access and learning. It builds on the value of ‘bottom up’ change characterized by decentralized and participatory structures. The project works with partners in three countries in South Asia - Afghanistan, Pakistan and Nepal, over a two- and half-year period, July 2021- September 2023. The ambition in this project is that school leaders work collaboratively in professional communities known as Networked Improvement Communities (NICs), on small experiments to tackle ‘micro problems’ of inclusion. These specific issues for collective exploration and action are decided by each NIC to ensure local relevance of the micro problem. NIC members analyze the selected ‘micro problem’ and use PDSA cycles (Plan, Do, Study, Act) to enact and evaluate data-driven small changes. Through this activity school leaders are able to increase their agency and capabilities to bring about continuous improvement in education equity. In the project’s school leaders are supported by local experts and resources from an open course, accessed through a blended mode. The course developed by the AIOU and partners helped the schools’ leaders to solve their issues and problems on their own. They first identify their issues then plan, do, study and act accordingly. The results/findings of the PDSA are amazing that they have their own number of models which not only helped themselves but the other schools too. On the successful implementation of PDSA model and NICs approached Govt institutions, private institutions, organizations, NGOs are willing to adopt this model and approach in their educational institutions.

Keywords: *NICs, School Leaders, Inclusion, PDSA Model*

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387-Exploring Postgraduate Students' Perspectives Towards Zoom-Based Online Teaching in M.ed Degree Programmes

F. M. Nawastheen¹, K. Ketheeswaran²

Abstract

This study investigates the perspectives of postgraduate students regarding Zoom-based online teaching in M.Ed degree programmes, a form of instruction that has gained popularity in response to the COVID-19 pandemic and the subsequent shift to remote learning. The research aimed to examine students' perceptions regarding the overall quality of instruction, affordability, and effectiveness of assessment methods, as well as challenges and opportunities related to access. Data was collected from 189 postgraduate students enrolled in Master of Education and Master of Education in Special Needs Education programmes, encompassing Sinhala, Tamil, and English mediums in the Open University of Sri Lanka. A mixed-methods approach was utilized, employing closed-ended questions, Likert-type scale items, and open-ended questions to gather data, which was subsequently analyzed using descriptive statistics with a focus on frequency and percentage distributions. The findings indicate that the majority of postgraduate students perceive Zoom-based instruction as effective and positive in terms of quality. However, certain areas for improvement were identified, particularly related to extended sessions with the same teachers, which students often found monotonous. They recommended reducing the duration of these sessions to enhance their effectiveness. Concerning affordability, although students expressed satisfaction with the convenience of online learning from home, many considered the cost of internet access, smartphones, and laptops to be prohibitively high, posing financial challenges. Likewise, most students expressed satisfaction with the assessment practices employed in Zoom-based online teaching. They specifically appreciated activities such as breakout rooms, quizzes, and discussions using chat options, as these facilitated engagement and satisfaction with the assessment process. However, access-related challenges were identified, including inadequate internet coverage and connectivity issues, even in urban areas. Students also voiced concerns about the lack of learning resources, underscoring the need for improved availability. This study contributes valuable insights into postgraduate students' perspectives on Zoom-based online teaching in M.Ed degree programmes. The findings highlight both positive aspects and areas that require attention and improvement, such as optimizing session duration, addressing affordability concerns, and enhancing access to resources. Addressing these aspects can enhance the overall quality of instruction, affordability, assessment practices, and access to Zoom-based online teaching, thereby improving the learning experience for postgraduate students in M.Ed programmes. Future research should consider evaluating undergraduate programmes and other institutions' programmes to comprehensively assess learners' satisfaction levels in Zoom-based teaching and assessment.

Keywords: *Postgraduate students, online teaching, zoom-based online teaching, student's perspectives*

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389-Integration of Innovative Pedagogy in Online Learning

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Abstract

Online learning platform allows educational institutions to upload and deliver learning materials online to students. Learning materials, such as texts, presentations, videos, or audio, can be accessed by students anytime and anywhere. This function allows students to study independently and adjust their learning rhythm according to their individual needs and preferences. The e-learning platform also provides interactive features that allow students to interact and collaborate with fellow students and lecturers. This survey research aims to determine student responses to the integration of innovative pedagogy in the Moodle e-learning platform at the Open University. The survey involved 435 students from 40 branch offices of the Open University. Data was collected through a questionnaire using Google Form. The survey instrument was designed to find out student responses to various forms of innovative pedagogy which include immediate feedback for essay assignments, plagiarism checking, learning materials with automatic grading, course suggestions based on student profiles, and grade predictions based on scores and student participation. Respondents were asked to provide answers in the form of a Likert scale (1-10) and open-ended questions. The results showed that the majority of respondents gave positive responses to all the features presented. This positive response indicates that the integration of innovative pedagogy in e-learning platforms has the potential to enhance students' learning experience and academic performance. These findings provide valuable insights for the future development of distance education, with a focus on leveraging innovative pedagogies to provide better benefits in self-directed learning. Respondents gave positive responses to the design of innovative pedagogy features that will be integrated into e-learning, such as providing quick feedback, plagiarism checking, automatic grading, course suggestions, and grade prediction. The positive responses given by students show that the integration of innovative pedagogy in e-learning has great potential in enhancing the independent learning experience. In the context of distance education which tends to require learning independence, the integration of innovative pedagogy in e-learning is an effective solution for optimizing student learning experiences. These AI features provide benefits in the form of fast feedback, support in avoiding plagiarism, objective automatic grading, relevant course suggestions, and accurate grade predictions. This can increase the motivation and quality of student learning. Nonetheless, the results of the study also indicated that there were some negative responses given by the respondents. Although relatively few, these negative responses still need attention for further development and improvement.

Keywords: *Innovative pedagogy, online learning, H5P*

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392-Edutech Based New Learning Contents Definition and Classification of Korea National Open University

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Abstract

A learning model based on a new type of learning content based on edutech is being proposed. In particular, content that can utilize real-world technology must be built on a new form of learning model. And it evolves from the traditional learning model as a learning device for learners to continue. New learning content classification standards and ranges that apply this transformation must be reestablished. A new learning model for new learning contents can increase the use of edutech and increase learners' motivation and learning achievement. Therefore, edutech based learner classification and redefinition are absolutely necessary. In this study, new learning contents based on edutech are defined as learning contents that combine and exchange with teaching research using lithium technology such as realistic media. And, it defines the difference between traditional learning content and current KNOU learning, learning content delivery system, and learning device. Finally, the relationship between KNOU department and edutech-based new learning content is defined, and based on the relationship suitable for learners' rights, a plan for introducing edutech-based new learning content is presented. First, learner groups were analyzed by dividing them into three groups: the younger age group, the middle age group, and the elderly group. Finally, learners defined new learning contents based on edutech by dividing them into active participant types, passive participant types, and observer types. Learner centered edutech based new learning contents are media advancement area, future learning area, the traditional lecture area, area of advanced teaching and learning methods divided into media advancement area, future learning area, the traditional lecture area. In each area of advanced teaching and learning method, edutech suitable for each area is applied and customized for learners. In this part, new learning contents based on mathematical edutech for major subjects of each department were defined. And, we propose an introduction roadmap for examples.

Keywords: *Edutech, learner centered edutech based new learning contents, learner classification*

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401-Rethinking Distance Education: Towards an Innovative Future for Universities?

Cathia Papi¹

Abstract

In the field of education, the term openness encompasses a number of meanings (Bozkurt et al., 2023); therefore, the theme of this conference on open universities is rather broad. In order to narrow down the topic, remaining within the framework of this short communication, we have chosen to focus on openness in distance learning universities. Although it has existed for hundreds of years (Daniel, 2021), distance learning has continued to evolve with technological developments, enabling knowledge transmission and distance communication. Thus, for decades, correspondence courses based on paper manuals and epistolary communications have gradually been enhanced by various technologies that were considered new when they were first released (disc, cassette, CD-ROM, etc.). Then, with the advent of the Internet, paper gradually gave way to a digital wave, with online courses and multiplication of the means of communication, leading to consideration of the existence of different eras of distance education (Anderson and Dron, 2010). Although it began over twenty years ago, the transition to digital remains an occasional challenge for institutions that have anchored their production scheme to the printed course model (Papi, 2016). While universities that traditionally offered face-to-face courses have developed their distance education offering, using digital technology since the 2000s, and the pandemic has recently reinforced this development, to what extent are distance learning universities still relevant? We propose to reflect on this question by exploring the evolution of distance education in general (Glikman, 2021) as well as by taking a specific look at the case of Université TÉLUQ. The latter is indeed interesting in the sense that this university is fifty years old and that it is the only French-language distance learning university in North America. We see that, despite ever-increasing online course offerings in other universities (Bates et al., 2017), student enrolment has not diminished. Thus, in the short term, distance learning universities appear to be just as significantly relevant, as evidenced by the support provided to all schools and universities by Université TÉLUQ during the pandemic. The University created the J'enseigne à distance (I teach at a distance) training programme as well as welcoming new registrants throughout the year, which is made possible by its flexible enrolment model. In the medium term, the future of distance learning universities also seems assured as they are accustomed to welcoming people from diverse backgrounds and likely require less adaptation than campus universities to meet different needs. The long-term outlook is, however, less certain. As the future depends greatly on developments in both distance learning

Keywords: *Open universities, distance education, online courses*

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409-Learning Analytics Dashboards in Action: An Empirical Study of Anadolu-LAD

Aylin Ozturk¹, Alper Tolga Kumtepe²

Abstract

This study investigated the effects of Anadolu Learning Analytics Dashboard (Anadolu-LAD) usage on learner engagement and performance in an open and online learning system. The Anadolu-LAD is a tailored learning analytics dashboard designed for learners enrolled in degree-programs at Anadolu University. It provides learner-centric information, including summaries of learning behaviors, learning material access, examination scores, and feedback messages. Anadolu-LAD empowers learners to monitor their individual progress and gauge their performance in relation to their peers, thereby fostering a holistic understanding of their learning journey. In this study, feedback messages provided by the system were designed utilizing the ARCS-V (Attention, Relevance, Confidence, Satisfaction, and Volition) motivational design model. An experimental study was conducted to determine the effects of Anadolu-LAD on learner engagement and performance in an online course. Learners were randomly assigned to experimental and control groups during the study. There were 13,377 learners in the experimental group and 13,376 learners in the control group. Learners in the experimental group were provided with access to Anadolu-LAD, while learners in the control group were not. The Anadolu-LAD was used over a period of 17 weeks. The independent samples t-test was used to investigate whether there was a statistically significant difference between experimental and control groups in terms of the number of sessions, number of days they logged in, access to learning materials, and grade. The analyses revealed that the experimental group had significantly higher average values for the number of sessions opened, number of days logged in, average access to learning materials, and grade than the control group. A total of 78 text messages, one video message, and six short messages were sent to learners via the Anadolu-LAD. An insightful examination of learners' material interactions after receiving messages revealed intriguing patterns. The materials most frequently accessed after messages were textbooks, previous exam questions, chapter summaries, and synchronous lecture video recordings. Notably, this observable change in learners' interaction with textbooks, particularly after receiving messages, deviated from their customary material usage patterns. This pivotal observation prompts further inquiry into the latent influence of feedback messages on learners' learning behaviors, beckoning future research endeavors to delve deeper into this intriguing phenomenon.

Keywords: *Learning analytics dashboard, learner engagement, learning behaviors, motivational feedback messages, open and distance learning*

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410-Using Machine Learning Algorithms to Predict Learner Success in Open end Distance Learning

Gamze Tuna Büyükköse¹, Alper Tolga Kumtepe²

Abstract

Concurrently with advances in technology, there have been significant developments and diversifications in systems and platforms within open and distance learning environments. These platforms offer the ability to comprehensively monitor students' learning processes, track progress, record user interactions, provide immediate feedback, and analyze student behavior in detail throughout the entire learning continuum. The use of learning analytics and artificial intelligence methodologies, especially in ODL environments, allows for a multifaceted examination of data related to the learning processes. In open and distance learning institutions, there has been an increase in data-driven studies aiming to improve learning processes. A significant area of these studies is the prediction of student success based on academic performance measures such as students' participation in online learning environments, exam scores, or course pass/fail status. Predicting students' academic performance has significant potential in the development of early warning and recommendation systems by enabling the early identification of students at academic risk. The primary purpose of this research study is to predict the academic performance of learners in open and distance learning based on their interactions in the e-learning environment. The study is based on data procured from students enrolled in Anadolu University Open Education System and using Anadolu eKampus Learning Management System (LMS). Within the scope of the study, various data sources such as students' exam results and grade records were used. Additionally, data pertaining to user sessions, course interactions, and content engagement activities within the LMS were diligently collected and analyzed. The research was executed with a substantial sample size, comprising 54,815 learners who participated in a course offered in the ODL system. Machine learning and deep learning algorithms were used in this study, aiming to predict the pass or failure of learners in the course. To predict academic performance, analyses of parameters such as the number of sessions, session duration, number of activities, and activity duration were performed using RapidMiner Studio 10.1 software.

Keywords: *Open and distance learning, machine learning algorithms, predictive analytics, predicting student success*

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413-An Evaluation of the Managerial Context for Digital Transformation in the Context of Open Education in Higher Education

Serap Uğur¹, Gökhan Deniz Dinçer², Didem Paşaoğlu Baş³

Abstract

Developments in technology lead to changes in many areas that touch people in daily life. Education is one of the areas affected by this change, which occurs in a wide range of areas from health to commerce, from citizenship applications to smart cities. In the 21st century, distance education activities, which are carried out with the mission of providing equality of opportunity in education and providing learners with the opportunity to learn independent of time and space, especially in higher education institutions, stand out as the services that benefit from technology at the highest level and therefore are most affected by technological developments. Looking at the literature, it is possible to find different studies on the digital transformation processes of higher education institutions. Open and distance learning services, which provide opportunities for individuals to access information and develop themselves in their fields of interest, are constantly updated with the developments in information and communication technologies and reach their stakeholders. The rapid digital transformation with the technologies that are used in different processes for different tasks in universities has also affected distance education services. Unlike the formal system, technologies that are used in different dimensions from registration to graduation and beyond for the learner in distance education, from the opening of the program to the content of the program for the instructors in the system, from interaction to measurement and evaluation, ensure that management processes are carried out effectively and efficiently. In this research, which is modeled as a case study, one of the qualitative research methods, the researchers, who have worked for more than 20 years in a higher education institution that has been providing distance education services for more than 40 years, will collect data through semi-structured interviews by interviewing academics with at least 20 years of experience in this field. Case studies The research strategy of case study is used in many situations to contribute to our knowledge about individual, group, organizational, social, political and events. Case studies are frequently used in the social sciences and humanities and in the planning of social structures. In case studies, instead of reaching generalization by making inferences, the emphasis is on the design to study what is most accurately understood from the situation. In case studies, there are stages such as collecting information, organizing the information obtained, and reaching research findings through interpretation. In this study, the researchers plan a systematic study that will interview experts on formal and informal distance education processes, create data triangulation, and ensure internal and external validity and reliability.

Keywords: Open education, higher education, digital transformation

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Panels

PANEL

Topic: Artificial Intelligence in Open Distance eLearning

Session Chair and Moderator: Prof. Melinda dP Bandalaria, Chancellor, University of the Philippines Open University

Main Speaker: Dr. Martin Dougiamas, Founder and Head of Research, Moodle

Discussants:

- Dr. Roberto B. Figueroa, Deputy Director, Center for Open and Digital Teaching and Learning, University of the Philippines Open University
- Kamran Mir, Assistant Director IT, Allama Iqbal Open University, Pakistan
- Dr. Don Hinkelman, Research & Development Officer, Moodle Association of Japan

Session Description:

A presentation and conversation with the Moodle developer and Moodle experts on AI in open distance elearning (ODEL); how the academics see the future of AI in education; and possible initiatives and useful ways by which AI can enrich and make inclusive the online learning ecosystem.

PANEL

Topic: The Digital Era - Women Leaders' Role in Moving Open Universities Forward

Session Chair and Moderator: Prof. Lily Chan, Chief Executive & Vice-Chancellor, Wawasan Open University

Discussants:

- Prof. Melinda Bandalaria, Chancellor, University of the Philippines Open University (UPOU)
- Prof. Asha Kanwar, President & CEO, Commonwealth of Learning
- Prof. Ir. Tian Belawati; Former Rector, Universitas Terbuka Indonesia

Session Description:

This is a panel discussion that explores the pivotal role of women leaders in propelling open universities into the digital era. Focusing on their contributions and impact, the panel examines successful strategies for inclusive and accessible education, student engagement, and fostering diversity in online learning environments. It addresses the challenges women leaders face, such as gender biases and work-life balance, and emphasizes the importance of mentorship and networking. By showcasing achievements and sharing practical advice, the panel inspires future generations of women to drive transformative change, advancing gender equality and fostering innovative open education systems in the digital age.



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Presenters: Maria Mashkeeva, Denis Zholobov

Company: Constructor



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PROCEEDINGS BOOK

Workshops

WORKSHOP

90m Workshop/Masterclass: Pedagogic Video Design Principles

Jack Koumi¹

Origin of the Workshop

Based on the workshop facilitator's Course, Scriptwriting for Effective Instructional Video, for the University of the Philippines OU. In that Course, two Lessons prepare students for their final Scriptwriting Project:

Lesson 1's six videos analyse 42 video clips (from existing instructional videos) that exemplify **34 Potent Pedagogic Roles/Techniques**, through which video can achieve **learning objectives** more effectively than other media:

| 1. Facilitate COGNITION | 2. Provide EXPERIENCES, otherwise inaccessible | 3. Nurture AFFECT | 4. Show SKILLS |
|--|---|---|--|
| <ul style="list-style-type: none"> 1 composite images 2 animated diagrams 3 visual representation
analogy, metaphor 4 illustrating concepts 5 modelling 6 juxtaposition 7 condensing time 8 audio-track reinforce 9 narrative power | <ul style="list-style-type: none"> 1 movement 2 viewpoints 3 places 4 3D 5 slow/fast motion 6 people/animals interact 7 chronological sequence 8 resource material 9 rare events 10 staged events | <ul style="list-style-type: none"> 1 galvanize / spur 2 motivate a strategy 3 appetite to learn 4 change attitudes 5 alleviate isolation 6 reassure, self-efficacy 7 authentic abstractions 8 sense of importance | <ul style="list-style-type: none"> 1 manual/craft 2 agility 3 reasoning 4 interpersonal 5 expressive /linguistic 6 studying 7 technical |

The workshop starts with a brief taste of these Roles/Techniques, but fuller coverage will be for Lesson 2, where a further six videos analyse 39 clips that illustrate **32 Pedagogic Video Design Principles**:

¹ Online Professor, University of the Philippines OU

| | |
|--|---|
| <p>1. HOOK (a. capture b. retain interest)</p> <p>a Shock / surprise / delight</p> <p>b Suspense, entertain, engross / appetise</p> | <p>5. SENSITISE</p> <p>a Priming</p> <p>b Reassure / build confidence</p> <p>c Personalise the teacher</p> <p>d Music style & timing by design</p> <p>e Consistent style</p> |
| <p>2. SIGNPOST (what's coming)</p> <p>a Set the scene</p> <p>b Signpost: what's coming later</p> <p>c Chapter Heading: what's next?</p> <p>d Heads-up: what to look out for</p> | <p>6. ELUCIDATE</p> <p>a Vary tempo to indicate syntax</p> <p>b Enhance legibility/audibility</p> <p>c Maximise Cognitive Clarity</p> <p>d Control pace, depth, breadth</p> |
| <p>3. STIMULATE COGNITIVE ENGAGEMENT</p> <p>a Pose questions</p> <p>b Encourage prediction</p> <p>c Students' personal relevance</p> | <p>7. REINFORCE</p> <p>a Repetition (with a new angle)</p> <p>b Re-exemplify</p> <p>c Words-image synergy</p> <p>d Compare / Contrast</p> <p>e Key-Word Text</p> |
| <p>4. ENABLE CONSTRUCTIVE LEARNING</p> <p>a Words NOT DUPLICATING pictures</p> <p>b Analogy and Metaphor</p> <p>c Scaffold construction of knowledge</p> <p>d Let students see the context</p> <p>e Concretise / Activate their knowledge</p> <p>f Pause commentary for contemplation</p> | <p>8. CONSOLIDATE</p> <p>a Recapitulate</p> <p>b Summarise key features</p> <p>c Integrate associated materials</p> |

Now that video is “easy” to produce, there is a proliferation of teaching/learning videos, but little attention is paid to whether video is the most appropriate medium to achieve the professed objectives (the focus of Lesson 1’s distinctive video Roles/Techniques) – and MORE IMPORTANTLY very little attention is paid to Pedagogic Video Design Principles that are necessary to achieve the learning potential of the above Roles/Techniques. **These are the 32 Principles, in the above 8 categories.**

How the Workshop will be Conducted

Following the brief taste of Lesson 1, the workshop facilitator will play a selection of the six videos in Lesson 2 of the UPOU Course and stop after each video to ask and answer questions, and to initiate discussion – mimicking the interactivity in the UPOU Course.

The content cannot be presented in detail within 90 minutes; however, a Handout will summarise missing details.

Objectives

Workshop Participants will be able to implement design principles to achieve the pedagogic potential of video.

References

The UPOU Course, and the derived workshop above, update the central content of the author’s book, *Designing Video and Multimedia for Open and Flexible Learning*, Routledge 2006/9.



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