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Dear TOJDE Readers,

Welcome to Volume 25 Issue 4 of TOJDE

There are 15 articles and a book review in October 2024 issue of TOJDE. 43 authors from 9 different countries contributed to the issue. These countries are Australia, Azerbaijan, Hungary, Indonesia, Malaysia, Morocco, Pakistan, South Africa and Turkiye.

Younes-Aziz BACHIRI, Hicham MOUNCIF, Belaid BOUIKHALENE and Radoine HAMZAOUI are the authors of the first article. INTEGRATING AI-BASED SPEECH RECOGNITION TECHNOLOGY TO ENHANCE READING ASSESSMENTS WITHIN MOROCCO'S TaRL PROGRAM is the title. The purpose of this study is to evaluate the effectiveness of an automated speech recognition tool compared to traditional paper-based assessments in improving reading skills among 100 Moroccan first to third-graders. Results show that students receiving the AI-enabled speech recognition assessments demonstrated significant gains in reading achievement compared to peers assessed via traditional methods.

The title of the 2nd article is ELECTRONIC ASSESSMENT ANXIETY SCALE: DEVELOPMENT, VALIDITY AND RELIABILITY. The authors are Osman TAT and Abdullah Faruk KILIC. The main goal of this study is to develop a Likert-type scale capable of measuring anxiety related to technical issues, social isolation, and the test interface experienced in e-assessment contexts. As a result of the study, a two-factor scale structure comprising 21 items measuring social and technical anxiety was developed.

The 3rd article, EXPLORING ONLINE LEARNERS' PERSPECTIVES IN RELATION TO PROCTORED EXAMS, is written by Mesut AYDEMIR, Erdem ERDOGDU and Hasan UCAR. This study targets to investigate the opinions and perceptions of the online and distance learners regarding to online proctored exams. The findings indicate that while online and distance learners are satisfied with the online proctored exams as they are secure, convenient, accessible, and reliable. They are also dissatisfied because of the technical problems and surveillance. Implications and future research suggestions are discussed in the study.

THE INVIGILATOR APP AND SOME VUCA ELEMENTS IT TRIGGERS IN STUDENTS AND LECTURERS DURING ONLINE EXAMINATIONS: A CASE STUDY OF AN ENGLISH STUDIES MODULE AT UNISA is the title of the 4th article, and the authors are Chaka CHAKA and Thembeka SHANGE. This study reports on the experiences students registered for a first-year, undergraduate English Studies module and English Studies lecturers had with the Invigilator app during an online examination in the first semester of 2023. The findings indicate that lecturers and students struggled with the Invigilator app as an e-proctoring tool. Future research should focus on other less-invasive and better AI-proof assessment methods of maintaining academic integrity in online assessments.

Koon Tatt TAN, Josephine Ie Lyn CHAN, Prakash V. ARUMUGAM and Heng Wei LEE are the authors of the 5th article titled CLOSING THE TALENT GAP: A PROPOSED MICRO-CREDENTIAL MODEL IN MALAYSIAN FORMAL EDUCATION. The purpose of this study is to explore the potential of a proposed micro-credential model for formal education via the Accreditation of Prior Experiential Learning Micro-credentials (APEL.M), to support the talent gap challenges faced by companies in Malaysia. The findings indicate that despite potential challenges and issues towards implementing the new micro-credential model, the proposed model is significant for policymakers, higher education providers, and industry stakeholders interested in addressing the talent gap and creating alternative pathways to formal academic qualifications.

The title of the 6th article is INTRINSIC MOTIVATION OF DISTANCE LEARNERS IN HIGHER EDUCATION INSTITUTIONS. Hakan KILINC and Nil GOKSEL are the authors. The aim of this study is to analyze the intrinsic motivation levels of students who get distance education from higher education institutions concerning factors including age, gender, employment, and educational status. The findings of the study have a guiding nature for the administrators working in higher education institutions.

ADAPTATION OF STUDENTS' ACCEPTANCE OF ONLINE LEARNING SCALE INTO TURKISH: VALIDITY AND RELIABILITY STUDY is the 7th article. Muhammet Ibrahim AKYUREK and Ali BATTAL are the authors. The purpose of this study is to adopt the acceptance of online learning scale into Turkish culture which was developed to determine students' acceptance of online learning. The adapted scale can be used by researchers and educators to detect the acceptance of online learning at different intervals.

The authors of the 8th article are Ozden CANDEMIR and Berrin OZKANAL. The title is AN EXAMINATION OF PERCEPTIONS REGARDING ONLINE STUDENT COMMUNITIES: A METAPHORICAL ANALYSIS FOR LEARNERS AND GRADUATES OF OPEN EDUCATION SYSTEMS. The aim of this study is to determine the metaphorical ideas held by learners/graduates who engage in online student communities within the Anadolu University Open and Distance Education System, specifically with the concept of "online student communities". According the study, the participants have positive views on acquiring information, building social connections, facilitating communication and interaction with other students and alumni, as well as personal enjoyment and benefits.

Eva MARKUS, Dorothee LEHR-BALLO and Bernadett SVRAKA are the authors of the 9th article. The title of this article is DIGITAL LEARNING SUPPORT ELEMENTS IN THE ONLINE TEACHING OF GERMAN AS A FOREIGN LANGUAGE. The goal of the study is to identify the problems that teachers faced in the transition to online teaching during the period of distance learning introduced due to the COVID pandemic in 2020 and since; the forms of support teachers received nationwide; and the measure of success in their work as language teachers. As a result, the authors examine whether teachers are still willing to use online learning support tools when returning to face-to-face teaching.

The 10th article which is authored by Nur W. RAHAYU, Agung Nugroho ADI, Ridi FERDIANA and Sri Suning KUSUMAWARDANI is titled NONLINEAR LEARNING PATH: A SYSTEMATIC REVIEW. This study aims to map out various nonlinear learning paths and explore the potential for personalization within these environments. The findings highlight the importance of promoting nonlinear learning paths in both classrooms and MOOCs, developing learning path recommender systems, and creating supportive MOOC learning materials.

BIBLIOMETRIC ANALYSIS OF SOCIAL MEDIA STUDIES WITHIN EDUCATIONAL RESEARCH is the 11th article. The authors are Murat ARTSIN, Zehra LUY, Funda BAKIRCI, Sercin KARATAS, Neslihan YONDEMIR CALISKAN and Melis SANLI. This study aims to outline the trends in the use of social media platforms by analyzing them within educational research published between 2017-2023. The findings of this study are believed to guide practitioners and researchers in their practice and consideration of social media within educational environments.

The 12th article, PAPERLESS ASSIGNMENTS AND CHALLENGES INVOLVED: VOICE OF DISTANCE LEARNERS, is authored by Muhammad Haseeb UL HASSAN and Zafar IQBAL. This study is planned to explore the challenges faced by distance learners during paperless assignment process. According to study students suggest that textbooks should be revised and delivered in time, connectivity issues should be resolved, free internet packages should be introduced, LMS training should be conducted, in time feedback in descriptive form by instructors must be provided to the distance learners.

Mesut KURULGAN is the author of the 13th article titled A BIBLIOMETRIC ANALYSIS OF RESEARCH ON DROPOUT IN OPEN AND DISTANCE LEARNING. The purpose of this study is to examine research on school dropout in open and distance education in the Web of Science (WoS) database using bibliometric analysis and to reveal trends in this area. In line with this goal, a total of 1,615 studies published between 1980 and 2022 were identified in the Web of Science (WoS) indexes. The results based on the data are discussed in the article.

The 14th article, titled UP-CLOSE AND SOCIAL RISKS IN DISTANCE HIGHER EDUCATION: A QUALITATIVE ANALYSIS OF EMERGENCY REMOTE TEACHING EXPERIENCES, is authored by Hasan TUTAR and Harun SERPIL. This study aims to examine the problem areas of distance education

experienced with Covid-19 by using an interdisciplinary approach in a psychological, sociological, and socio-psychological framework. The results reflect that education is not only an activity of acquiring knowledge but also a socialization process, the educational bureaucracy and environment make a significant contribution to the socialization of students, and that distance education can only be used as a supportive model. According to authors, education isolated from real life that does not contribute to the socialization processes of students may bring important psychological and social problems.

I Putu Indra KUSUMA, Ni Luh Putu Eka Sulistya DEWI and A.A. Gede Yudha PARAMARTHA are the authors of the 15th article. The title of this article is INFORMAL DIGITAL LEARNING OF ENGLISH TO SUPPORT A FORMAL SPEAKING COURSE: EFL PRESERVICE TEACHERS' PERCEPTIONS AND IMPLEMENTATION IDEAS. This study aims at exploring how English as a foreign language preservice teacher who has no teaching experience perceived Informal Digital Learning of English and their perceived Informal Digital Learning of English implementation ideas for their future students' out-of-class activities to support formal classroom instruction. Two implications for English educators and teacher education programs are highlighted in this article: changing teachers' mindsets towards English as a foreign language learning and the insertion of Informal Digital Learning of English as a topic into pedagogy courses.

There is a book review in this issue. ONLINE POSTGRADUATE EDUCATION:RE-IMAGINING OPENNESS, DISTANCE AND INTERACTION is the title of the book. This is an editorial book, and the editors are Katharine STAPLEFORD and Kyungmee LEE. The reviewer is Rangga Alif FARESTA

Hope to meet you in the next issue of TOJDE.

Cordially,

Dr. T. Volkan YUZER

Editor in Chief

INTEGRATING AI-BASED SPEECH RECOGNITION TECHNOLOGY TO ENHANCE READING ASSESSMENTS WITHIN MOROCCO'S TaRL PROGRAM

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ABSTRACT

This study examined the integration of artificial intelligence-powered speech recognition technology within early reading assessments in Morocco's Teaching at the Right Level (TaRL) program. The purpose was to evaluate the effectiveness of an automated speech recognition tool compared to traditional paper-based assessments in improving reading skills among 100 Moroccan first to third-graders. The mixed-method approach combined pre-post standardized reading tests with qualitative feedback. Results showed students receiving the AI-enabled speech recognition assessments demonstrated significant gains in reading achievement compared to peers assessed via traditional methods. Qualitative findings revealed benefits of instant feedback and enhanced engagement provided by the speech recognition tool. This study contributes timely empirical evidence on adopting learning technologies, specifically AI-driven automated speech assessment instruments, to enhance foundational literacy development within under-resourced education systems implementing student-centered pedagogical techniques like TaRL. It provides valuable insights and guidance for integrating innovative speech analysis tools within localized teaching and learning frameworks to strengthen early reading instruction and monitoring.

Keywords: Artificial intelligence, automatic speech recognition, reading assessment, Teaching at the Right Level (TaRL), Moroccan education system, e-learning.

INTRODUCTION

The rapid shift to a digital environment in the world has been markedly accelerated by the global response to the COVID-19 pandemic. In Morocco, this transition was epitomized by the Ministry of National Education, Preschool, and Sports (MEN)'s decision to suspend face-to-face classes across all teaching cycles starting March 16, 2020, as a containment strategy against the virus's spread (Berdi, Sebbar, & Hadri, 2021). This abrupt move to digital learning platforms reflects a significant pivot in educational strategies, underscoring the increasing reliance on technology-driven solutions in crises. Furthermore, the World Bank underscores the substantial impact of such closures, estimating a decrease in effective learning time and a 2% reduction in average annual learning rates due to the three-month school closures and subsequent economic shocks (Azevedo, Hasan, Goldemberg, Iqbal, & Geven, 2020). These figures highlight the profound implications of the pandemic on educational systems worldwide, prompting a reevaluation of digital learning's role and effectiveness in sustaining education during unprecedented times.

The anticipated beginning of the 2022-2023 school year marked a tentative return to normalcy for pupils in Morocco. With the easing of pandemic restrictions, over eight million students, guided by more than 290,000 teachers, resumed their education in physical classrooms. This return was not just a reinstatement of pre-pandemic conditions but was accompanied by a new roadmap for educational reform spanning from 2022 to 2026. The aftermath of the pandemic has left an indelible mark on student achievement, exacerbating pre-existing educational disparities, and necessitating robust pedagogical strategies to bridge these gaps (Y. Bachiri & Mouncif, 2020).

In response, the Moroccan educational system has introduced structured activities designed to reinforce subject mastery and adjust to the new normal. For instance, dedicated reading sessions in Arabic and French, along with mathematics exercises, are aimed at strengthening comprehension and numerical skills. Additionally, motor activities incorporating a variety of physical exercises such as calisthenics and agility drills are allocated twenty minutes thrice a week. These initiatives are a testament to the holistic approach adopted by the Teaching at the Right Level (TaRL) methodology, which emphasizes needs-based and targeted educational interventions. This strategic pedagogical shift is scheduled for implementation in 250 primary schools, with an ambitious goal of impacting one million beneficiaries by the 2024-2025 school year (Hantati, 2022).

Despite these efforts, conventional means of assessing reading skills—predominantly paper-based—have revealed significant shortcomings in terms of efficiency and accuracy. Consequently, there has been an increasing shift towards leveraging technology-based tools, such as automatic speech recognition (ASR), to enhance the precision and effectiveness of reading assessments (Aldarmaki, Ullah, Ram, & Zaki, 2022). The proliferation of K-12 Massive Open Online Courses (MOOCs) in Morocco in the post-pandemic era further accentuates the trend towards embracing digital solutions to bridge educational divides and promote continuous learning (Y.-A. Bachiri, Mouncif, & Bouikhalene, 2023; Guggemos, Moser, & Seufert, 2022).

This study, therefore, aims to investigate the effectiveness of an AI-based ASR tool in the reading assessment of K-12 students within the Moroccan education system, employing the TaRL methodology. It seeks to understand how such technology can potentially revolutionize the assessment process, ensuring robust development of foundational skills before students' progress to more advanced levels. This research is positioned to address a critical gap in understanding the integration of AI and ASR tools into existing pedagogical frameworks, particularly within the context of developing countries' educational systems.

The structure of this article is designed to provide a comprehensive understanding of the research conducted. The literature review section explores the TaRL methodology and the role of ASR tools in education. The methodology section details the design and data collection processes employed in the study, leading to a presentation of findings, which includes a comparative analysis of AI-based and traditional reading assessments. The discussion section offers interpretations of these findings in the context of educational policy and practice, and the conclusion summarizes the study's contributions, limitations, and suggests avenues for future research.

LITERATURE REVIEW

The transformative potential of technology in education, particularly through the integration of Artificial Intelligence (AI) and Automatic Speech Recognition (ASR) technologies, has been a focal point of scholarly interest for decades. Albudoor & Pe (2022) have highlighted the promise these technologies hold in enhancing the precision and efficiency of reading assessments for K-12 students. Yet, the application of AI and ASR in diverse educational contexts, particularly in developing countries, remains inadequately explored, prompting the need for further research in this area.

In evaluating reading comprehension, tools such as the Comprehensive Test of Phonological Processing, 2nd Edition (CTOPP-2), have been widely used in K-12 public schools. The study by Dickens, Meisinger, & Tarar (2015) underscores its significance, especially for dual language learners. However, research by Shergill, Camozzi, O'Malley, & Ortiz (2023)points to a lack of metric and scaler invariance in CTOPP-2 for diverse language groups, suggesting a gap where AI and ASR could offer more nuanced assessment capabilities.

Zhai et al. (2021) conducted a content analysis to understand AI's application in education, uncovering research trends and challenges from 2010 to 2020. This analysis revealed a gap in practical implementations of AI in classroom settings, especially in non-western educational contexts. Complementing this, Tahiru (2021) examined both the benefits and drawbacks of AI in education, identifying a significant research void in AI's practical, classroom-based applications in less developed countries.

Y. Bachiri & Mouncif (2022) explored AI's capacity to generate evaluation questions from video transcripts, demonstrating AI's potential in creating interactive educational environments. However, these innovations have not been extensively tested in diverse educational settings, such as reading assessments. Additionally, Hannah, Kim, & Jang (2022) investigated the accuracy of ASR systems across various tasks and linguistic backgrounds, revealing a need for more in-depth understanding of ASR technology's application in multilingual educational environments.

Research on AI in second language learning, such as by Gkountara & Prasad (2022) and Geckin (2023)'s study on robot-assisted language learning, highlights AI's potential. However, these studies focus more on language learning than reading comprehension and assessment, indicating a research gap in this specific area.

The Teaching at the Right Level (TaRL) approach, as examined in studies by Lakhsman (2019), Fitriani (2022), and Meishanti & Fitri (2022), has shown effectiveness in improving literacy skills. Nonetheless, these studies did not incorporate advanced technologies like AI and ASR in their methodologies, suggesting an area ripe for exploration.

This literature review identifies a clear research gap: the limited application and evaluation of AI and ASR technologies in reading assessments within the context of TaRL in developing countries, such as Morocco. This study aims to address this gap by investigating the efficacy of AI-based ASR reading assessments in enhancing reading proficiency among Moroccan primary school students. It seeks to expand the current understanding of AI and ASR's applications in education, particularly in under-resourced and multilingual settings, thereby contributing to the broader dialogue on primary education policy and practice in Morocco and similar contexts.

PURPOSE OF THE STUDY

The purpose of this study was to investigate the efficacy of utilizing an AI-powered automated speech recognition tool for assessing reading skills within Morocco's Teaching at the Right Level (TaRL) program for early literacy development. Prior research has examined ASR for evaluation purposes and the implementation of TaRL in developing countries. However, the integration and impacts of ASR-based reading assessments within TaRL programs specifically have not been extensively explored.

This study addressed critical gaps in understanding by examining two key research questions:

RQ1: How does the reading proficiency of Moroccan students assessed using an ASR tool compared to those assessed using traditional paper-based methods?

RQ2: What are teacher and student perceptions regarding usability and acceptability of the ASR reading assessment approach?

Investigating these questions provides timely empirical insights on leveraging ASR technologies to improve fundamental literacy instruction and monitoring through localized teaching models like TaRL. The study has significant implications for early reading skills development in under-resourced schools.

ASSESSMENT

Key Strategies in Educational Assessment

In the Teaching at the Right Level (TaRL) framework, assessment is not merely a tool for measurement but a fundamental component that guides the instructional strategy and enhances the educational trajectory for each child. This section delineates the utilization of assessment information, outlines the criteria and structure for assessment, and details the methods for conducting evaluations, supported by the interactions of TaRL actors as visualized in Figure 1.

Figure 1. Key Strategies in Educational Assessment

the description of a systematic approach to educational assessment might be articulated as follows:

Data-Driven Action

Educational practitioners promptly leverage assessment data to stratify students into groups of homogeneous learning levels. This strategic grouping facilitates targeted instructional design and intervention, optimizing learning outcomes for each proficiency tier.

Objective-Driven Assessment Design

The assessment instrument is meticulously crafted, reflecting ambitious yet attainable learning objectives stipulated by educational strategists. These objectives are clearly communicated and universally understood within the educational ecosystem, ensuring all stakeholders are aligned in their educational pursuits. The instrument not only measures but also guides progress toward these articulated goals.

Fundamental Skills Evaluation

The assessment methodology prioritizes foundational skills, thereby reaffirming their critical importance to the broader educational community. By focusing on essential competencies, the tool underscores and promotes the acquisition of foundational knowledge as a cornerstone of educational development.

Individualized Assessment Techniques

Employing oral, one-on-one assessment techniques allows educators to forge a direct connection with the learning trajectories of individual students. This personalized approach facilitates a nuanced understanding of each student's learning needs and progress, thereby enhancing the motivation of both students and educators as improvement is observed and measured.

Continuous Learning Monitoring

Frequent and systematic evaluations are integral to this approach, ensuring sustained focus on enhancing student learning outcomes. Regular assessments provide a dynamic framework for monitoring progress and identifying areas needing intervention, thereby supporting continuous academic growth.

Data Synthesis and Strategic Analysis

Data collected from individual and group assessments are aggregated and subjected to rigorous analysis by implementation teams. This analysis informs strategic support and resource allocation to schools and educators, particularly those demonstrating acute need. Through this cyclical process of assessment, analysis, and intervention, educational strategies are continually refined and targeted for maximum effectiveness.

In integrating these strategies, educators and administrators create a responsive and dynamic environment conducive to student learning and achievement. This approach reflects a commitment to data-informed, learner-centered, and goal-oriented education.

TaRL's approach to assessment is proactive, utilizing immediate test results to stratify students into skill-similar groups. This dynamic classification allows educators to customize instruction and resources to meet the individual and collective needs of students effectively. The process is underpinned by educational objectives that are ambitious yet attainable, ensuring that all stakeholders are aligned towards achieving measurable and meaningful educational outcomes. The design and implementation of these objectives are continually informed and refined through the ongoing application of assessment results, ensuring that instructional strategies remain responsive to the evolving needs of students.

Foundational Principles of TaRL Assessment

The TaRL assessment framework is predicated on a set of core principles that ensure the validity, utility, and efficacy of the evaluation process:

Reachable Learning Objectives

Recognizing the diverse ability levels across the student population, TaRL assessments are designed around realistic learning targets. These targets are thoughtfully calibrated to challenge students appropriately based on what the majority can realistically achieve at various stages of their educational journey.

Simplicity and Speed

In order to maximize teaching time and minimize assessment fatigue, TaRL assessment tools are designed to be straightforward and quick to administer. This principle ensures that educators can efficiently assess students' abilities and promptly apply insights to instruction.

Contextual Reality

The assessment content is carefully selected to resonate with the students' experiences and environments. This contextual alignment is crucial in maintaining focus on genuine reading skills and comprehension, ensuring that assessments accurately reflect students' capabilities and learning needs.

Structure of Reading Assessment

The TaRL reading assessment is a multi-level process designed to comprehensively evaluate students' reading capabilities:

1. *Basic Level:* Assessing the ability to recognize letters, laying the foundation for further reading skills development.
2. *Letter Reading Level:* Evaluating the proficiency in recognizing and articulating letters, an essential step in the journey towards literacy.
3. *Word Reading Level:* Determining the ability to read and comprehend individual words, a critical skill for sentence construction and understanding.
4. *Sentence and Paragraph Level:* Assessing the capacity to read and understand simple sentences and paragraphs, marking an advanced stage of reading proficiency.
5. *Story Reading Level:* Evaluating the ability to read, understand, and critically engage with stories, including the capacity to answer comprehension questions that assess deeper understanding of the text.

Description of the Assessment Tool

Each level is systematically integrated into the assessment tool, as illustrated in Figure 2: Reading Assessment Parts. The tool includes a series of components, each increasing in linguistic and cognitive complexity, designed to evaluate the student's proficiency and comprehension at each stage effectively.

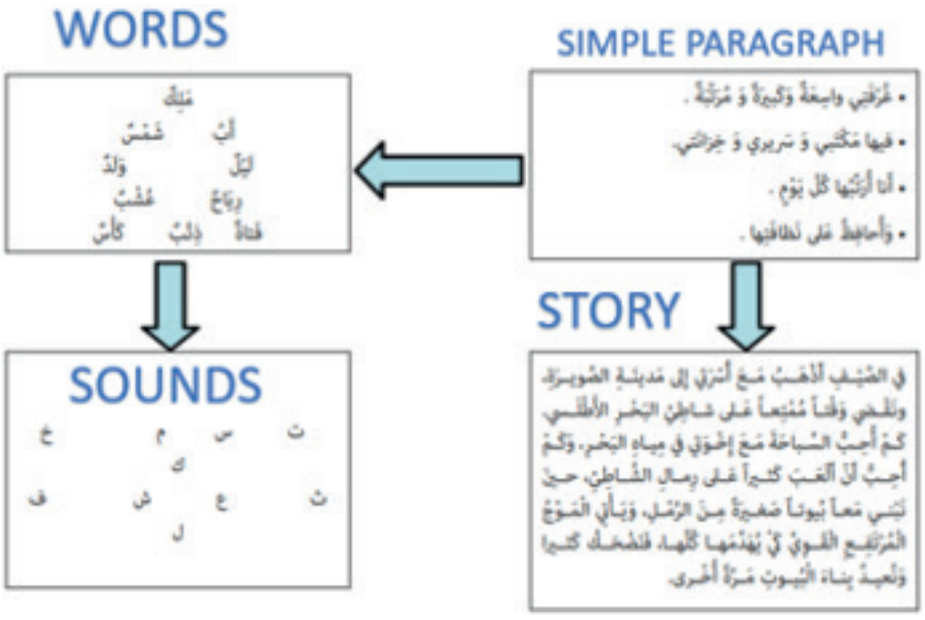

Figure 2. Reading Assessment Parts

Methodology for Conducting the Evaluation

The evaluation procedure within the TaRL framework is adaptive and student-centred, designed to accurately gauge each student's reading level through a series of progressive steps:

1. *Initial Assessment:* Students begin by reading a simple paragraph. This initial step sets the baseline for their current reading level.
2. *Progressive Evaluation:* Depending on their performance in the initial assessment, students are either advanced to higher complexity levels or receive targeted support to address specific areas of need.
3. *Comprehension Assessment:* For students who advance to the story reading level, comprehension is assessed through a series of questions designed to gauge understanding and critical engagement with the text.

4. *Adaptive Registration of Achievement:* Throughout the evaluation process, each student's highest level of achievement is meticulously recorded, providing educators with a detailed profile of their reading capabilities.

This structured and nuanced approach to evaluation ensures that each student's reading ability is understood and addressed with the appropriate level of instruction and support. By continuously adapting and responding to the individual needs of students, the TaRL assessment methodology contributes significantly to the goal of elevating educational outcomes and fostering a community of engaged, proficient readers.

METHOD

The methodology of this study was derived from the pedagogical strategies developed by the Indian NGO Pratham, focusing on elevating children's basic reading and arithmetic abilities to correspond with their actual developmental level rather than their prescribed grade level. The cornerstone of this research is the creation and deployment of an innovative digital tool, referred to as "TARL-BOT", designed to assess spoken language skills utilizing automatic speech recognition technology, as illustrated in Figure 3: The System Architecture. This tool aims to facilitate self-directed learning, enabling students to autonomously improve their pronunciation and reading fluency. Initially developed in Arabic, French, and English, plans for extending its capabilities to include the Amazigh language are under consideration.

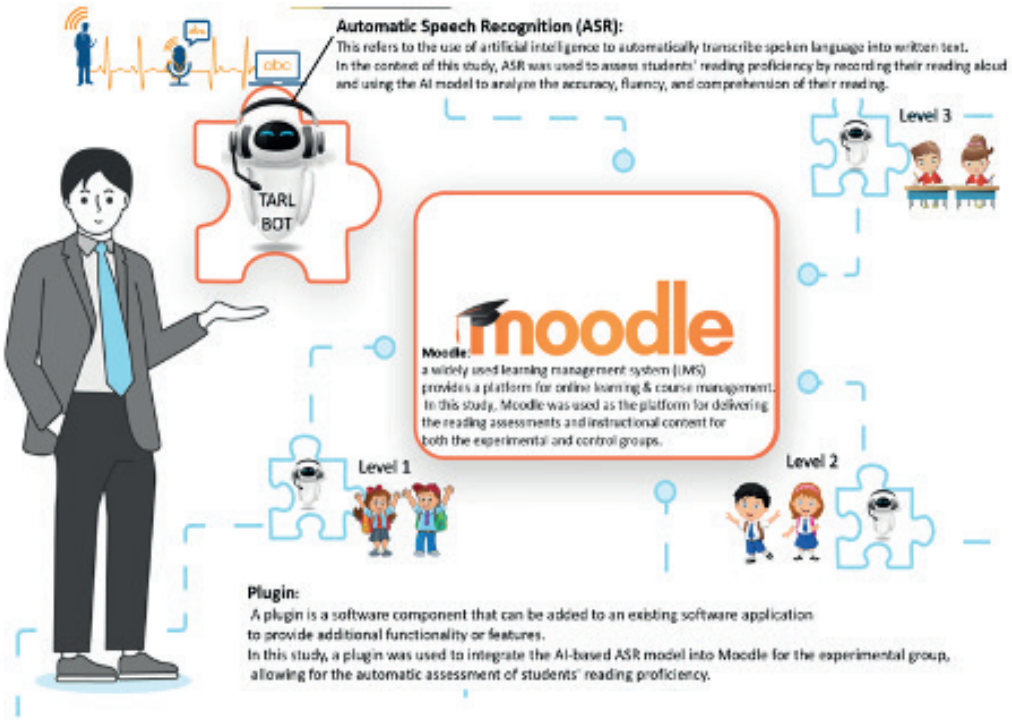

Figure 3. The System Architecture

Detailed TARL-BOT Architecture

The TARL-BOT architecture is a robust framework designed to support the automated reading assessment of students within a Moodle-based learning environment. This intricate system architecture, depicted in Figure 4, synergizes a variety of technologies to create a seamless and user-friendly assessment process.

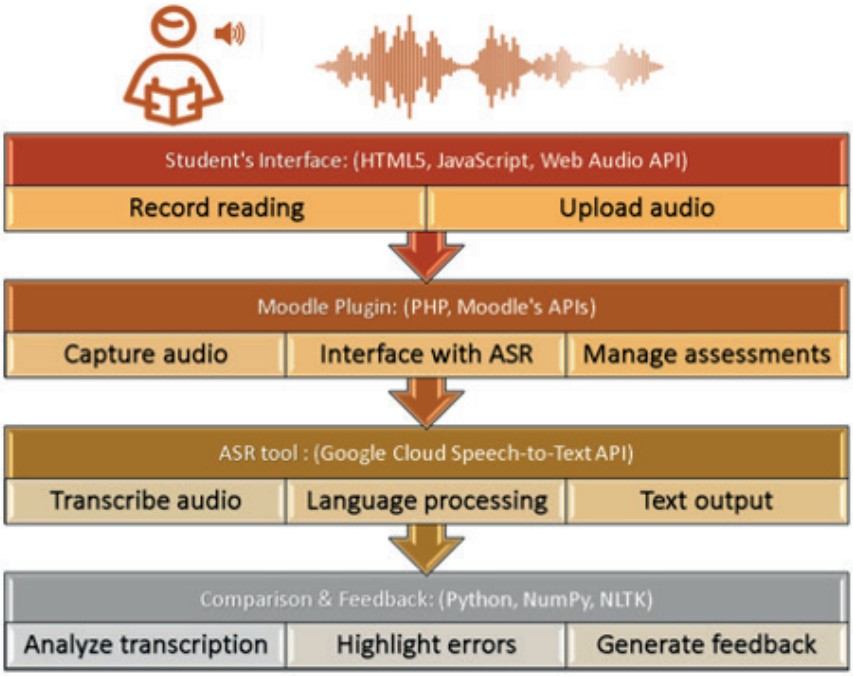

Figure 4. Detailed TARL-BOT Architecture Workflow

Figure 4 visually represents the workflow of the TARL-BOT reading assessment system, detailing each component's role from the student's initial interaction to the final feedback delivery.

Student's Interface: The front-end interface where students engage with the system is developed using HTML5 and JavaScript, chosen for their wide support across web browsers and ability to handle multimedia content robustly. The interface allows students to record their reading, which is captured using the Web Audio API for high-quality audio processing.

Moodle Plugin: The core of the system, a Moodle plugin, is crafted using PHP to ensure seamless integration with the learning management system. This plugin is responsible for the secure capture and storage of audio recordings, interfacing with the ASR tool, and managing the overall assessment workflow within the Moodle ecosystem.

ASR Tool: At the heart of TARL-BOT is the ASR tool, which transcribes the student's audio into text. Google Cloud Speech-to-Text API is utilized for its superior transcription accuracy, extensive language support, and robust handling of various speech nuances, making it an optimal choice for educational applications.

Comparison & Feedback: Post-transcription, the system employs a comparison algorithm developed in Python, leveraging libraries such as NumPy and NLTK for advanced text and numerical analysis. This algorithm assesses the transcription against the expected reading material, identifying errors and providing feedback. The feedback mechanism, built into Moodle, offers personalized and constructive insights based on the comparison analysis.

The underlying database for the TARL-BOT system is MySQL, selected for its proven reliability and extensive use within the Moodle community. The database securely stores assessment data, user interactions, and the system-generated feedback, ensuring data integrity and facilitating detailed reporting.

This multi-faceted architecture represents a significant advancement in automated reading assessment, showcasing the integration of state-of-the-art technologies to enhance educational outcomes.

Integration of TARL-BOT with Moodle

The integration process of TARL-BOT into the Moodle learning management system involved several key steps:

Plugin Creation: A specialized plugin was developed, combining the functionality of ASR tools with the pedagogical approach of TaRL for reading assessment. This plugin was designed for seamless integration into the Moodle platform, allowing for flexible adaptation to various curriculum needs.

Installation and Setup: Upon creation, the plugin was installed on the Moodle platform. The installation process was tailored to accommodate different versions of Moodle, ensuring broad applicability. Subsequent to installation, the assessment was set up by educators, configuring the tool to evaluate students' reading proficiency according to the TaRL methodology and the capabilities of the ASR instrument.

Assessment Administration and Feedback: Utilizing the Moodle platform, the TARL-BOT assessment was administered to students, providing immediate feedback on key metrics of reading proficiency, including accuracy, fluency, and comprehension. This real-time feedback is pivotal in allowing educators to quickly identify and address individual student needs.

Following the completion of the assessment, data were collected and analysed to ascertain the efficacy of the ASR tool and the TaRL approach in enhancing students' reading proficiency. Educators were then able to provide targeted feedback and support based on the assessment results, fostering an environment conducive to continuous reading skill improvement.

Participants

The sample consisted of 100 students from two primary schools in Morocco. Participants were in grades 1-3 between the ages of 6-9 years old. Schools were selected in consultation with administrators to represent typical public primary schools in urban areas. Students within participating schools were randomly assigned to either the experimental group (n = 50) that received the AI-ASR reading assessment or the control group (n = 50) that received traditional paper-based assessments. This random assignment helped ensure the two groups were equivalent on key characteristics that could influence reading ability. The sample size was chosen to provide sufficient statistical power for quantitative comparisons.

Data Collection and Analysis

Data was collected over a four-week period. In week one, students' baseline reading proficiency was assessed using a standardized test. In week two, the experimental group received the AI-ASR reading assessment on a tablet device while the control group took traditional paper-based assessments. The AI-ASR tool provided instant feedback on reading accuracy, fluency, and comprehension. Both groups then received regular reading instruction based on the TaRL approach in week three. In week four, students were retested using the same standardized reading assessment.

Quantitative data analysis consisted of descriptive statistics and a mixed-design ANCOVA to compare post-test scores between groups, controlling for pre-test baseline. The researcher had prior experience administering standardized reading assessments but was blind to the study condition of participants during analysis to avoid bias.

FINDINGS

The study examined the effectiveness of using an AI-based automatic speech recognition (ASR) tool for reading assessment in comparison to traditional paper-based reading assessment in primary schools in Morocco. The results showed that the experimental group who received the AI-based ASR reading assessment showed significant improvement in their reading proficiency, while the control group who received the traditional paper-based assessment did not show significant improvement. Additionally, both groups showed significant improvement in their reading proficiency after receiving regular instruction based on the TaRL approach in the third week.

Figure 5 depicts a screenshot of "TARL-BOT" the Moodle learning management system plugin.

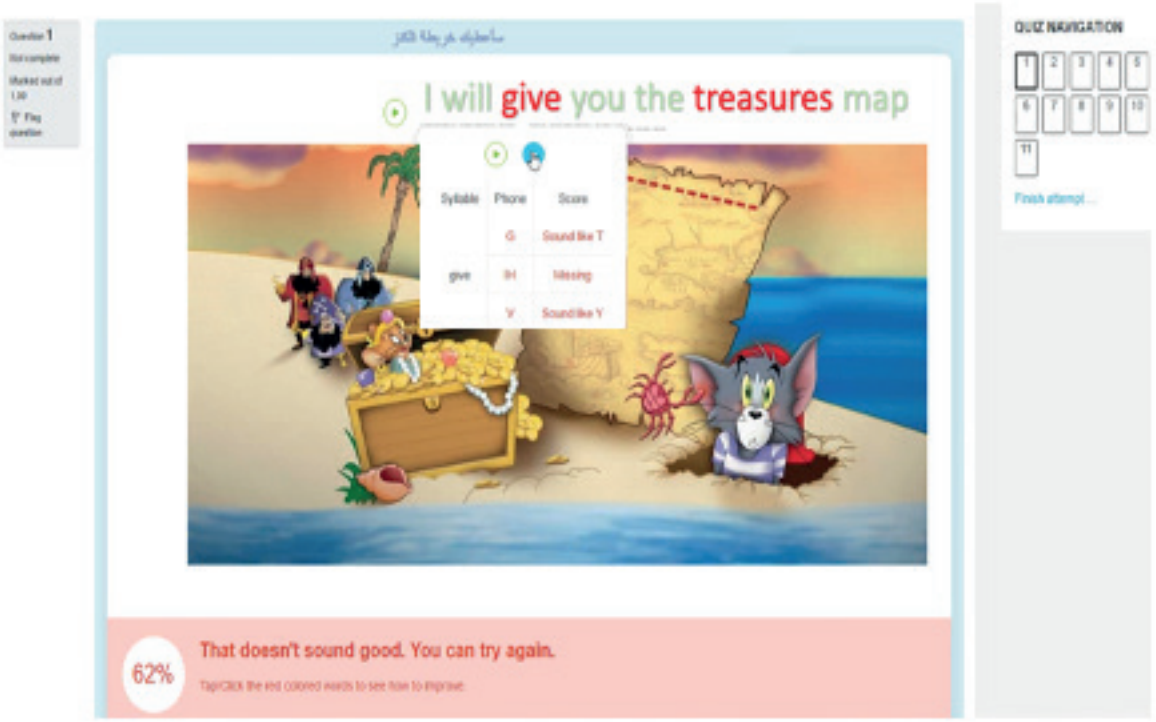

Figure 5. A Screenshot of the Plugin Integrated in Moodle's LMS

Table 1 displays the means and standard deviations for the pre-test and post-test measures of reading proficiency for both the experimental and control groups. As shown in the table, the pre-test mean scores were relatively similar for both groups, with the experimental group scoring slightly higher than the control group. However, the post-test mean scores for the experimental group were significantly higher than those for the control group, indicating that the AI-based ASR reading assessment was effective in improving students' reading proficiency.

Table 1. Means and Standard Deviations for Pre-Test and Post-Test Measures of Reading Proficiency

Group	Pre-Test Mean Score	Post-Test Mean Score	Standard Deviation
Experimental	45.6	63.4	7.8
Control	43.9	49.8	8.5

Table 2 displays the results of the independent-samples t-tests that were conducted to compare the pre-test and post-test mean scores between the experimental and control groups. As shown in the table, there was no significant difference between the pre-test mean scores of the experimental and control groups ($t(98) = 1.59$, $p > .05$), indicating that the groups were initially equivalent. However, the post-test mean scores for the experimental group were significantly higher than those for the control group ($t(98) = 3.62$, $p < .01$), indicating that the AI-based ASR reading assessment had a significant positive impact on students' reading proficiency.

Table 2. Independent-samples t-tests Comparing Pre-Test and Post-Test Mean Scores Between Experimental and Control Groups

Test	t-value	df	p-value
Pre-Test Mean Scores	1.59	98	> .05
Post-Test Mean Scores	3.62	98	< .01

Figure 6 displays the results of the regression analyses that were conducted to examine the relationship between the use of the AI-based ASR reading assessment and students' post-test scores, while controlling for the pre-test scores. The results showed that the use of the AI-based ASR reading assessment was a significant predictor of students' post-test scores ($\beta = .43$, $p < .01$), even after controlling for the pre-test scores. This indicates that the AI-based ASR reading assessment had a significant and positive impact on students' reading proficiency, above and beyond the impact of any pre-existing differences in proficiency levels between the experimental and control groups.

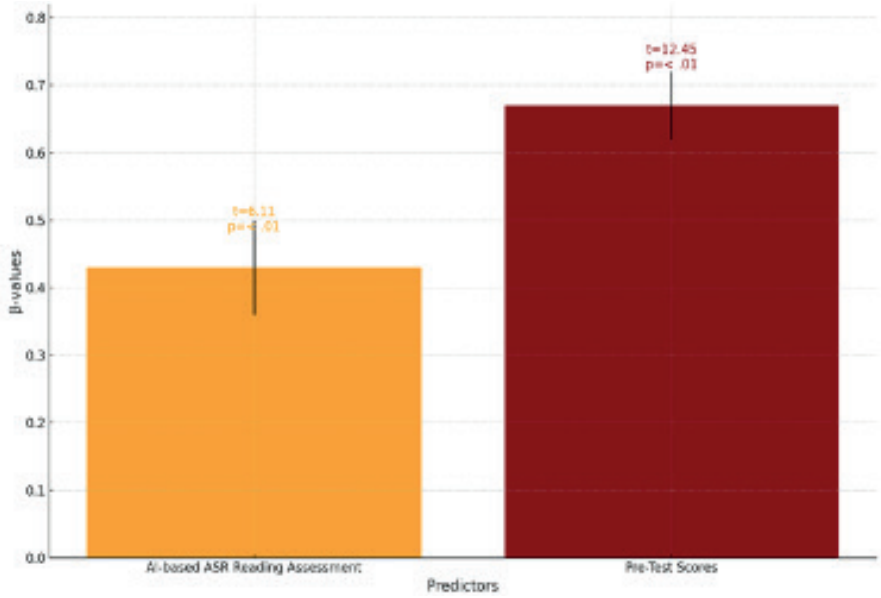

Figure 6. Regression Analyses Predicting Post-Test Scores from AI-based ASR Reading Assessment, Controlling for Pre-Test Scores

The findings of this study suggest that using an AI-based ASR reading assessment in conjunction with the TaRL approach can significantly improve the reading proficiency of elementary school students. Mean pre-test scores were comparable between the experimental and control groups, indicating that the groups were initially equivalent. However, the post-test mean scores for the experimental group were significantly higher than those of the control group, indicating that the AI-based ASR reading assessment had a positive effect on students' reading proficiency. Even after controlling for pre-test scores, regression analyses revealed that the use of the AI-based ASR reading assessment was a significant predictor of students' post-test scores.

These findings have significant implications for the improvement of reading instruction in primary schools, particularly in low-resource contexts where access to traditional assessment instruments may be limited. The use of ASR reading assessments powered by AI can provide immediate feedback to students and teachers, allowing for more efficient use of instructional time.

Teaching at the Right Level (TARL) will be given a larger role in the Moroccan educational system. After a preliminary wave of testing in 200 schools with 15,000 participants, the Department of National Education appears satisfied with the results. The Ministry of National Education, Preschool and Sports revealed the results of this first phase, which has been in effect since September of last year and stated that around 100,000 students will be affected by this strategy beginning with the next school year.

On Tuesday, October 11, 2022, while presenting the findings of this initial phase, the Minister of National Education did not conceal his elation. In fact, the approach has demonstrated its efficiency after three weeks of study. In its presentation, the Department of National Education provided numerous illustrations of the progress accomplished because of the Indian system.

Thus, the degree of subtraction knowledge among fourth-grade students who lacked the qualifications to begin the new school year increased from 10 to 61 percent in just three weeks following the implementation of this strategy. These kids have also made significant progress in mastering the Arabic language's written form. The rate of mastery grew from 23% on September 6 to 54% on September 28.

Students in their fifth year of elementary school demonstrated the same gains. The rate of reading proficiency in French at home increased from 5% to 20%. According to the data presented, students who followed the TARL technique were able to make faster improvement than students with similar impairments who followed a traditional tutoring program.

The positive results of the first phase of the TARL technique have prompted the ministry to expand the number of beneficiaries, which will exceed one hundred thousand kids at the beginning of the following school year. To accomplish this purpose, the Minister will increase the number of teachers who can teach using the new way. Between January and June of 2023, 5,000 teachers will receive training in this area, along with 300 guides between inspectors and experts ("Enseignement," 2022). Additionally, the ministry intends to deepen its connections with diverse actors, especially the National Initiative for Human Development.

DISCUSSIONS AND CONCLUSION

This study contributes compelling empirical evidence supporting the integration of AI-powered speech recognition technology into early reading assessments, significantly enhancing literacy outcomes alongside Teaching at the Right Level (TaRL) methodologies in under-resourced primary school systems. By comparing students assessed with AI-based tools against those evaluated with traditional paper-based methods, a marked improvement in reading proficiency was observed. This finding is in line with and extends previous research on the efficacy of ASR for assessment and evaluation purposes (Geckin, 2023; Hannah et al., 2022), illustrating the transformative potential of AI in literacy development, particularly within the context of localized teaching models like TaRL.

Several factors may underpin the observed outcomes, offering insights into the mechanisms driving the effectiveness of AI-based assessments:

Individualized Feedback and Metacognitive Scaffolding: The AI-based tool's ability to provide tailored feedback enhances learners' metacognitive skills, helping them become aware of their learning process and areas needing improvement.

Engagement through Gamification: The use of engaging, game-like elements in AI assessments can significantly increase motivation and sustained attention among students, leading to higher engagement rates and, subsequently, better learning outcomes.

Data-Driven Instructional Tailoring: The granular data provided by AI assessments enable teachers to fine-tune instruction to fit each student's unique learning needs, particularly within their proximal development zones, fostering more effective and personalized learning experiences.

Synergy between Technology and Pedagogy: The study underscores the synergistic potential of combining advanced technological tools with proven pedagogical strategies, particularly in enhancing literacy skills in primary education settings.

Implications for Practitioners:

For educational practitioners, the following suggestions emerge from the study's findings:

Integration of AI Tools: Educators should consider integrating AI-based speech recognition tools for reading assessments to provide more individualized, precise, and engaging learning experiences for students.

Professional Development: It is critical for educators to receive ongoing professional development on using these tools effectively, including understanding how to interpret data and integrate insights into teaching strategies.

Monitoring and Evaluation: Continuous monitoring and evaluation should be conducted to assess the effectiveness of AI tools in different contexts, ensuring that the technology is being used as effectively as possible to enhance learning outcomes.

Limitations and Future Research Directions

While the study provides important insights, it acknowledges limitations such as the small sample size confined to urban schools. Expanding research to include rural and diverse educational settings could enhance the generalizability and applicability of findings. Future research should explore the following avenues:

Longitudinal Studies: Conducting long-term studies to observe the enduring impacts of AI-based assessments on literacy development, tracking progress over several years.

Comparative Effectiveness Research: Comparing different types of AI assessment tools to determine their relative effectiveness and identifying best practices for various educational contexts.

Cultural and Linguistic Adaptations: Exploring the effectiveness of AI-based tools across different languages and cultural settings, ensuring that the technology is adaptable and inclusive.

Evaluating Effectiveness Across Languages: An important direction for future research involves evaluating the effectiveness of the AI-based speech recognition assessment approach across diverse languages and multilingual educational environments.

In conclusion, this study underscores the significant potential of leveraging AI-powered speech recognition technology to enhance early reading assessment and instruction. The integration of such technology, particularly in resource-constrained educational settings, promises to boost the precision, timeliness, and student-centered nature of foundational literacy skill development. While the journey toward widespread adoption and optimization of these tools involves addressing certain limitations and continued research, the path forward is illuminated by the clear benefits and transformative potential of AI in education. As we move forward, it is crucial for the educational community to embrace these innovations, ensuring that they are effectively and ethically integrated into teaching and learning processes.

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ELECTRONIC ASSESSMENT ANXIETY SCALE: DEVELOPMENT, VALIDITY AND RELIABILITY

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ABSTRACT

The widespread availability of internet access in daily life has resulted in a greater acceptance of online assessment methods. E-assessment platforms offer various features such as randomizing questions and answers, utilizing extensive question banks, setting time limits, and managing access during online exams. Electronic assessment enables real-time monitoring, customization, and scalability of feedback, benefiting students, academic staff, and administrative personnel. However, students encounter specific challenges in the electronic assessment environments. These challenges include limited control over test settings and the isolated nature of taking exams without peers. Furthermore, the technological proficiency of both instructors and students, along with resource constraints (computers, mobile devices, internet), can impede the effective utilization of these assessment tools. Technical issues like slow internet connection or disconnections can have significant consequences, especially in online exams, posing difficulties for corrections. The main goal of this study is to develop a Likert-type scale capable of measuring anxiety related to technical issues, social isolation, and the test interface experienced in e-assessment contexts. The study consists of two separate groups: the first group comprising 359 participants and the second group consisting of 356 participants. Both groups include undergraduate and pedagogical formation certificate program students from a university in the Eastern Anatolia Region of Turkiye. Construct validity was assessed through exploratory and confirmatory factor analyses. Item parameters were examined using item analysis based on classical test theory. As a result of the study, a two-factor scale structure comprising 21 items measuring social and technical anxiety was developed. These two dimensions account for 59.89% of the total variance. The Cronbach's alpha coefficient for the entire scale was 0.93, the McDonald's omega coefficient was 0.93, and the construct reliability was 0.99.

Keywords: Anxiety, e-assessment, social isolation, technical problems.

INTRODUCTION

In the realm of education, assessment serves not only for grading but also as a means to identify the strengths and weaknesses of education, observe progress, and provide valuable feedback for the purpose of designing an appropriate learning plan for both teachers and students. Compared to other components, assessment has a greater impact on the nature and efficacy of the learning environment in this capacity (Ashton & Wood, 2006; Dermo, 2009; Hricko & Howell, 2006; Moore & Anderson, 2003; Robles & Braathen, 2002). The use of different technology instruments in educational settings has increased significantly in recent years.

These tools involve virtual learning environments, simulation software, virtual experiments, visualization of complex models, as well as communication tools including email, electronic forums, and instant messaging systems (Admiraal et al., 2014; Fill & Ottewill, 2006). The utilization of these tools has facilitated a shift in the learner profile in distance education, resulting in individuals who take more responsibility, engage in greater reflection, and show more independence (Donnelly & McSweeney, 2009; Heafner et al., 2015; Kidd & Morris, 2017; Palloff & Pratt, 2003). The changing nature of technology and the characteristics of learners have necessitated the development of new alternatives to conventional assessment methods. These new methods, despite being implemented in various contexts, have fundamentally brought techniques often referred to as e-assessment, online assessment, or remote assessment into our lives. "The term "e-assessment" is defined as the use of computers that have existed since the 1970s or modern mobile devices for the purpose of managing and evaluating exams. E-assessment consists many forms that can be conducted using both online and offline modes. The growing accessibility of internet usage in everyday life has contributed to an increased degree of willingness towards online assessment. The notion of conducting assessments online is interesting because it has the ability to solve difficulties such as test time, location, and cost (Graff, 2003; Hricko & Howell, 2006; Wandeler & Emmenegger, 2010). Moreover, online e-assessments are able to contribute to the examination and enhancement of online learning processes and outcomes (Daly et al., 2010). However, for online assessment to work well, decisions must be made during the planning phase about feedback systems, standards and rules, measurement tools, types of tests, and how exams are given that are in line with the behaviors that are desired. E-assessments created in this manner can be as successful as assessments performed in a classroom environment when conducted under supervision (Buchanan, 2004; Sanchez-Cabrero et al., 2021). Because e-assessment requires a higher degree of skill than traditional paper-and-pencil approaches, it may not be appropriate in the early stages of schooling. However, because today's pupils use smart phones, tablets, and laptop computers in their learning activities from a young age, it may be stated that such devices can also be used for evaluation reasons from a young age. E-assessment, which is not limited by age, can also be used not only for certain subjects or courses, but for almost all disciplines (Sainsbury & Benton, 2011; Sozen & Guven, 2019).

When compared to assessment given in a classroom context, evaluating learning in an online environment where students and teachers do not share the same physical space has a different meaning (Vonderwell & Boboc, 2013). Hence, while examinations and tests can be useful instruments for evaluating specific areas of learning, they should not be used as the main tools for assessing online programs. To get an accurate evaluation of the performance of online learners, it is important to use a range of assessment procedures together with traditional methods (Heafner et al., 2015; Palloff & Pratt, 2009). Discussions, group activities, and self-assessment assignments, in which students assume responsibility for their own learning, are widely used in the online environment to measure progress and development. The e-assessment mechanism, which includes approaches such as discussions and self-assessment, is classified into four major groups in the literature: peer, teacher, self-assessment and automated (Buchanan, 2004; Rovai, 2000). Each of these four main categories contains a wide range of assessment tools that may be used for formative and summative evaluation. Table 1 lists the measurement tools that may be utilized in formative and summative evaluation.

Table 1. Measurement Tools Utilized in e-Assessment

Uses	Measurement Tool
Submission of items for assessment	Essays: discursive, descriptive, analytical
	Reports: CBL, PBL
	Reviews: critical, analytical
	Media: image, audio, video, presentation
Automated Assessment	Multiple choice
Quizzes	Short answer
Multimedia	Calculation
	Matching
	Fill blanks
	True/false
	Matching
	Drag and drop
	Simulations
Online Discussions	Forums: case analysis, project development
	Debates
	Allocated roles: lead, summarize, provoke
	Role plays
Web Publishing	E-portfolios
	Webpages: blogs, wikis
	Shared documents: Google Documents

Source: (Benson, 2010)

E-assessment has various advantages for assessing learning. Most e-assessment platforms, for example, include capabilities such as randomizing questions and answers, applying huge question banks, setting up time limitations, and managing access in online examinations. Furthermore, e-assessment enables real-time monitoring, customization, and scalability of feedback to students, academic staff, and administrative staff (Dennick et al., 2010; Hricko & Howell, 2006; Jiao, 2015). The success of e-assessment, on the other hand, is dependent on a variety of criteria, including the sort of assessment used, the degree of feedback provided and student participation. A constructivist approach that stresses cooperation, inquiry, and mentoring is advocated in this regard for maximizing the benefits of e-assessment (Benson, 2010; Ramsaran-Fowdar et al., 2011; Rovai, 2000). When combined with real-time feedback, tasks allowing projects, portfolios, self-evaluation, and peer assessment in line with constructivist principles are especially successful instruments in e-assessment (Gaytan & McEwen, 2007). Nevertheless, e-assessment has a number of disadvantages, including software, hardware, and personnel costs, potential risks deriving from external threats and internal security policies, and technical issues that may pose a failure risk. These challenges must be considered for a successful implementation (Dennick et al., 2010; Hricko & Howell, 2006; Jiao, 2015).

The performance of individuals in tests has a significant role in shaping their educational possibilities and life circumstances since the beginning of the 20th century. Thus, the investigation of emotional reactions displayed by students during academic assessments has been a topic of academic interest (Pekrun et al., 2004). One of these emotional reactions is a psychological construct known in the literature as test or exam anxiety. The literature defines test anxiety as an extreme state of anxiety and stress related to assessment. Test anxiety, an important phenomenon that has been extensively studied from multiple viewpoints (Sarason, 1984), is known to have a negative influence on some students' test performance (Powers, 2001; Wine, 1971).

In some studies, which are investigate the level of test anxiety and its relationship with performance in e-assessment environments, it has been indicated that test anxiety in online assessments is either not significantly different from that in traditional classroom exams or slightly lower (Cassady & Gridley, 2005; Powers, 2001; Sanchez-

Cabrero et al., 2021; Stowell & Bennett, 2010). Cassady and Gridley (2005), on the other hand, stated in their study that students with less online experience are less likely to experience similar levels of comfort, and that anxiety levels are expected to rise in students who have not been systematically exposed to computer-based instructional processes. According to Stowell and Bennett (2010), e-assessment lowers anxiety in persons with severe claustrophobia but increases test anxiety in students with low classroom anxiety. The entrance procedure into the e-assessment system, trust in the system's correct functioning, the presence of proctors, or a lack of knowledge with online assessments are all mentioned as possible causes (Stowell & Bennett, 2010). Similarly, it has been found that students with high test anxiety perform worse when questions administered in different order compared to when the order of question administration is fixed. This suggesting that order of items may lead to additional challenges on students (Ortner & Caspers, 2011).

PURPOSE OF THE STUDY

Students encounter specific difficulties in the context of e-assessment, as opposed to typical tests delivered in a physical classroom setting. These difficulties include having little control over the test settings and taking the exam alone, without the presence of other pupils (Rovai, 2000). Furthermore, instructors' and students' technological abilities, as well as the restrictions of the suitable resources (computers, mobile devices, internet), might have a negative impact on the successful usage of evaluation tools. Connection speed, disconnection, or other technical problems can have serious effects, especially in online exams, that can be difficult to correct (Brink & Lautenbach, 2011; Senel & Senel, 2021). It is known that automated proctoring with camera or integrated in the e-assessment system, as well as records kept by the system regarding student movements, can influence students' emotional states (Divjak et al., 2022).

While some studies in the literature suggest that e-assessment conditions do not impose an additional challenge on students beyond test anxiety, numerous other studies have found that students in e-assessment environments are affected by various factors. These factors include insufficient technical infrastructure, the possibility of internet and power outages, inexperience in using computers or mobile devices for assessment, variations in the order of items, online proctoring, the absence of someone to consult during the exam, and social isolation. Test anxiety, computer anxiety, and computer competency anxiety may not be adequate to fully describe the difficulties students have in online assessment settings. However, a measurement tool which can assess the underlying structure with mentioned indicators has not yet been developed. The goal of this study is to develop a Likert type scale that might measure anxiety regarding technical problems, social isolation, and the test interface experienced in e-assessment contexts. The development of a valid and reliable assessment tool could open the way for further studies about the features of this structure or its relationship with different factors. This study aims to answer four research questions in this context:

1) How is the structure of the e-assessment anxiety scale?
2) How is the level of validity of the e-assessment anxiety scale?
3) How is the level of reliability of the e-assessment anxiety scale?
4) How are the parameters of items in scale according to classical test theory?

METHOD

We used the survey model for scale development. The survey model aims to describe the group's status in terms of the measured feature as it is (Karasar, 2014). The survey model was preferred since this study aimed to develop a measurement tool to measure electronic assessment anxiety.

Participants

There are two different study groups in the study. The first one consists of 359 participants. We used this sample to reveal the structure of the scale. We used exploratory factor analysis for this purpose. The participants in the first group consisted of undergraduate and pedagogical formation certificate program students studying at a university in the Eastern Anatolia Region of Turkiye. Among the first group participants, 32.03% (n=115) were male and 67.97% (n=244) were female. When analyzed according to

their departments, it was observed that there were students from 14 different departments, such as social studies teaching, coaching, literature, and economics, and the highest number of students was in the English language teaching department with 76 students.

The second study group consists of 356 participants. We used this data set for confirmatory factor analysis (CFA) to examine model-data fit. In other words, CFA with the data of the second group to investigate the extent to which the structure of the scale fits in a similar group. The second group consisted of undergraduate and pedagogical formation certificate program students studying at a university in the Eastern Anatolia Region of Turkiye. Among the participants in the second group, 30.33% (n = 108) were male and 69.67% (n = 248) were female. When analyzed in terms of departments, it was observed that most participants were in classroom education, 16.85% (n = 60), and geography, 14.61% (n = 52), and there were participants from 16 different departments.

Data Collection and Analysis

The data obtained from the first study group were analyzed in terms of EFA assumptions, and the data obtained from the second study group were analyzed in terms of CFA assumptions (Tabachnick & Fidell, 2019). There was no missing data in the first study group data set. Then, we examined the data set in terms of multicollinearity. We used tolerance (TV), condition index (CI), and variance inflation factor (VIF) statistics. The variance inflation factor should be less than 10, the tolerance value should be greater than 0.01, and the state index should be less than 30 (Kline, 2016; Tabachnick & Fidell, 2019) for the absence of multicollinearity. As a result of the analysis of the first data set, the VIF varied between 1.99-4.81, the TV varied between 0.21-0.5, and the CI varied between 1.00-65.5. Accordingly, the CI indicates there may be a multicollinearity problem. Therefore, we examined the inter-item correlation matrix. So, the lowest correlation between the variables was 0.24, and the highest one was 0.82. Accordingly, there is no multicollinearity between the variables. It is generally stated that the correlations between variables should be greater than 0.90 for multicollinearity problems (Tabachnick & Fidell, 2019).

For this reason, since the TV and VIF are within the appropriate range and the largest correlations between the variables are less than 0.90, it is concluded that there is no multicollinearity between the variables. Mahalonobis distance was calculated for multivariate outliers, and the significant individuals at α=0.001 level were removed from the data set. Accordingly, 31 individuals were identified as outliers and were removed from the data set. Thus, a data set of 328 individuals was formed. Mardia's (1970) multivariate skewness and kurtosis coefficient can be used for another assumption of multivariate normal distribution. Since it is stated that Mardia's multivariate skewness coefficient gives better results than other methods (Uysal & Kilic, 2022), this method was preferred. Mardia's multivariate skewness coefficient was 34698.96, statistically significantly different from 0 ($p<0.05$). Therefore, unweighted least squares (ULS), which is strong against the violation of the multivariate normality assumption (Zygmont & Smith, 2014), was used as a factor extraction method in the EFA.

For the second study group, data were collected from 356 individuals; this dataset has no missing data. When the data set was analyzed in terms of multicollinearity, it was observed that the TV was in the range of 0.34-0.63, the CI was in the range of 1.00-33.72, and the VIF was in the range of 1.59-2.94. As stated above, CI indicated multicollinearity. Therefore, we examined the inter-item correlation matrix. So, the lowest correlation between the variables was 0.19, and the highest one was 0.71. Accordingly, there is no multicollinearity between the variables. Mahalonobis distance was calculated for multivariate outliers, and the significant individuals at α=0.001 level were removed from the data set. Accordingly, 14 individuals were identified as outliers and were excluded from the data set. Thus, a data set of 342 individuals was formed. Mardia's (1970) multivariate skewness coefficient was found to be 34698.96 and statistically significantly different from 0 ($p<0.05$). Therefore, we used robust maximum likelihood (MLR) as an estimation method that is strong enough to violate the normality assumption (Brown, 2015) in CFA.

Factor software (Lorenzo-Seva & Ferrando, 2023) was used for EFA analysis. We used Mplus for CFA (Muthen & Muthen, 2012). We used the second group data set for the reliability coefficients and item analysis based on classical test theory (CTT). Cronbach's Alpha was calculated by psych (Revelle, 2022), McDonald's omega and structure reliability was calculated by semTools (Jorgensen et al., 2022) and stratified Alpha was calculated by sirt (Robitzsch, 2021) package in R language (R Core Team, 2022).

Scale Development Process

We adopted the deductive method in the scale development process for item writing. In this method, items are written using previously developed scales and a large literature review (Hinkin, 2005; Morgado et al., 2018). According to this method, a 69-item candidate scale form was first prepared and sent to three measurement and evaluation experts with doctorate degrees in their field. Similarly, opinions were received from one expert in computer and instructional technology education and one Turkish language and literature expert with doctorate degrees in the candidate scale form. The candidate scale form was made into 48 items in line with the opinions received.

FINDINGS

In this section, we examine the e-assessment scale's factor structure, validity, reliability, and CTT item analysis.

The Structure of the E-assessment Scale

We conducted EFA with Pearson correlation matrix on the first study group data set. Direct Oblimin, one of the oblique rotation methods, was used as the rotation method. In EFA, it was observed that the KMO value was 0.95. Accordingly, the data set is suitable for factorization (Kaiser, 1970). Bartlett's test of sphericity revealed that the correlation matrix obtained from the data set statistically significantly differed from the unit matrix ($\chi 2(171) = 3682.2$, $p<0.01$).

Firstly, we examined the dimensionality of the 48-item scale form by parallel analysis (PA), Minimum Average Partial (MAP) analysis, HULL method, explained variance ratio and eigenvalues to understand the number of dimensions. PA, MAP, and HULL methods suggested a two-dimensional structure in this first analysis. When the explained variance ratios were analyzed, it was observed that the eigenvalue of the first factor was 26.06. The explained variance ratio was 54.2%, while the eigenvalue of the second factor was 3.42, and the explained variance ratio was 7.12%. The number of factors with eigenvalues greater than one was seven. In this case, the proposed number of dimensions, 2, was thought to be a more appropriate solution for the data. Because the variance explained by the third factor is 3.3%, these factors can usually be ignored. In order to create simpler and reproducible structures, factors with an explained variance ratio of less than 5% can be considered insignificant (Kilic, 2022).

We observed that some items had factor loadings greater than 1, while others had cross-loadings for two-dimensional solutions. In this case, we tried to exploratory bi-factor models. However, some items did not load on any specific factor. In this case, we tried bi-factor (S-1) (Burns et al., 2020) models, but similarly, some items were included with items measuring different traits. In this case, since the variance explained by the first dimension was as high as 54%, it was thought that there might be a secondary factor in the data set. In order to have a secondary level factor, there should be at least 3 sub-factors (Brown, 2015). In this direction, as stated in the literature section, a three-factor structure was created as anxiety arising from social relations, anxiety arising from technical reasons, and anxiety arising from the exam. As a result of the EFA conducted in this way, it was seen that a 3-factor structure could be obtained. However, as a result of second-order CFA, it was observed that the error variance of the exam sub-factor was negative. While investigating the reason for this situation, it was observed that the items were highly correlated since they included both physiological and psychological reactions. Namely, while one of the items was "The thought that the electricity cut during the assessment makes me nervous.", another item was "The thought that the electricity cut during the assessment causes me to experience physiological changes (e.g., rapid heartbeat and breathing, sweating, trembling, dry mouth)." It was understood that the applied individuals gave similar answers to both items because they could not distinguish between these physiological and psychological reactions. For this reason, the items with physiological reactions were removed from the scale. As a result, a 19-item scale form was obtained.

After the physiological expressions were removed from the scale, EFA was applied again to the 19-item scale form. In this case, it was observed that PA, MAP, and HULL methods suggested a 2-dimensional structure. When the eigenvalues and explained variance ratios were analyzed, it was observed that the eigenvalues of the first and second dimensions were 10.09 and 1.88, respectively. The explained variance ratios are 52.73% and 7.16%, respectively. The two dimensions explain 59.89% of the total variance. It can be said that this explained variance ratio is sufficient for social sciences (Buyukozturk, 2020). It was also observed that the number of factors with eigenvalues greater than 1 was two. Therefore, it was decided that the number of factors was 2, and the analysis continued. The EFA with direct oblimin rotation results are presented in Table 2.

Table 2. The EFA Results of the Electronic Assessment Anxiety Scale

Variable Name	Unrotated Solution		Rotated Solution		
	First Factor	Second Factor	First Factor	Second Factor	Communalities
i1	0.67	-0.22	0.64	0.08	0.49
i3	0.60	-0.09	0.43	0.22	0.37
i4	0.53	0.33	-0.18	0.75	0.39
i5	0.66	-0.15	0.54	0.17	0.46
i17	0.80	-0.37	0.92	-0.06	0.78
i18	0.78	-0.35	0.89	-0.05	0.73
i21	0.79	-0.19	0.66	0.18	0.65
i24	0.63	0.30	-0.08	0.76	0.49
i25	0.58	0.18	0.05	0.57	0.37
i26	0.72	0.03	0.33	0.44	0.52
i27	0.63	0.16	0.11	0.57	0.42
i31	0.68	0.20	0.07	0.65	0.50
i32	0.75	0.10	0.24	0.56	0.57
i34	0.67	0.30	-0.07	0.79	0.54
i36	0.77	0.12	0.23	0.59	0.61
i39	0.83	-0.06	0.51	0.38	0.68
i41	0.74	0.20	0.10	0.69	0.60
i42	0.80	0.09	0.29	0.57	0.64
i44	0.80	-0.32	0.85	0.01	0.74
Explained Variance Ratio	%52.73	%7.16			

The rotated results showed that eight items belong to the first factor and 11 items belong to the second one. The factor loadings of the items in the first-factor range between 0.33-0.92, and those in the second factor range between 0.44 and 0.79. Regarding cross-loading, the difference between the two-factor loadings is greater than 0.10 in all items that load on both factors. In addition, the inter-factor correlation was 0.73. Accordingly, it indicates that inter-factor correlation is high.

The first factor was named "Technical Anxiety," and the second factor was named "Social Anxiety" due to factor labeling performed by examining the items that loaded the first and second factors at the highest level. The items according to the dimensions are presented in Table 3.

Tablo 3. Scale Items*

Item	Technical Anxiety
i1	The thought that the electricity cut during the assessment makes me nervous.
i3	I feel nervous when I think my time will not be enough because I cannot type fast on the keyboard in open-ended questions.
i5	The possibility that the computer or mobile device I will use in the application will run out of charge makes me uneasy.
i17	The thought that the internet will be cut off if the application is online makes me uneasy.
i18	The thought of being unable to re-enter the system if the internet is disconnected and reconnected makes me uneasy.
i21	I feel uneasy because I cannot be sure my answers are saved.
i39	Knowing that my right to change my answers is limited makes me uneasy.
i44	The thought that my exam will be canceled due to the accidental closing of the application page increases my tension.
Item	**Social Anxiety**
i4	I worry that there is little opportunity to exchange opinions about the e-assessment task with my friends.
i24	In environments such as forums where I have to write my opinions, the thought that what I write will be seen by my friends makes me anxious.
i25	If my exam is scored automatically, I worry that it will be scored incorrectly.
i26	A countdown timer or stopwatch on my application screen makes me nervous.
i27	Taking a test alone makes me feel more nervous than in a classroom setting.
i31	A proctor monitoring my movements on my screen puts pressure on me.
i32	The possibility of forgetting my account information just before the application starts makes me nervous.
i34	I worry about being unable to find someone to consult about questions I think are wrong.
i36	If everyone is asked different questions in the practice, I feel uneasy thinking I will be asked difficult questions.
i41	I worry that my attention will be distracted in exams outside the classroom.
i42	I feel nervous because it is more difficult to understand what I read on the screen of my computer or mobile device.

*Note, *The items are only translated from Turkish to English.*

The technical anxiety dimension has items related to power failure, internet disconnection, or recording of answers (see Table 2). The social anxiety dimension relates to communication with friends or monitoring the screen by a supervisor. In this dimension, some items may not be thought to be related to social anxiety. However, they found a place in the social anxiety dimension based on the data obtained from the participants. For example, item 25 is ("If my exam is scored automatically, I worry that it will be scored incorrectly"). In this case, this item may have been included in the social dimension because he/she probably thought that their friends would see his/her scores. On the other hand, " The presence of a countdown timer or stopwatch on my application screen makes me nervous", item 26, which contains the statement " belongs to social anxiety. The fact that he/she was worried that his/her friends might see the countdown timer may have caused these items to be in the social anxiety dimension.

Confirmatory Factor Analysis of E-assessment Scale

According to the model-data fit indices obtained from CFA using the Pearson covariance matrix, the model-data fit is acceptable [$\chi 2$ (151) = 324.76, $p < 0.01$, $\chi 2/df=2.15$, RMSEA = 0.058 [90% C.I. 0.049-0.067], CFI = 0.931, TLI = 0.922, SRMR = 0.056]. The result $\chi 2/df=2.15$ suggests that the model-data fit is good (Anderson & Gerbing, 1984). The RMSEA value 0.058 indicates a good fit (Steiger, 2007). The recommended CFI value for indicating a good fit is at least 0.95. However, an acceptable fit can be indicated by a range of 0.90-0.95, as noted by Hu & Bentler (1998, 1999). Similarly, a TLI value in the range of 0.90-0.95 indicates a good fit. Based on the TLI and CFI values, it can be concluded that the model aligns with the data at an acceptable level. Since an SRMR value less than 0.08 is deemed acceptable (Hu & Bentler,

1999) and a value less than 0.05 indicates a good fit (Byrne, 1998), the model-data fit is acceptable. Figure 1 displays the path diagram resulting from the CFA. The inter-factor correlation is 0.73. The factor loadings of items in the technical anxiety dimension vary from 0.644 (i16) to 0.772 (i7). The factor loadings of items in the social anxiety dimension vary from 0.582 (i9) to 0.723 (i13). Thus, it can be inferred that items' commonly suggested factor loading to be greater than 0.40 (Howard, 2016) is also met.

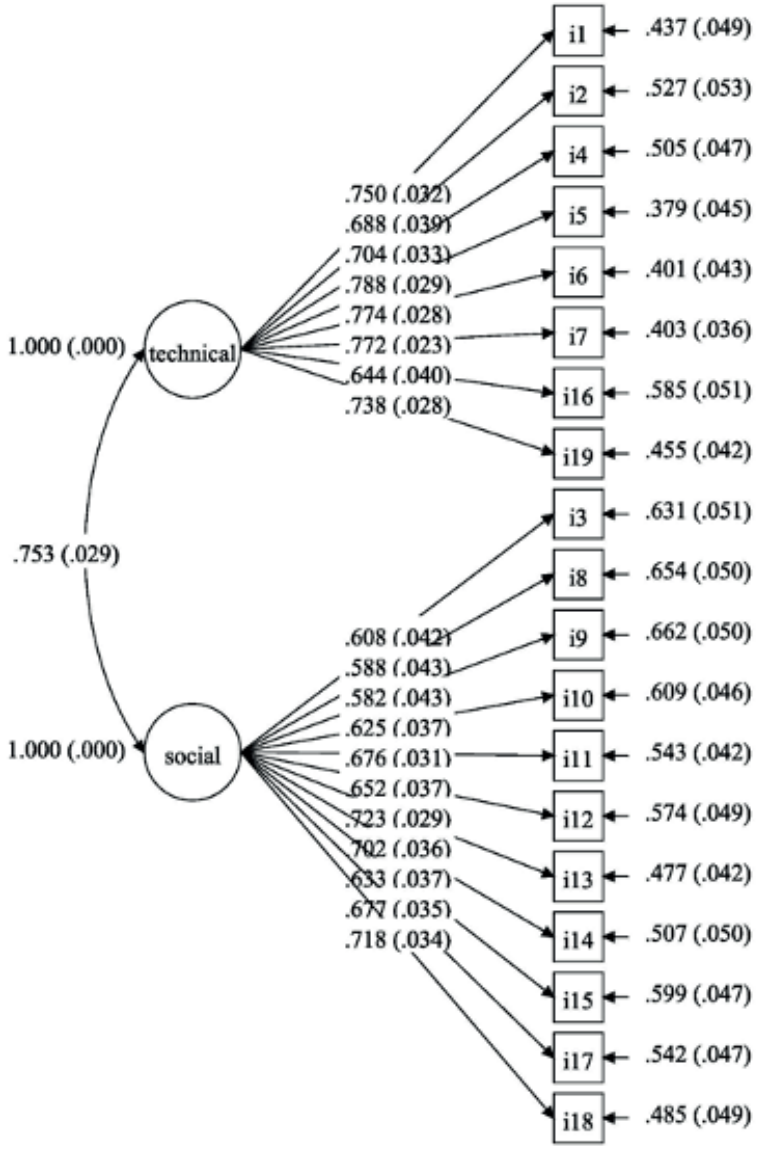

Figure 1. CFA path diagram

The Reliability of the E-assessment Scale

Since the model-data fit is acceptable in CFA, the E-assessment scale has a multi-dimensional structure. The reliability analysis included the calculation of Cronbach's Alpha, stratified Alpha, construct reliability and McDonald's omega coefficients. The Cronbach's alpha coefficient for the entire scale was 0.93, the McDonald's omega coefficient was 0.93, and construct reliability (Hair et al., 2019) was 0.99. Cronbach's alpha coefficient was 0.89 for technical anxiety and 0.89 for social anxiety. McDonald's omega coefficient was 0.89 and 0.90 for technical and social anxiety, respectively. The construct reliability was 0.99 for technical anxiety and 0.99 for social anxiety. The stratified alpha coefficient, calculated due to the scale's multidimensionality, was 0.93. Since Hair et al. (2019) recommended reliability coefficients for internal consistency to be greater than 0.70, it can be concluded that the internal consistency in this study is sufficient.

Item Analysis Based on Classical Test Theory for E-assessment Scale

In this section, we examined item analyses using classical test theory. Thus, Table 4 presents the mean, item endorsement rates, corrected item-total correlations, and lower and upper group analyses of the items according to classical test theory.

Table 4. The Results of Item Analysis for Scale†

Item	Mean	Standard deviation	Item endorsement rates	Skewness	Kurtosis	The average of lower and upper groups		t-value	Corrected item-total correlation
I1	3.76	1.02	0.75	-0.38	-0.72	2.88	4.58	-16.17**	0.61
I2	3.58	1.12	0.72	-0.56	-0.41	2.61	4.46	-15.18**	0.61
I3	2.86	1.09	0.57	0.08	-0.49	2.07	3.57	-10.74**	0.53
I4	3.59	1.18	0.72	-0.48	-0.75	2.60	4.54	-14.78**	0.60
I5	3.84	1.03	0.77	-0.60	-0.32	2.94	4.63	-15.22**	0.62
I6	3.94	1.02	0.79	-0.84	0.13	3.07	4.71	-13.58**	0.59
I7	3.60	1.10	0.72	-0.43	-0.70	2.56	4.48	-16.47**	0.66
I8	2.58	1.15	0.52	0.25	-0.76	1.84	3.40	-11.00**	0.51
I9	2.67	1.27	0.53	0.29	-0.88	1.86	3.65	-11.00**	0.52
I10	3.34	1.24	0.67	-0.34	-0.86	2.40	4.29	-13.47**	0.59
I11	2.79	1.30	0.56	0.18	-1.07	1.82	3.89	-14.15**	0.57
I12	3.10	1.29	0.62	-0.10	-1.03	2.14	4.16	-13.79**	0.56
I13	2.96	1.27	0.59	0.07	-1.03	1.99	4.25	-17.93**	0.67
I14	2.96	1.17	0.59	0.00	-0.74	2.04	3.95	-13.94**	0.62
I15	3.31	1.25	0.66	-0.30	-0.84	2.26	4.31	-14.10**	0.61
I16	3.43	1.13	0.69	-0.28	-0.75	2.44	4.32	-14.57**	0.63
I17	3.01	1.21	0.60	-0.04	-0.87	2.22	4.03	-12.45**	0.59
I18	3.13	1.21	0.63	-0.09	-0.88	2.17	4.23	-15.46**	0.65
I19	3.82	1.09	0.76	-0.64	-0.47	2.85	4.69	-14.46**	0.62
Sum Score	62.24	14.39	0.66	0.09	-0.38	44.77	80.13	-35.62**	-

*Note, *p<0,01 †Scale items are in Appendix 1.*

Table 4 presents the mean, standard deviation, skewness, kurtosis coefficients, and upper and lower group averages for each item and total test score. It also highlights the t-values obtained from the t-test. The corrected item-total correlations are presented in the last column of Table 4.

i1 had the highest mean (3.76), while i8 had the lowest (2.58). These items are presented as follows. i1 is " The thought that the electricity cut during the assessment makes me nervous." while i24 is " In environments such as forums where I have to write my opinions, the thought that what I write will be seen by my friends makes me anxious.".

The skewness coefficient ranges from -0.84 (i6) to 0.29 (i9). Similarly, the skewness of the total score was 0.09, so the scale items followed a normal distribution (Tabachnick & Fidell, 2019). Additionally, the kurtosis coefficient ranged from -1.07 (i11) to 0.13 (i6), and the kurtosis coefficient of the total score was -0.38. As such, the variables do not significantly deviate from normal distribution (Chou & Bentler, 1995). Therefore, we utilized a t-test to analyze the mean differences between the upper 27% and lower 27% groups. The mean values of both items and the total score were found to be statistically significantly different between the groups. Thus, it can be concluded that the individuals in the lower and upper groups differ statistically significantly regarding both items and the total score. When examining the corrected

item-total correlations, it became evident that they generally exceeded the recommended cut-off point of 0.30 (Buyukozturk, 2020). It can be concluded that the items possess a satisfactory level of discrimination based on both the statistically significant difference between the means in the lower and upper groups and the sufficiency of the factor loadings.

DISCUSSIONS AND CONCLUSION

As a result of a study on e-assessment anxiety, a two-factor scale structure consisting of 21 items measuring social and technical anxiety was developed. The EFA (sample 1) and CFA (sample 2) data indicate that the e-assessment anxiety scale's scores are adequately valid. As a result of both exploratory and confirmatory factor analyses, the scores from the scale can be used to measure the entire scale (by summing all items) and two dimensions, technical and social anxiety, individually. Researchers studying e-assessment anxiety can create an e-assessment anxiety score by summing the item scores from the data collected using the scale. On the other hand, researchers seeking to conduct an in-depth study on a specific type of anxiety, such as technical anxiety or social anxiety, can gather responses to items in the respective dimensions. Despite the high correlation between the dimensions, obtaining a total score is meaningful. After analyzing the data obtained from the scale, it was noted that both the sub-dimensions of the scale and the scale as a whole demonstrated sufficient reliability in terms of internal consistency. Therefore, it can be stated that researchers conducting similar studies utilizing the e-assessment anxiety will have similar results.

One limitation of this study is that the data was collected from the faculty of education and pedagogical formation students of a university in the Eastern Anatolia Region. Measuring the e-assessment concerns of individuals from different regions or age groups with this scale may lead to low validity results. Additionally, it is important to note that the results of this study are limited to this specific population and may not be generalizable to other populations. For this reason, researchers intending to use the scale should focus on using it at the university level. Conducting separate validity studies with data obtained from their samples can help establish the validity of the data.

The development of the e-assessment anxiety scale with a two-factor structure, focusing on separate measurements of social and technical anxiety, offers significant theoretical and practical implications. This scale provides researchers with the flexibility to measure overall e-assessment anxiety or focus on specific dimensions, aligning with the multifaceted nature of anxiety as a construct. Practically, the scale is useful in educational settings for identifying students with high levels of e-assessment anxiety, aiding in the development of targeted interventions to improve their academic performance. The scale's validation in university settings also indicates its potential applicability in similar educational environments.

However, the study's limitation, particularly its focus on a specific population from the Eastern Anatolia Region, highlights the need for further validation across diverse demographic groups. This would enhance the scale's generalizability and utility in various cultural and educational contexts. The scale's development also contributes to the broader understanding of anxiety assessment, emphasizing the complexity of anxiety experiences and the importance of considering different anxiety dimensions in research and clinical practice for a more comprehensive evaluation and targeted interventions.

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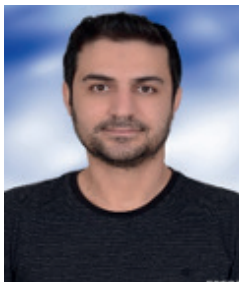

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EXPLORING ONLINE LEARNERS' PERSPECTIVES IN RELATION TO PROCTORED EXAMS

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ABSTRACT

This study targets to investigate the opinions and perceptions of the online and distance learners regarding to online proctored exams. A qualitative case study was employed to explore views of the participants related to the online proctored exam practice. The data were collected from 69 undergraduate distance learners via an online form. A content analysis approach were employed to analyze the data. As a result of the content analysis three themes namely, satisfaction, dissatisfaction, and exam administration emerged. The findings indicated that while online and distance learners were satisfied with the online proctored exams as they are secure, convenient, accessible, and reliable they also dissatisfied because of the technical problems and surveillance. Furthermore, the results also revealed that the administration of the online proctored exams needs to be reviewed. It is hoped that the findings will pave the way for future applications and research on the design and implementation of online proctored exams. Implications and future research suggestions are discussed.

Keywords: Online proctored exam, online and distance learning, distance education, proctoring online assessment.

INTRODUCTION

Many institutions and universities around the world were forced to close their doors and switch to online learning as a result of the Covid-19 pandemic, which significantly altered how we live and learn. The sudden shift to distance learning has become more popular as a result of the pandemic, making it clear that both students and teachers must use it (Doz et al., 2022). In online distance learning programs, online proctored exams for evaluating students' skills and knowledge are becoming more popular (Andreou et al., 2021; Lee & Fanguy, 2022). These tests are frequently carried out online and monitored by a proctor, either in person or remotely, to maintain the integrity of the assessment process. In this paper, we aim to investigate the opinions and perceptions of the online and distance learners regarding to online proctored exams

Proctored exams have become an essential component of education today, providing students with flexibility and accessibility while also maintaining the integrity of the assessment process (Kharbat & Daabes, 2021).

These tests can be taken by learners anywhere with an internet connection, including their own home. Learners who might have trouble getting to a physical testing location due to distance, disability, or other personal reasons can benefit from adaptability best. Furthermore, by utilizing cutting-edge monitoring techniques such as camera, microphone and screen recording, online proctoring can aid in the prevention of cheating (Han et al., 2021). Considering the fact that information and communication technologies are supported in the processes of communication, interaction and evaluation of learner success in addition to transferring the course contents, the design and implementation dimension of online supervised exam applications gains importance (Daniel, 1996). Overall, online proctored examinations can increase access to education while also ensuring the integrity of assessment processes in open and distance learning (Gudino et.al, 2021).

Proctored assessments strive to maintain the integrity and security of the testing procedure by guaranteeing the accuracy and dependability of the test outcomes (Chen et al., 2021). These online assessments can be administered in modes, such as sessions, automated processes, or recorded sessions depending on the level of supervision and intervention needed. Exams are administered to learners in online distance programs through proctored exams, typically referred to as remote proctoring. Instead of taking these tests in a physical location, learners can take them from home under the supervision of a proctor, who may be present or not, to ensure the credibility of the online assessment process. The proctor can monitor the student during or after the exam and make sure they are adhering to the rules and regulations by using a range of equipment, including cameras, microphones, and proctoring software. They can also be integrated with types of exams like multiple choice questions, essay writing tasks or performance-based assessments. Proctored exams offer advantages compared to conventional testing methods, including convenience, flexibility, scalability, and accessibility (Reedy et al., 2021). Nevertheless, there are drawbacks to this strategy as well, including technological difficulties, security issues, a lack of interpersonal connection, and the possibility of cheating (Balderas & Hernandez, 2020; Zhao et al., 2022). Moreover, these types of assessments also come with challenges and limitations such as difficulties, concerns regarding privacy issues and ethics dilemmas as well as potential cultural biases (Coghlan et al., 2021). These advantages and disadvantages, as well as the necessary hardware and software and industry-recognized best practices for exam integrity, must all be carefully taken into account when designing and executing online proctored examinations for online learners (Lee & Fanguy, 2022). Consequently, it is crucial to design and implement proctored exams while continuously evaluating and enhancing them to ensure their effectiveness and fairness. Taking all these into account, this study was conducted to explore perspectives of online learners in relation to the proctored exam practice.

LITERATURE

Assessments conducted through internet-based platforms, such as learning management systems (LMSs), web browsers, or dedicated software applications, are generally known as online examinations. These evaluations can be categorized according to several criteria, such as their format, content, goals, and the particular circumstances in which they are administered. Three commonly employed modes of proctoring are live, recorded, and automated methods (Hussein et al., 2020). Furthermore, Aurelia et al. (2023) presents an alternative form of proctoring known as image proctoring.

Live proctoring online assessments done in real time are monitored and authenticated by a proctor. These assessments utilize techniques such as verifying identity, conducting environment inspections, enforcing rules, and intervening to monitor and analyze the behavior of those taking the exam and the surrounding environment (Coghlan et.al., 2021). The main objective of this endeavor is to guarantee the integrity as well as the security of the testing process. The availability of online examinations proctored by human proctors whose interactive proctoring makes them well-suited for exam scenarios that include high stakes or intricate circumstances. Moreover, they facilitate the settlement of any academic challenges that may develop throughout the examination.

Recorded proctoring online assessments are a type of online testing where the test-takers' screen, camera, and audio are recorded during the exam session. These recordings are then reviewed at a later time by either a human or automated proctor. The purpose of this strategy is to ensure the integrity and authenticity

of online assessments by recognizing and foiling any instances of cheating or impersonation by the individuals taking the exam. In comparison to alternative approaches, the utilization of recorded proctoring for examinations presents both benefits and drawbacks. The utilization of recorded proctoring has several benefits, such as reduced expenses, enhanced scalability, more adaptability, and a less disruptive encounter. Implementing this approach can effectively decrease expenses related to the recruitment and instruction of proctors, while simultaneously accommodating a substantial number of test takers at different times and locations (Han et al., 2023; Aurelia et al., 2023; Nigam et al., 2021). Nevertheless, it is not without its drawbacks. The efficacy of recorded proctoring in identifying occurrences of cheating or impersonation may be compromised, particularly in cases when test takers use numerous tools or devices. Furthermore, it has the potential to result in delays and increased weakness to privacy intrusions. The process of post-exam analysis and verification of records has the potential to extend the duration needed for the communication of findings and interpretations.

In automated proctoring online assessments, online proctoring software verifies students based on facial recognition, student´s movements, the positions of students' devices like mobile phones, tablets, and additional gadgets, the findings of other people in the room, and other distractions such as the voices of other people. The software then generates a full report, where potential infringements are portrayed as flags or other signs on the exam duration timeline. Software algorithms, machine learning, computer vision, and other forms of artificial intelligence (AI) are used to monitor and verify the validity of online exams known as automated proctored assessments. Motwani et al. (2021) lists a number of methods and tools used by automated proctored online assessments to keep tabs on test takers, record their screen activity, analyze their keystrokes, and identify any questionable or inappropriate behavior. Because it may provide consistent and objective monitoring while reducing the time and money needed for human intervention, automated monitoring of online tests can be helpful for large-scale or high-stakes testing. The use of AI technology, which relies on camera and microphone data to monitor and assess test takers, has led to an increase in online assessments with automated proctoring. In order to explore test takers for any behavioral patterns, these systems analyze various markers such as eye tracking, speech patterns, ambient noises, and objects in the area (Potluri et al., 2023). While automated proctoring with camera support can be critical in maintaining academic integrity, it is essential to concede the potential privacy concerns (Coghlan et al., 2021). The access to and recording of sensitive data during online exams raise legal and ethical considerations that institutions need to address to ensure compliance and protect individuals' privacy rights (Coghlan et al., 2021).

Several studies have investigated the structure of automated proctoring systems and their impact on online assessments. Researchers have conducted research to assess the level of accuracy of AI-driven proctoring strategies (Tweissi et al., 2022). Furthermore, a study conducted by Lee (2020) shed light on the influence of proctoring settings on student performance, revealing that the specific kind of proctoring does not have a substantial effect on academic attainment. The majority of online exam proctoring is carried out by AI systems that utilize the webcam and microphone of the test takers as data sources in order to verify and administer the examinations. These assessments use a variety of techniques and instruments, such as voice pattern analysis, eye movement monitoring, and object or background noise detection. The aim is to monitor and evaluate the behavior and environment of examination participants while notifying any unethical actions. Online assessments that are autonomously proctored and include camera support have the potential to improve the efficacy and dependability of recognizing deception. This is due to the ability of such assessments to capture voice data, facial expressions, and eye movements of test takers, which could potentially indicate collusion or cheating. Nevertheless, it is critical to acknowledge that these forms of evaluations may encroach upon the privacy of individuals due to their reliance on information access, and the recording of such data could potentially give rise to legal ramifications. In conclusion, automated proctored online exams enhance exam security and mitigates cheating through cutting-edge AI technologies; however, educational institutions must consider the balance between maintaining academic integrity and protecting privacy. Additional investigation and continuous review are required to effectively tackle possible ethical and legal concerns in online assessment settings and optimize the use of automated proctoring methods.

Image proctoring online assessments usually involve image proctoring to monitor applicants' behaviors and authenticate their identities. This approach involves utilizing the webcams of the applicants to take images, which are subsequently transmitted to either the test administrator or an artificial intelligence system. These

images undergo meticulous analysis to detect any signs of cheating, such as the presence or absence of faces, unidentifiable faces, or suspicious objects (Aurelia et al., 2023). Image proctoring can be integrated with monitoring methods such as tracking copy/paste actions, monitoring tabs, or employing picture identification (Gopalakrishnan, Dhiyaneshwaran, & Yugesh, 2022). The primary objective of picture proctoring is to ensure the integrity and dependability of assessments by deterring misconduct and imitation.

While numerous online proctoring solutions are accessible, providing the aforementioned types of online exam proctoring services, institutions currently in the process of selecting and deploying such systems must take various factors into account. These factors encompass but are not confined to, the ease and adaptability of integration with the institution's existing learning management system, the technical reliability and resilience of the proctoring system, even under adverse conditions like low internet bandwidth, limited hardware capabilities, or electrical outages, the extent of effective task automation, and the system's reporting capabilities (Hussein, et.al, 2020).

Online proctored assessments have long been recognized as one of the most popular online proctoring systems, combining the benefits of a traditional examination environment with the option to have proctor monitor test takers remotely. The use of online proctoring in education is not a new field of study and even before the Covid-19 pandemic and numerous educational institutions were utilizing proctoring frameworks for online courses (Nigam et al, 2021; Raman, Vachharajani, & Nedungadi, 2021). Online proctored assessments have become increasingly prominent as a method for ensuring the authenticity of online examinations, particularly within the realm of online remote education. To enhance the scholarly authenticity of online assessments, higher education institutions (HEIs) have recently adopted digital proctoring systems (Han et al., 2023).

Despite the increasing popularity of online education in the 21st century, mostly driven by the huge impact of the COVID-19 pandemic, ensuring the quality and reliability of online assessments has been a challenge for educators and institutions. An emerging solution to address this problem is the use of AI-based proctoring systems (AIPS). These software tools use artificial intelligence algorithms to watch and evaluate the behavior and performance of people during test-taking. Automated Intelligent Proctoring Systems (AIPS) are regarded as a technological innovation with the capacity to enhance the dependability and efficiency of tests. Despite their potential benefits, it is essential to acknowledge and address the concerns and limitations associated with these systems. In their study, Nigam et al. (2021) performed a thorough examination of AIPS, assessing both their present state and their prospects for future advancement. In their study, Nigam et al. (2021) analyzed AI-based proctoring systems (AIPS) to investigate their development and potential future opportunities. This study provides a complete analysis of several domains within the field of AIPS, including their architectural design, development requirements, prevailing trends, challenges, and potential future opportunities. The aforementioned reasons include security, privacy concerns, ethical ramifications, faith in artificial intelligence (AI) technology, and the accompanying expenses. The authors' conclusion emphasizes the need of achieving an acceptable balance while using AIPS, by considering the concerns expressed and prioritizing the reasons and suitable implementation.

Online proctoring is also a technique used to remotely monitor and verify the identification of students during tests. The process involves the use of advanced technology such as webcams, biometrics, and artificial intelligence. Nevertheless, online proctoring presents difficulties and ethical considerations including privacy, security, accessibility, and fairness. The practice of online proctoring, which is becoming more prevalent in educational settings, entails the use of technological tools like as cameras, biometrics, and artificial intelligence to oversee and verify the identities of students during examinations (Arnò et al., 2021). The objective of this method, referred to as remote proctoring, is to proactively identify and prevent any instances of academic dishonesty during examinations (Arnò et al., 2021). Online proctoring plays a vital role in upholding academic integrity, particularly in the realm of remote learning amidst circumstances such as the COVID-19 pandemic (Gribbins, 2023). However, it presents certain difficulties and ethical concerns pertaining to privacy, security, accessibility, and fairness (Arnò et al., 2021).

Numerous studies have been conducted to examine various facets of online proctoring. Previous studies have shown the efficacy of online proctoring technologies, such as artificial intelligence (AI) systems and human proctors, in overseeing students during online examinations with the aim of mitigating academic

dishonesty and upholding academic integrity (Coghlan et al., 2021; Tweissi et al., 2022). Nevertheless, there have been expressed apprehensions over the possible presence of biases in proctoring software, infringement upon privacy, and the promotion of a climate of mistrust among those taking tests (Alessio & Messinger, 2021). In addition, Meulmeester et al. (2021) have shown a correlation between the use of online proctoring technologies and heightened levels of concern and anxiety among students.

Regarding security and privacy issues for students, a similar study by Coghlan et al. (2021) was conducted by Balash et al. (2021) and investigated what students think about online proctoring services used to prevent cheating in online exams. User reviews and an online survey were utilized to collect data from students with online proctoring experience. The survey results reveal that students have concerns about the security and privacy of data collected by proctoring organizations. However, they are also aware of the imperative to maintain exam integrity in the ongoing pandemic.

PURPOSE OF THE STUDY

This research is primarily concerned with the opinions and perceptions of the online and distance learners regarding to online proctored exams, as well as providing suggestions on how to build and deploy effective online proctored exams for online and distance learners. With this purpose, the study targets to contribute to the existing literature on proctored exams and provide valuable recommendations for enhancing the precision, security, and user-friendliness of online assessments in online and distance learning environments.

Within this context, this research aims at an in-depth understanding of the experiences and perspectives of online learners regarding the proctored exams application. With this aim in mind, the study will address the following research questions:

- What are the views of online distance learners' towards online proctored exam practice?
- To what extent are online proctored exams aligned with learner expectations?

METHOD

In this study, researchers aimed to reveal learners' perspectives and examine their experiences regarding proctored exams in an open and distance learning environment. In accordance with this purpose, a qualitative case study approach was conducted. The case study approach is descriptive in nature to capture online and distance learners' views and experiences on online proctored exams and illustrate the issue. The case study was used because it enabled the creation of an in-depth understanding of the subject (Yin, 2018; Creswell & Guetterman, 2021).

Participants

This study was conducted with learners enrolled in Anadolu University open education system abroad programs. There are students from 31 countries enrolled in Anadolu University open education system abroad programs. The university has started to implement online proctored exams in order to conduct exams safely, especially in countries with a small number of students in the post-Covid-19 period. During the 2022-2023 academic year spring semester, 372 students took online proctored exam at the university. The data collection tool was sent all students took part in proctored exam. Participants in this study were 69 overseas students who participated in online proctored exams held in the 2022-2023 academic year spring semester and responded voluntarily.

Context

The context of the research is online proctored exams attended by students enrolled in Anadolu University open education system abroad programs. Students from 31 different countries are enrolled in these programs. Approximately five thousand students enroll in these programs every semester. With the closure during the Covid-19 period, exams started to be held under supervision. Proctored exams are conducted using the

QulakExam software. QulakExam features a user interface that makes it easy to conduct tests benefiting both test administrators and test takers (Figure 1). By utilizing intelligence technology QulakExam allows for the creation and customization of test questions while providing detailed analysis reports, for comprehensive feedback. Additionally, the platform includes security measures to prevent access and ensure exam integrity. QulakExam prioritizes information security by implementing encryption protocols to safeguard data during assessments. Furthermore, online proctored exams are carried out with an artificial intelligence-supported exam application and live human supervision is also provided.

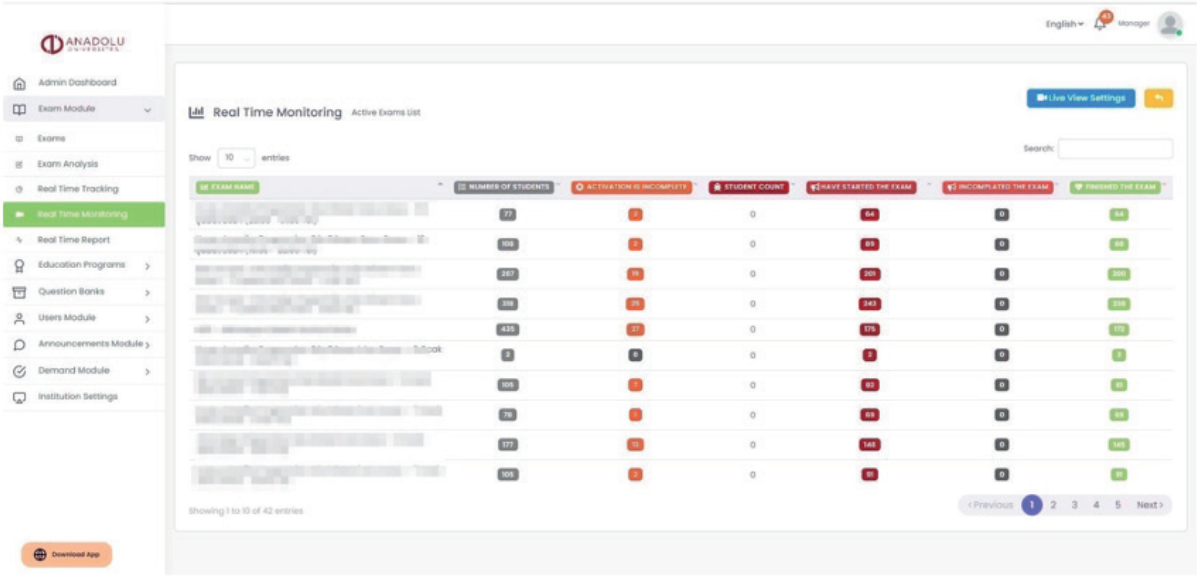

Figure 1. Real time monitoring in proctored exam practice

Real time tracking screen which provides information on start time, activation photos and warnings for possible violations during the proctored exam is given in Figure 2.

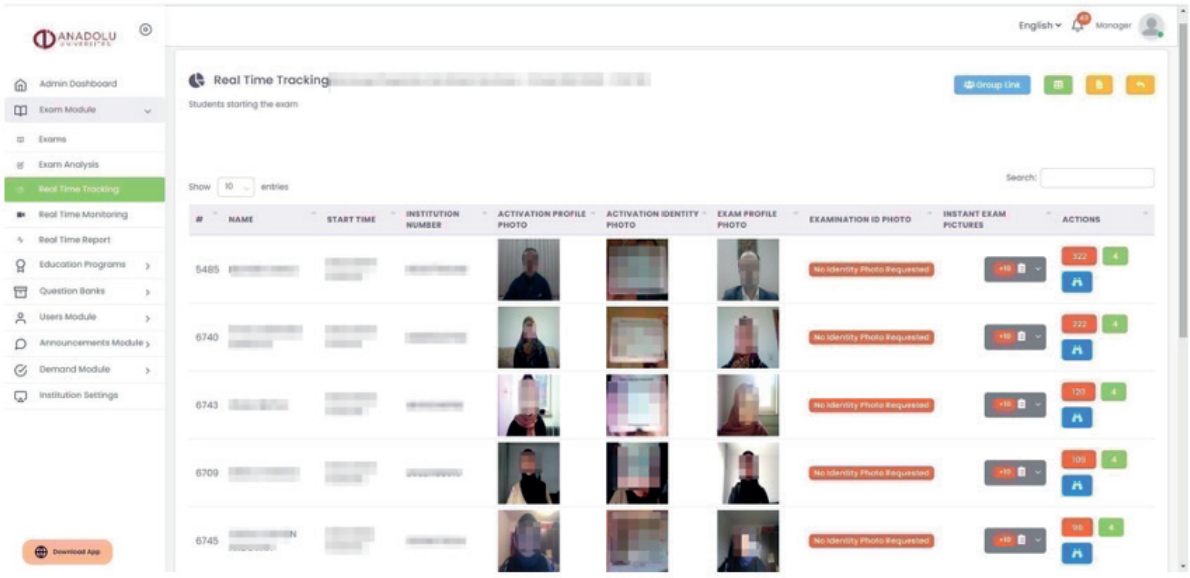

Figure 2. Real time tracking in proctored exam practice

The dashboard for the supervisor who has administrative capabilities in the software is shown in Figure 3.

Figure 3. Online proctored exam supervisor dashboard

The dashboard from the view of invigilators during an online proctored exam is given in Figure 4.

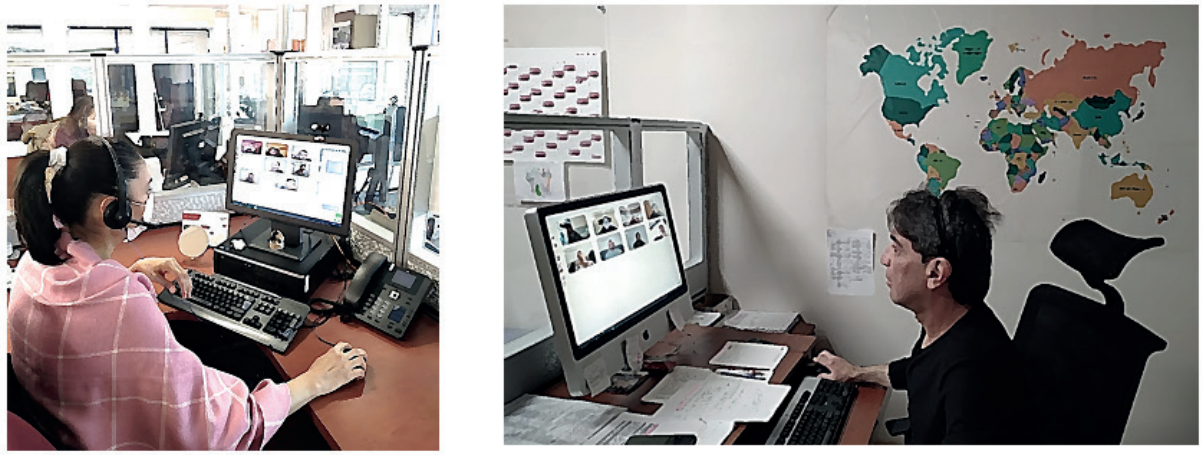

Figure 4. Exam monitoring by invigilators in online proctored exams

Data Collection and Analysis

The purpose of this case study is to provide broad data on online proctored exams. Research data were collected over a period of one week after the online proctored exams were conducted. The data sources used in the research are an open-ended question presented to students via Google forms and the researchers' observations during the exams. In addition, interviews were held with the invigilators in charge of the exam. Additionally, researchers took notes during the administration of online proctored exams. In this context, the data obtained with the online form was analyzed using the content analysis method. The students answered the following open-ended question: "What is your opinion about online proctored exams conducted at Anadolu University Abroad Programs?". Content analysis was applied to reveal categories from the data obtained.

We have built robust protocols to assure the dependability of the coding process in processing the data. We assembled a group of proficient academicians who have expertise in the analysis of qualitative data. Interrater reliability approach was utilized to improve the consistency and reliability of the coding. This included regular meetings among the coders to examine the codes they had extracted. Consensus was reached to settle any differences or conflicts, ensuring coding consistency and accuracy. To mitigate bias, each coder autonomously coded a segment of the data, and the results were then verified by another coder to guarantee uniformity. The utilization of overlapping dual coding facilitated the ongoing advancement of the coding theme and enhanced the dependability of the ultimate coding outcomes. As a result of the analysis, themes were obtained and direct quotations were presented to reflect the students' opinions. Additionally, a thematic map was created.

FINDINGS

The views of learners who took part in the online proctored exam and attended the study voluntarily were analyzed. The collected answers were examined using the content analysis method and three themes were created. Learners' comments were used as the unit of analysis while assessing these viewpoints. Table 1 displays the themes, categories, and corresponding number of coding instances.

Table 1. Themes, categories, and corresponding number of coding instances

Theme	Category	Coding
Dissatisfaction	Surveillance	17
Dissatisfaction	Technical Problem	12
Dissatisfaction	Physical Strain	11
Dissatisfaction	Exam Anxiety	9
Dissatisfaction	Preferring Face-to-Face Exams	8
Dissatisfaction	Other Dissatisfaction Opinions	3
Exam Administration	Implementation of Examinations and Other Expectations	25
Exam Administration	Navigation	16
Satisfaction	General Satisfaction and appreciation	21
Satisfaction	Convenient and Accessibility	9
Satisfaction	Secure and Reliable	2

The obtained themes and their categories are given in the thematic map in Figure 5.

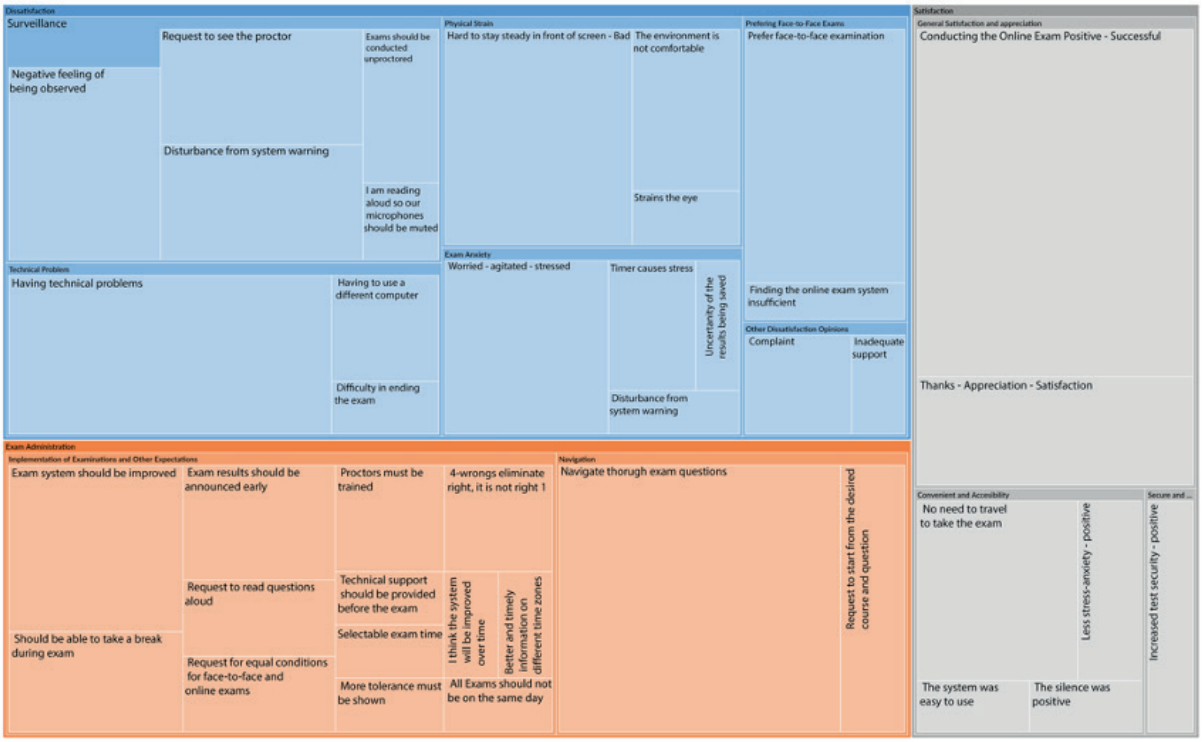

Figure 5. Themes and categories related to online proctored exam

The emerging opinions have been presented along with examples for each theme and category.

Dissatisfaction: Surveillance

Among the negative opinions, the issue that stands out prominently pertains to surveillance during examination. Notably, students who are similarly monitored during face-to-face exams express discomfort with the surveillance aspect in online assessments. This warrants careful examination as one of the critical areas of concern. Below, we present some illustrative examples of opinions related to this topic:

> *"Persistently feeling monitored has been a source of discomfort for me in terms of adapting to exams...."* S063
>
> *"The constant feeling of being observed is humiliating."* S030

In the context of surveillance anxiety, some students have expressed their dissatisfaction due to not being able to discern who is monitoring them. They emphasize that being able to see proctors could create a more favorable environment for them:

> *"It would be better if we could see the proctor as well."* S024
>
> *"The fact that proctors could see me made me feel a bit strange, albeit only slightly. Perhaps it's because it's the first time."* S068
>
> *"I believe the environment would have been more comfortable if we could see the proctors as well."* S013

The warnings issued by proctors during online proctored exams have caused dissatisfaction among some students:

> *"During the exam, the proctor continuously disrupted my concentration by instructing me not to look elsewhere."* S009
>
> *"My situation is one of enthusiasm and desire. We pay a considerable amount for courses, undergo scrutiny during exams, and even receive admonitions."* S015

In addition to these perspectives on surveillance, it has been brought up by two students those exams should be conducted without surveillance. Similarly, the idea of surveillance being not only visual but also auditory was perceived negatively by one student.

Dissatisfaction: Technical Problem

Technical issues experienced by students during online proctored exams are also among the negatively expressed situations.

> *"I was unable to attend both exams. The system continued to prompt, 'Please close the applications below and try again."* S004
>
> *"Despite participating in three different sessions, I encountered issues with both closing the application and saving answers in all of them, unfortunately."* S014
>
> *"There were still glitches in the system. For instance, when I clicked "finish exam", I couldn't log out of the system."* S033

In addition to these issues, some students who experienced difficulty connecting to the exam system have indicated that they were able to log in using a different computer.

> *"I had to borrow my colleague's computer for that day."* S067

Dissatisfaction: Physical Strain

Compared to the exams conducted face-to-face one of the most distinctive aspects is the fact that the entire exam takes place in front of a screen, in front of a camera, depending on the space and resources provided to the students. The AI-supported exam system is capable of issuing warnings if it detects that students have moved away from the screen (camera) or if invigilators observe suspicious behavior from the student in front of the screen. This structure has been highlighted as a negative aspect by some students.

> *"Remaining seated in a fixed position throughout the entire exam did not provide a favorable experience."* S001
>
> *"The mobility in front of the screen is very limited; it's even difficult to lean back due to exhaustion!!!"* S025
>
> *"Sitting in front of a computer for 2-3 hours straight is not very comprehensible either."* S050

In addition to students who mentioned that being in front of the screen and under supervision during the exam is physically demanding, some students have also pointed out that the environment is uncomfortable, with one student specifically noting eye strain.

Dissatisfaction: Exam Anxiety

In the online proctored exam, returning to a previously answered question was prevented, and no opportunity for resuming the exam was granted after its termination. Furthermore, students were empowered to conclude the exam within the allotted time frame. Some students expressed concerns and stress regarding these aspects of the system:

> *"The unilateral and stressful exam was challenging. I hesitated to scratch my head, and unfortunately, I couldn't even concentrate on the questions."* S013
>
> *"I contacted the AOF official in our WhatsApp group, and the stress gradually intensified until I received a response."* S033
>
> *"The concern about technical malfunctions during the exam (such as camera, microphone, or audio connection failure) slightly unnerves me."* S061

Some students have emphasized that the timer displaying the remaining time on the exam screen also contributes to stress:

> *"Moreover, the timer counting backward induces significant stress."* S042
>
> *"Contemplating when the last-second warning for answering a question will appear induces panic during answering."* S063

Warning message from the system and not being sure about saving the answers are also highlighted among anxiety increasing elements.

Dissemination: Preferring Face-to-Face Exams

After experiencing online proctored exams in the Anadolu University Open Education System, students who are new to this process have expressed a preference for face-to-face exams:

> *"I personally prefer proctored exams conducted in face-to-face environments, which mimic real-life settings."* S042
>
> *"I prefer the upcoming exams to be held in face-to-face examination centers."* S043
>
> *"I prefer exams that take place in face-to-face examination centers."* S060

One student has also expressed dissatisfaction with the technical support and the adequacy of the examination system following a technical issue s/he encountered:

> *"In our recent experience with the current macOS operating system, we encountered an issue related to the Safari browser's behavior. Specifically, the application failed to detect that Safari was open, preventing us from initiating the exam. Despite seeking assistance from Global Campus, their support was neither effective nor solution-oriented. However, we did identify an intriguing behavior: an unidentified application seems to utilize certain Safari resources, detecting its state even when Safari is not visibly open. I personally used my son's computer, while my wife installed the Windows operating system. Unfortunately, this system does not appear to be well-prepared."* S026

Exam Administration: Implementation of Examinations and other Expectations

Some students have offered suggestions regarding the management of exams and have expressed certain expectations. At the forefront of these suggestions and expectations is the provision of a system compatible with various hardware and software configurations:

"The application used for the exam system should be capable of running on a wider range of processor types..." S060

"I recommend that you also take into account the diversity of hardware and software." S026

"I hope that the deficiencies in the exam application are rectified before the next examination." S014

There are students who express the need for faster announcement of results following online exams.

"Unfortunately, the announcement of online exam results is excessively delayed..." S062

"If the purpose of online exams is to facilitate life, then we would also like to receive the exam results earlier:)" S064

"We will take the final exams, and despite the exams being conducted online, the results have not been announced yet." S010

In the face-to-face exams of Anadolu University Distance Education System, students are unable to re-enter the exam hall after leaving, whereas there are students in online proctored exams who express a need for breaks.

"Conducting examinations consecutively without any breaks was extremely exhausting." S066

"I took exams for 4 courses in one session; why can't I attend to my restroom needs between two exams?" S009

"If you could allow at least enough time for a brief water break after one exam before starting the next." S050

In online proctored exams, proctors have the authority to verbally or warn students by sending messages if they deem it necessary to maintain exam integrity. However, some students emphasize the need for further improvement of proctor communication during this process:

"I believe it is also important that the individuals conducting the monitoring are competent. When I requested to report a problem occurring in the system, I received a warning stating that keyboard usage is prohibited. In my opinion, individuals responsible for monitoring should first and foremost be knowledgeable about the subject matter." S028

"In the context of examination administration, it is essential to provide adequate training to the exam proctors." S050

In the context of distance education systems, one of the most significant challenges in providing services to students across different continents is the time zone difference. This situation necessitates meticulous planning for both enrollment, support, and examination processes. Furthermore, it is emphasized that students should receive clear and timely communication regarding this matter:

"It would be beneficial to provide more detailed information to those residing abroad. Until the last minute, I was uncertain whether the exams would be based on Turkish local time or the local time of the place where one resides. Unfortunately, when making payments or seeking answers to our questions, we always have to adjust to Turkish local time. A last-minute email arrived regarding the timing." S048

Exam Administration: Navigation

In the context of student feedback, one of the most frequently expressed opinions is the request for the ability to revisit questions during an exam. Anadolu University has previously restricted this feature in unproctored exams. Similarly, in the first-ever proctored exams, this practice has been included in the rule

set. However, the most significant demand from students remains the ability to revisit previously answered or left blank questions within the exam duration:

> *"The inability to review answered and unanswered questions is definitely an oversight. I kindly request that this matter be taken into consideration for future examinations."* S006
>
> *"I do not believe that it is fair to be unable to review the questions I have marked. Personally, I consider it essential to examine the questions I am confident about, mark those I know for sure, and then revisit other questions to verify my answers."* S007
>
> *"Not being able to review questions later is quite unfavorable. In traditional paper-based exams, we can revisit questions where we initially hesitated or those that didn't immediately come to mind. However, in online exams, such an opportunity is lacking. This situation seems unfair and warrants consideration."* S035
>
> *"It would be highly beneficial if we could later revisit the questions, we left unanswered."* S036
>
> *"I advocate for the ability to revisit questions, allowing us the opportunity to answer questions we initially left blank. The only drawback of the exam is the inability to go back to previous questions."* S046
>
> *"There are times when I encounter questions, I've left unanswered or wish to revisit. I believe there should be an option to go back."* S058

It has also been highlighted that the online proctored examination system allows students the flexibility to start with the course and question of their choice:

> *"Rather than sequentially solving questions of all courses according to the system's order, it may be preferable to choose the desired exam first and proceed with that selection within the system."* S002
>
> *"In a face-to-face examination, students have the option to view all the questions during the exam within the given time frame. They can then choose to start from any desired exam (course) and answer the questions they are most familiar with. This provides students with a sense of morale and confidence."* S042

Satisfaction: General Satisfaction and Appreciation

Within the Open Education System, there are students who generally express satisfaction with the exams being conducted online and proctored, appreciating the ability to keep up with innovation and the use of current technologies. Some of the statements reflecting this viewpoint include the following:

> *"The online examination approach is quite innovative and aligns well with today's technological trends. The online proctored exam is the method I would prefer to participate in from now on."* S014
>
> *"The exam was quite straightforward and comprehensible; thank you."* S019
>
> *"The online exam system was excellent overall; harnessing the benefits of technology and embracing the blessings of our digitized world. It would be wonderful if all exams were conducted online."* S051
>
> *"The online examination system was quite successful. I felt proud to be a part of our digitalizing world."* S062
>
> *"The system was functioning quite nicely, securely, and successfully. I was very satisfied with the examination system; I read and answered the questions very well."* S053
>
> *"The new examination system was quite successful; it went smoothly. I hope our remaining exams will be like this as well."* S054
>
> *"The examination system was highly successful and executed smoothly."* S066
>
> *"Despite all the challenges faced during the pandemic, the provision of such a system to us international students is commendable. I sincerely thank you for all the efforts made to benefit us."* S044
>
> *"I extend my sincere thanks once again for this new initiative!"* S063

Satisfaction: Convenient and Accessibility

Among the expressed satisfactions, it is particularly highlighted that online proctored exams provide time and location flexibility for students who are distant from examination centers where face-to-face exams can be conducted, and this environment is noted to induce less anxiety:

> *"It provided time and space savings and convenience."* S037
>
> *"Instead of having to travel for 2 hours to take the exam, I was able to participate in the secure exam from the comfort of my home."* S052
>
> *"Taking the online exam from the comfort of my home environment has reduced my anxiety."* S039
>
> *"The online exam system was incredibly enjoyable and convenient. Due to work requirements, I will have to move from New York to another city, which would have forced me to take a break from my distance education. I was very upset about this because I wouldn't have the time or the means to travel to the nearest exam center for just one day, and it would have been very expensive. If I can continue taking exams from home like this, I am considering studying another degree."* S059
>
> *"I am very pleased. Otherwise, I would have had to travel hundreds of kilometers."* S067

Satisfaction: Secure and Reliable

Students also emphasize that the implementation of online exams with proctoring and centralized control enhances exam security:

> *"For exam security, I can only say it was good."* S024
>
> *"I strongly believe that exam security has significantly improved."* S036

DISCUSSIONS AND CONCLUSION

The result of the study illustrated that online learners were satisfied with the online proctored exams as they are secure, convenient, accessible, and reliable. However, the learners dissatisfied because of the technical problems and surveillance. In addition, the findings also revealed that the administration of the online proctored exams needs to be reviewed. Previous studies that investigate the proctored exams reveled similar and different findings. In their study, Selwyn et.al (2023) conducted a research to examine the use and transformation of proctoring technology, focusing on its 'appropriation', 'objectification', 'incorporation', and 'conversion' by commercial suppliers, university authorities, university personnel, and student groups. One of their findings represented under 'Student perspectives' heading focuses on initial concerns on privacy with regards to "in-home surveillance and eye-movement detection". The concern on privacy is also stated by participants of the study. However, as Selwyn et.al (2023) found out in the study, these concerns will probably fade away in the future. People share their personal data on social platforms and it is possible that their concerns on privacy in proctored exam environment will fade away in the future, as they adapt to the changing circumstances, gain more confidence and empowerment, and enjoy more convenience and quality in online education. However, this does not mean that privacy issues will disappear or become irrelevant, but rather that they will require continuous attention and evaluation from all the stakeholders involved.

Concerns about privacy are a significant ethical issue that arises from both studies, specifically in the context of online proctoring. Just like Coghlan et al.'s thorough examination of the intersection between privacy and AI ethics in their 2021 study, we found similar sentiments expressed by some participants in our own investigation. They shared a common worry about privacy concerns, especially regarding the intrusive nature of surveillance technologies used in educational settings. Similar to Coghlan et al.'s analysis of privacy intrusion, our study participants expressed unease about their personal spaces, such as bedrooms and living rooms, being subjected to scrutiny.

One of the challenges of online proctoring is ensuring the compatibility and functionality of the devices and software used by the examinees. In their research, Nigam and colleagues (2023) underscored the significance

of employing devices equipped with current hardware. While they accentuated the need for contemporary peripheral devices, in this study participants highlighted the necessity of having an up-to-date operating system for the proctoring software function.

Exam Satisfaction is a crucial measure of how examinees perceive and accept online proctoring. Consistent with the findings of Milone et al. (2017), our study also found that a large number of participants were very satisfied with the experience of taking an online proctored exam. Both studies indicate that a significant proportion of the participants express satisfaction with their experience of taking an online proctored exam. They see it as convenient, flexible, and secure. Nevertheless, both studies also pinpoint several factors that cause discontent among the test takers, including the protracted and intricate setup procedure, technological malfunctions and disruptions, and the unprofessional or unforeseen interruption by the proctors.

Exam Anxiety is a common phenomenon that affects many students who take online exams. Analogous to the findings of Woldeab and Brothen (2019) in their examination of 631 undergraduate students at a prominent midwestern US university, our study participants reported that they felt more nervous and stressed when taking online proctored exams, as they had to deal with the technical and ethical challenges of online proctoring.

Surveillance concern is another factor that influences the examinees' experience and performance in online exams. In line with what Nigam et al. (2021) concluded in their recent study, some participants in our study expressed similar concerns about the implications of ongoing surveillance. Both studies highlight how participants worry about the potential negative effects on their mental well-being when they are continuously monitored. The idea that prolonged surveillance can lead to self-doubt and distract from the learning process is a common theme found in both Nigam et al. (2021) and our own study's findings. This similarity highlights the complex challenges that arise from constant scrutiny in educational environments and emphasizes the importance of carefully considering the implementation of surveillance measures.

Training Proctor is another crucial aspect that affects the quality and credibility of online exams. As stated by Furby (2020) since the proctors are responsible for monitoring and verifying the test-takers' identity and behavior, they need to have adequate skills and knowledge to perform their duties effectively. Similarly, some participants of the study suggested that the proctors should receive regular training on the latest technologies, policies, and ethical standards of online proctoring. They also emphasized the importance of having clear and consistent guidelines for the proctors to follow in case of any issues or violations during the exams. Future research could explore the invigilators and instructors' perspective in relation to proctored exams. Additionally, future studies are suggested to concentrate on the design and development of the proctored exams.

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THE INVIGILATOR APP AND SOME VUCA ELEMENTS IT TRIGGERS IN STUDENTS AND LECTURERS DURING ONLINE EXAMINATIONS: A CASE STUDY OF AN ENGLISH STUDIES MODULE AT UNISA

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ABSTRACT

This study reports on the experiences students registered for a first-year, undergraduate English Studies module and English Studies lecturers had with the Invigilator app during an online examination in the first semester of 2023. Current research indicates that e-proctoring induces anxiety and uncertainty in students when they write online examinations. However, there is a paucity of research on the VUCA elements that the Invigilator app triggers in students and in lecturers during online examinations. The study was informed by a critical data surveillance framing, and it used convenience sampling to collect data through semi-structured interviews with seven lecturers (n = 7) for various undergraduate English Studies modules. Additionally, it employed purposive sampling to collect data from five (n = 5) email queries sent by five first-year, undergraduate English Studies module students to their lecturers when they experienced problems with the Invigilator app during their online examination. The findings indicate that lecturers and students struggled with the Invigilator app as an e-proctoring tool. Future research should focus on other less-invasive and better AI-proof assessment methods of maintaining academic integrity in online assessments.

Keywords: The Invigilator app, e-proctoring, online examinations, VUCA, critical data surveillance.

INTRODUCTION

The current paper is motivated by and builds on Shange's (2023) study on the use of the Invigilator app by first-year, undergraduate English Studies students at the University of South (henceforth UNISA). Most importantly, it is triggered by student queries that we (as lecturers) and some of our colleagues in our department tend to receive about the Invigilator app during and after every online examination. Shange (2023) points out that few of the e-proctoring apps that are currently available for higher education (HE) online examination invigilation purposes have not yet been extensively studied in relation to the experiences students have in using them. Most of the studies that have investigated e-proctoring apps for HE online examinations have focused on using e-proctoring apps during the COVID-19 pandemic. Three such studies are those by Khalil et al. (2022), Lee and Fanguy (2022), and Woldeab and Brothen (2021). All these three studies frame e-proctoring technologies as surveillance technologies, with Lee and Fanguy (2022) further framing these technologies as resembling Foucauldian disciplinary governmentality. This framing suggests how e-proctoring technologies lend themselves well as invasive technologies (Brown, 2018; Giller, 2021; Khalil et al., 2022; Langerfeld, 2020; Shange, 2023; Terpstra et al., 2023) that tend to discipline targeted users' bodies.

There appear to be fewer studies that have investigated the impact of e-proctoring technologies on students within the HE online examination environment in the post-COVID-19 pandemic period. As mentioned above, a study by Shange (2023) has examined what it calls 'the bad and ugly' (p. 214) side of the Invigilator app among first-year, undergraduate English Studies students at UNISA during an online examination after the COVID-19 pandemic. One of the variables this study explored was an Invigilator app-induced anxiety in examinees (in these first-year students) (also see Giller, 2021; Langerfeld, 2020; Woldeab & Brothen, 2021). In a different but related context, a study by Saurwein and Xu (2020) investigated the VUCA elements associated with the COVID-19 pandemic among exchange students during a normal, disruption-free semester in 2019 and during a COVID-19-disrupted, VUCA-stricken semester in 2020.

In this regard, the current paper maintains that there is a paucity of research that has examined how online invigilation technologies tend to trigger volatile, uncertain, complex, and ambiguous (henceforth VUCA) elements in some of the HE students during online examinations. Thus, it set out to explore the VUCA elements the Invigilator app evoked in a cohort of first-year, undergraduate English Studies students at UNISA, who used it in one of the online examination sessions in the first semester of 2023. The paper also sought to examine lecturers' perceptions of the use of the Invigilator app in online examinations by undergraduate students in the Department of English Studies.

THE INVIGILATOR APP AND ONLINE EXAMINATIONS – E-PROCTORING ECOSYSTEM

When the COVID-19 pandemic broke out in 2020, many higher education institutions (HEIs) pivoted to emergency remote online teaching and learning (EROTL) (see Khalil et al., 2022) and to emergency online assessment (EOA) (see Chaka, 2020). In fact, schools and universities closed down globally (Sahu, 2020; Viner et al., 2020; cf. Zhou et al., 2020). Later on, Zhou et al. (2020) came to characterise this situation as 'School's Out, But Class's On' (p. 503). It was within this context that many HEIs transitioned to EOA. During this period, EROTL enjoyed the spotlight and a lion's share of scholarly publications, while EOA did not. Since then, though, some of the HEIs have formalised the EOA pivoting into their regular online assessment. UNISA is one such HEI, which is also an open distance and e-learning (ODeL) institution. The move to embrace online assessment, including the initial move to pivot to EOA, is part of safeguarding the academic integrity and credibility of online assessment (see Gamage et al., 2020; Giller, 2021; Guangul et al., 2020). EOA, like EROTL, is unplanned and less-coordinated, whereas online assessment is planned and well-coordinated.

There are different types of online exam proctoring options. The first is recorded proctoring. This is an artificial intelligence (AI) powered webcam in which students' screen and audio feeds are recorded, with no real-time monitoring. The second is auto proctoring, which is a web-based, AI-enabled, automated proctoring. The third one is live proctoring. It is similar to an in-person exam setting, except that it is device-driven, with real-time audio and video feeds from the start to the end (Jain, 2021; also see Arnò et al., 2021; Giller, 2021; Hussein et al., 2020; Nigam et al., 2021; Shange, 2023; Terpstra et al., 2023). The Invigilator app used at UNISA falls under the first proctoring option. It is a mobile-based app, which students can access from their mobile phones, especially their entry-level smartphones (see Mafolo & Shoba, 2021). Dubbed the "Owl" by students (Mafolo & Shoba, 2021) owing to its iconic owl logo (see Figure 1), this invigilation app's real name is the Digikamva Invigilator app (Mafolo & Shoba, 2021). This paper refers to it using its short form, the Invigilator app (cf. Business, 2022). The word kamva in Digikamva is an isiXhosa word for the future. So, loosely translated, Digikamva is Digifuture. IsiXhosa is one of the nine African languages spoken in South Africa.

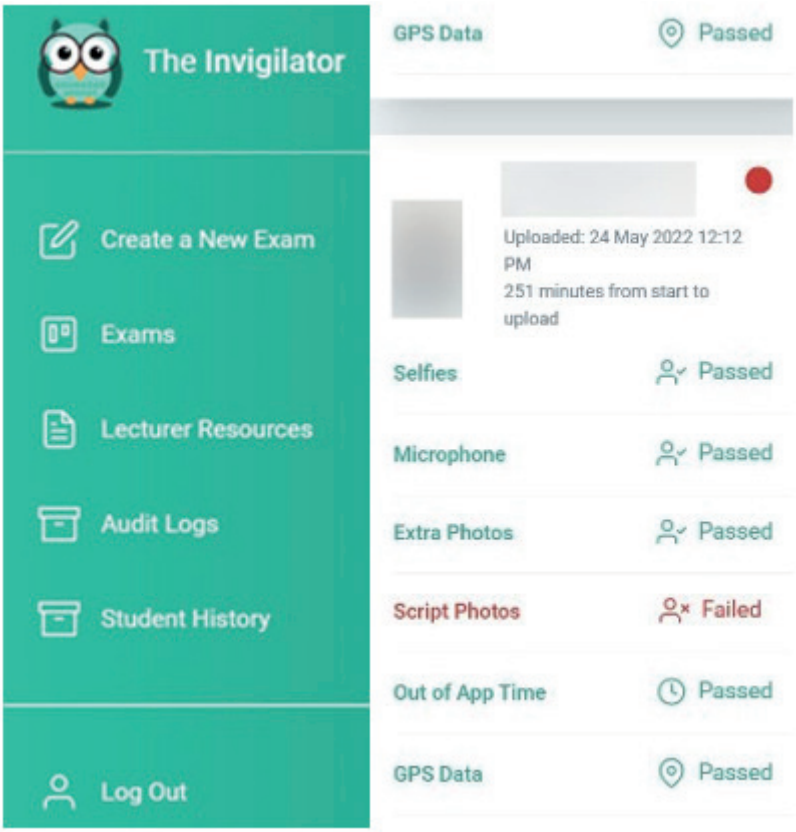

Figure 1. A screenshot of the Invigilator app (left-hand side) and the GPS data it requires from a student (right-hand side).

The Invigilator app is AI-powered. It utilises Global Positioning System (GPS) to track and pinpoint students' location, and to establish students' proximity to one another during an online examination session. It also employs facial recognition technology to verify students' identities while sitting down to take their online examination. In addition, it requires students to randomly take their selfies during the online examination, and to take random audio recordings during the online examination (Business Day, 2022; Mafolo & Shoba, 2021; also see Figure 1). Moreover, using AI-aided facial recognition technology, the Invigilator app matches students' selfies with students' master photos to regularly verify students' identities. In this case, it employs a liveness test, which is an anti-spoofing technology that prevents students from providing photos of video or photos of photos (Business Day, 2022) as proof of their faces. All of this has to do with two issues that are at stake here: test-taker authenticity and test-taking credibility, or identity and authorship verification, and credible and trustable test-taking environment (cf. Giller, 2021; Terpstra et al., 2023).

Broadly speaking, the Invigilator app as used at UNISA and the online examinations conducted by UNISA in the post-pandemic era are part of the broader e-proctoring ecosystem, which, has, since, been adopted by many HEIs globally (see Arnò et al., 2021; Giller, 2021; Khalil et al., 2022; Nigam et al., 2021; Shange, 2023; Terpstra et al., 2023). This e-proctoring move is meant to maintain and safeguard the integrity and credibility of UNISA's online examinations. So, the Invigilator app is the case of a private tech company coming to the rescue (Business Day, 2022) of UNISA's online examinations as is the case with other technologies that are an integral part of our everyday lives such as Google Assistant, Siri, Alexa, Google Maps, and Google Translate (see Chaka, 2023a, 2023b, 2023c).

However, there is a catch in deploying the Invigilator app for online examinations: breaches and violations of students' personal privacy data online. This catch relates particularly to:

- Harvesting these data for genuine and logical uses vis-a-vis the Protection of Personal Information Act (POPIA or POPI);
- Personal data surveillance (cf. Giller, 2021; Khalil et al., 2022; Shange, 2023; Woldeab & Brothen, 2021); and
- Privacy invasion (cf. Giller, 2021; Langerfled, 2020).

In addition to the personal data concerns raised above, there are issues triggering the VUCA elements for some students. One example of these VUCA elements is depicted in Figure 2 in which one ENG0000 (not its real name) student had a chat with the Invigilator app about the problems he encountered during an online examination.

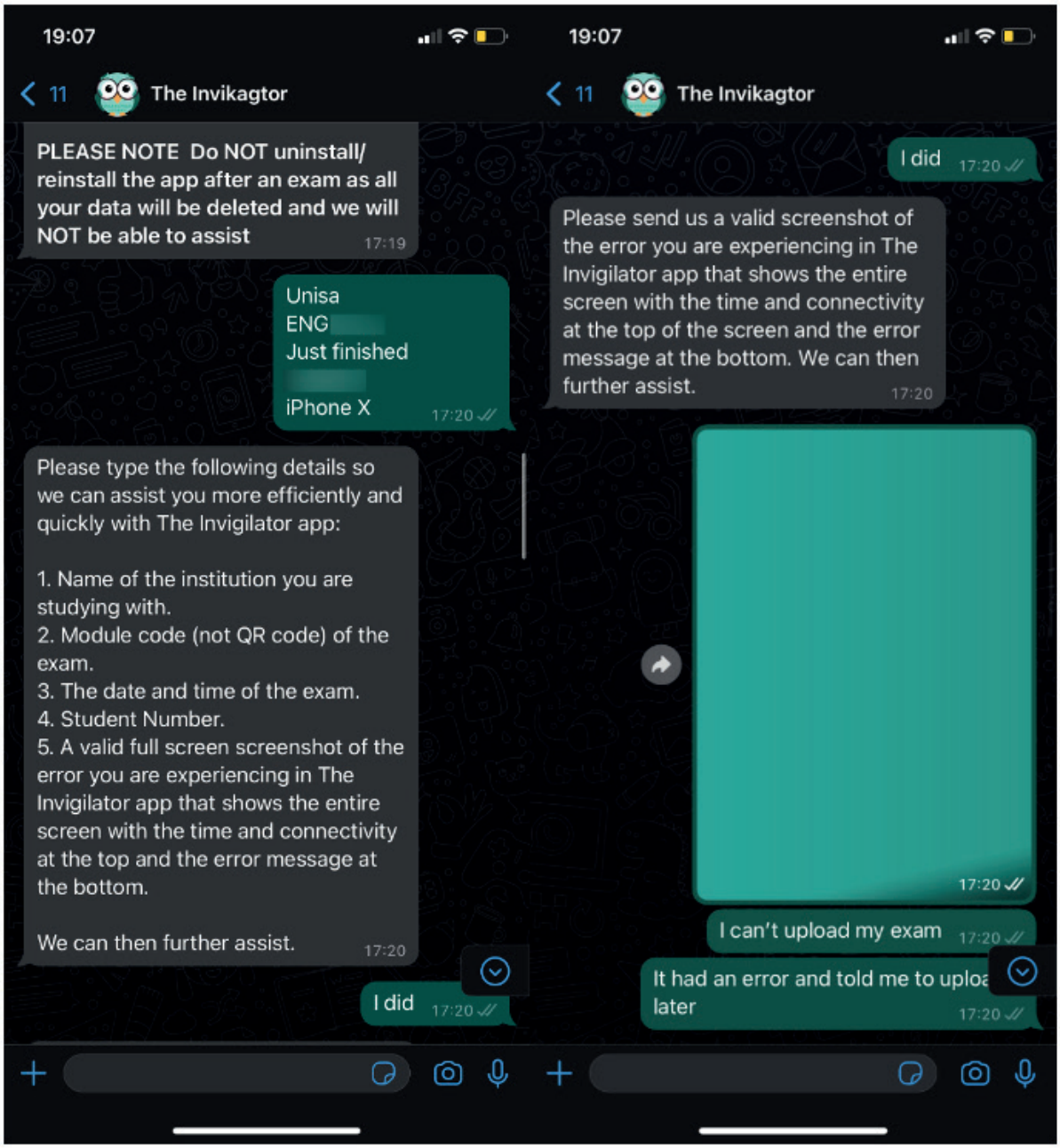

Figure 2. A student's chat with the Invigilator app about the problems the student encountered during an online examination.

Additionally, Figure 3 demonstrates the issues the Invigilator app had flagged for certain students who wrote an ENG0000 (not its real name) online examination. These two figures (Figures 2 and 3) provide a glimpse of some of the VUCA elements that students encounter, at a practical, real-world level, when writing their online examinations in this undergraduate module offered by the Department of English Studies at UNISA.

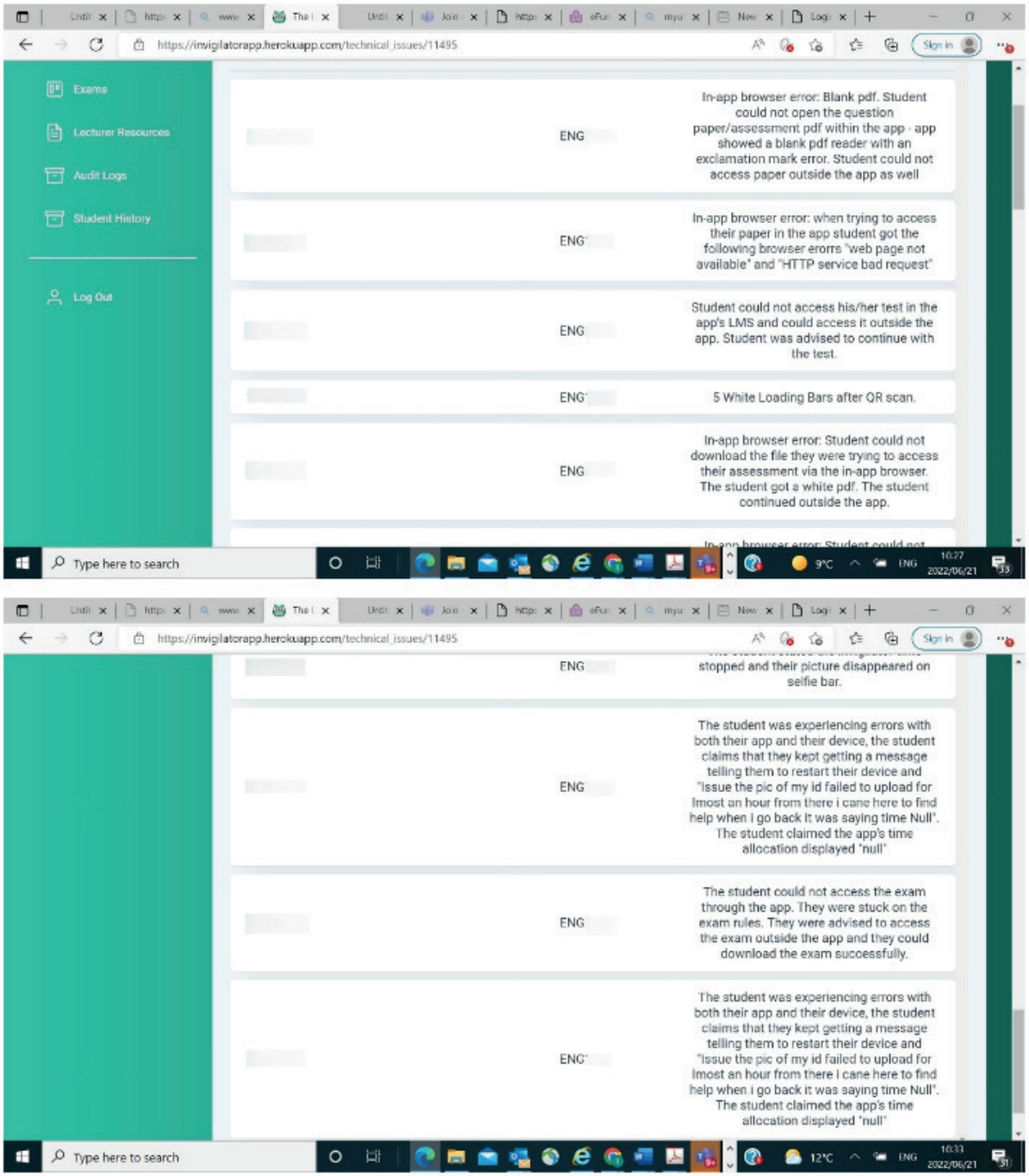

Figure 3. The Invigilator app's reporting on some aspects of students' activities during an online examination.

At a theoretical level, VUCA elements can be triggered by:

- Uncomfortability with the loss of control over personal privacy
- Onerous restrictions on body movements/postures
- Distractions/Interruptions by the Invigilator app through intermittent and untimed alert messages (see Brown, 2018; Giller, 2021).

All of these factors lead to student stress, anxiety, and fear: exam stress, anxiety, and fear tend to camouflage or falsify students' true abilities (cf. Giller, 2021; Woldeab & Brothen, 2021). These factors also have to do with techno-invasion, techno-uncertainty, techno-insecurity, techno-overload, and techno-complexity (Bahamondes-Rosado et al., 2023).

CRITICAL DATA SURVEILLANCE FRAMING

This paper employed a critical data surveillance (CDS) framework. CDS is part of critical data studies and views data technologies such as the Invigilator app as not just neutral technological inventions. Additionally, it sees data technologies as harvesters of data assemblages. As a concept, data assemblages are used to help imagine multiple ways in which big data shapes, manages, inflects, controls, monitors, surveils, and affects users' online lives and personas. In this sense, data assemblages include forms of knowledge; systems of thought; infrastructures; governmentalities; institutions; organisations; practices; communities; individuals; and subjectivities (Iliadis & Russo, 2016; also see Boyd & Crawford, 2012; Crawford et al., 2014; Dalton et al., 2016; Kitchin, 2015; Lee & Fanguy, 2022; Nguyen & Beijnon, 202). From a CDS perspective, data practices like data harvesting and datafication as aided by artificial intelligence (AI) powered tools such as the Invigilator app, are a throwback to Foucault's panopticon and the birth of the prison (see Foucault, 1977, 1980).

This is so since such surveillance data practices tend to invade students' online privacy and, crucially, foist 'self-disciplining governmentality' (Nguyen & Beijnon, 2023, p. 5) on students. Therefore, from a CDS vantage point, when users' data such as students' online data is harvested, managed, controlled, monitored, and surveilled, this practice leads to an algorithmic constitution and enactment of students' identities (cf. Chaka, 2022; Cheney-Lippold, 2011; Couldry & Mejias, 2020; Khalil et l., 2022; Langerfeld, 2020; Nguyen & Beijnon, 2023). Through this algorithmic constitution and enactment, students find themselves passively and helplessly interacting with the Invigilator app at the innocuous and seamless interface level, without knowing and understanding the subtle workings of "the black box of algorithms" (Nguyen & Beijnon, 2023, p. 9, my emphasis) underpinning and powering the Invigilator app. Against this background, this paper argues that the use of the Invigilator app triggers the VUCA elements for some students during online examinations administered by UNISA. That is, it wants to reflect on and interrogate Invigilator app-related student queries by using a VUCA lens.

METHOD

This study sought to examine the lecturer and student VUCA elements that get triggered when students use the Invigilator app during online examinations administered by UNISA. The research question which guided the study was: What lecturer and student VUCA elements are triggered by the Invigilator app during online examinations? The study employed a qualitative research design as this design afforded the two researchers the ability to keep a focus on the views that the participants held (Creswell & Creswell, 2018) about the VUCA elements triggered by the Invigilator app. The researchers were lecturers of first- and third-year level English language modules at UNISA.

Participants and Context

The participants in the study were seven lecturers (n = 7), who taught different undergraduate English modules in the Department of English Studies at UNISA. These lecturers participated in the study through semi-structured interviews. They were purposively selected due to their experience with dealing with the Invigilator app-related student queries. Their profiles appear in Table 1.

Table 1. The demographic data of the lecturers (n = 7).

Participants' labels	Gender	Age	Years of experience with the Invigilator app
Lm1	M	>40-49	1
Lm2	M	>40-49	2
Lfl	F	>60	1
Lf2	F	>40-49	2
Lf3	F	>40-49	2
Lf4	F	>30-39	2
Lf5	F	>30-39	1

In addition, the study used purposive sampling to collect and select data from five (n = 5) email queries sent by five first-year, undergraduate English Studies module students to their lecturers when they experienced problems with the Invigilator app during their first-semester 2023 online examination.

The study was granted ethical clearance by the College Research Ethics Committee with the registration and reference numbers, respectively: NHREC Registration #: Rec-240816-052CREC and Reference #: 90258495_CREC_CHS_2021.

Data Analysis

Both sets of data were analysed using thematic analysis. The themes and sub-themes embedded in and that emerged from the two data sets were both inductively and iteratively searched and reviewed. They were, then, coded and categorised to establish patterns and links between them. A step-wise coding system was followed to capture and distill the richness embodied in the themes and sub-themes. Firstly, initial themes and sub-themes were identified from lecturer responses and student email queries (Chaka et al., 2020; Vaismoradi, 2013). Thereafter, they were compared and contrasted within each data set and across the two data sets. Secondly, final themes and sub-themes were identified following the procedures used in identifying initial themes and sub-themes. Thirdly and lastly, theoretical constructs related to the VUCA elements were established from the final themes and sub-themes of the two data sets (see Chaka et al., 2020).

To ensure that the data collected was valid and credible, firstly, student email data was drawn from a large pool of email messages that students sent to their lecturers during and after the afore-mentioned online examination, which was written in the first semester of 2023. That is, the selected student email data represents the common major categories of queries students sent to the module lectures during this online examination session. In this case, technical glitches emanating from the use of the Invigilator app and the students' inability to scan the Quick Response (QR) code during the examination session were among the top-ranking student queries. Secondly, the validity and credibility of lecturer data was ensured by selecting and interviewing lecturers who taught different undergraduate modules offered by the Department of English Studies at UNISA. Most importantly, the interview items (questions) were sent out to four other English Studies lecturers with a view to having them comment on them and *quality-assure* them. So, these two sets of data have a contextual representativeness of the online examination queries for the undergraduate module being investigated in this study. Finally, to ensure the validity and credibility data analysis, copies of the data analysis of the two sets of data conducted by the two researchers were sent to two more colleagues for their comments.

FINDINGS

In this section, the findings related to lecturers' responses to the semi-interviews are presented first. They are, then, followed by the findings based on student email data.

Data from Lecturer Semi-Structured Interviews

The lecturers' semi-structured interviews were meant to explore the VUCA challenges that lecturers experienced when dealing with the Invigilator app-related student queries during online examinations. The data here is based on lecturers' responses to the interview questions as indicated below.

> *How were you as lecturers first introduced to the Invigilator app?*

The responses to this question were almost similar as lecturers confirmed receiving information for the Invigilator app guidelines from the university or from watching videos about how the App works. However, comments like, "It was sudden and it became a stipulation so we received an email notification with support documents" (Lf1), suggest that this app was not introduced gradually over a long period of time to allow the lecturers time to familiarise themselves with this new way of invigilation.

> *Did you feel that as lecturers you were ready to facilitate this type of invigilation? Please share more information.*

When lecturers responded to this question, they all seemed to share a sentiment of uncertainty and fear about this new change. This comment from one lecturer sheds some light on how lecturers felt about their readiness to facilitate the Invigilator app:

> *"No. The Invigilator app only started sharing how-to videos after we'd been using it for more than a year" (Lf3).*

Another lecturer expressed strong feelings about his encounter with the Invigilator app, and he had this to say:

> *"No, just like students, we were equally confused. The guiding information that we received was kind of frightening to the first users. This made us wonder if we were going to receive enough exam scripts to mark given the rate at which students were being disqualified or not allowed to submit their exam scripts in the modules that started to use the Invigilator app before us" (Lm1).*

> *Were you ever exposed to any e-proctoring before you encountered the Invigilator app?*

The majority of the lecturers who were interviewed had never been exposed to any e-proctoring except for (Lf5) who had experienced it as a student at some point. She said: "*Yes. I wrote exams that used an Invigilator app in the previous year".* On the contrary (Lm1) and (Lf4) responded with an emphatic "*not at all*" or *never",* respectively. When the same lecturer who had experienced the Invigilator app as a student was asked about the queries she had received from students as a lecturer, this is how she responded:

> *"At times, I could not understand what the students needed assistance with as they could not articulate their issues clearly, and as lecturers, we could not see what was happening on their side of the screen and provide suitable answers" (Lf5).*

Seemingly, the experiences that one had as a student are not the same as those that one had as a lecturer.

> *When you experienced the Invigilator app for the first time did you experience any challenges? If so, what were those challenges?*

The lecturers' responses to this question mainly emphasised the challenges that the students experienced and that the students forwarded to them as lecturers for intervention. (Lf2) presented a list of some of the challenges when she mentioned the following:

> *"The amount of information may have been overwhelming, especially for first-year students who were already dealing with the stress of the examination. There was a lot of panic among students who did not scan the app code within the required timeframe. Students were given a WhatsApp number to call in case of technical or other difficulties – many reported not receiving responses. A huge number of microphone recordings were flagged – it took a long time to work through all of them. In addition, many conversations were not in English, so there were times when lecturers, who did not understand the language being spoken in the recordings, had to simply look out for English words that related to the exam. The information gathered from the recordings was not reliable."*

What seemed to bother the majority of the lecturers was the lack of assistance from the Invigilator app technical team as reported by the students. (Lf3) corroborated the observation made by (Lf2) when she

commented, "*We were unable to assist students with technical queries and they reported that the WhatsApp helpline referred them back to us".*

> *Did the students send you any queries relating to the Invigilator app when they wrote the exams? If so, how did you feel about that?*

The lecturers expressed emotions of frustration and helplessness when they were overwhelmed by queries from students about the Invigilator app-related technical challenges. Some of them uttered phrases like, "*… is frustrating because we always work under tight timeframes and the added queries cause more work and less time to process the exam* " (Lf1). In a similar vein, (Lf1) summarised her feelings by saying, "*…leaving us feeling helpless and frustrated*".

> *Were you able to solve these queries from the students relating to the Invigilator app when they wrote the exam? If yes, how so? If no, why not?*

When lecturers responded to this question, it felt like they were the first "line of defence" when students experienced elements of VUCA with the Invigilator app. One lecturer (Lm2) made this comment: "*Submission on the app was a major frustration for students, students panicked when this happened and sent emails. At times they were able to submit on my exams but not on the app".* Another lecturer, who thought that solving queries was not part of the lecturers' responsibility, commented as follows: "*Well solving is out of our hands. We merely administer and do not make decisions like this. So we need to depend on the exams department to support the students and make decisions. Not all decisions are in favour of the students though* "(Lf1). This view indicates that the three parties, that is, the lecturers, the Exams Department, and the Invigilator app helpdesk team have different understandings of what their respective responsibilities are and how far those responsibilities should go.

> *Please share any lessons that you have learnt from dealing with the Invigilator app.*

From the lecturers' comments, it is evident that they had learnt some lessons from their experiences with the Invigilator app. (Lm1) shared this comment: "*I have also learnt the extent to which the Invigilator app subjects students to frustrations".* Another interesting observation was shared by (Lf3) who said:

> *"There were hundreds of recordings randomly identified for cheating, yet a handful revealed actual plagiarism. In the rest of the recordings, we heard evidence of the difficult conditions under which students write their exams – lots of babies crying, children demanding attention, and spouses asking questions relating to domestic tasks."*

This comment reveals the challenges the students experience in their personal lives and some invasion of their personal privacy, all of which may negatively affect their examinations.

Data from Student Queries

In this study, five students sent their Invigilator app-related queries to lecturers during the online examination, while they were using the Invigilator app. The queries were selected in order to understand how the app might have triggered VUCA elements in the students. One student sent this long query:

> *"I am a bit worried and confused, it was my first time using the Invigilator app, hence my uncertainty. I've opted to make use of MS Word to do my assignment and accessed my exam portal via the link that we received via email, and uploaded my pdf document (clear-1 document) by using my laptop. The Invigilator app then required me to upload my document again, I did so, but I could only take pictures of the document. I had to capture my laptop screen but the pictures are not as clear as I would've liked it to be; the reflection of the laptop screen made it difficult to capture a clear picture... Will this affect negatively in any way? Please kindly advise, thank you in advance for your assistance in this matter"* (Student query 1).

This comment shows that even when the student had managed to submit the examination answer script, there was still uncertainty and concern about whether she/he had done the right thing. One gets a sense that this student may not have advanced digital literacy to contend with more than one device while dealing with a stressful event like an examination. This is corroborated by (Lf2) who mentioned that: "*many of the students did not have the required digital literacy to understand how to use the app correctly".*

Another comment that drew our attention was the following:

> *I am experiencing problems relating to the Invigilator app. I asked for some assistance from the helpline but it seems like they cannot assist me with the issue. If as a student you cannot access another Invigilator app elsewhere will the student be penalized? It keeps on saying there is an error mam and I can't go any further and yes I know if I don't use the app then it won't be marked. I've been refreshing the app but it keeps on doing the same thing. Good day mam it's 2 now and it's still not working I am gonna start with the exam. It's still giving me problems"* (Student query 2).

A common view among both the students and the lecturers was how the Invigilator app has brought added distress and helplessness to them during online examinations.

Student query 3:

> *"I'm (name), module Eng15… and I was written on 18 May 2023. I experienced a loadsheding problem when I was uploading my documents on the Invigilator app I tried to communicate with Invigilator assistant on WhatsApp but they didn't respond, I tried to go back to the Invigilator app my documents were not shown."*

Another source of VUCA elements regarding the Invigilator app is electricity load-shedding, which affected some students negatively either while they were in the middle of the online examination or before they even started writing the online examination.

In addition to electricity load-shedding issues, some students seemed to panic when their results were not released, and their immediate suspicion was that things may have gone wrong with the Invigilator app. This student's query suggests that she/he has no idea why her/his results have not been released. This is the message she/he sent:

> *"Help sir, I wrote exam using INVIGILATOR APP but even today my results are pending, and I even have screen shots as proof of submission to the Invigilator app help to get my results"* (Student query 4).

A query like this shows that the Invigilator app sometimes haunts the students beyond the day of the online examinations. In certain instances, students failed to follow the Invigilator app instructions and entered the wrong Quick Response (QR) code. The following screenshot from student query 5 shows that the student was unable to access an examination question paper because of the wrong QR code:

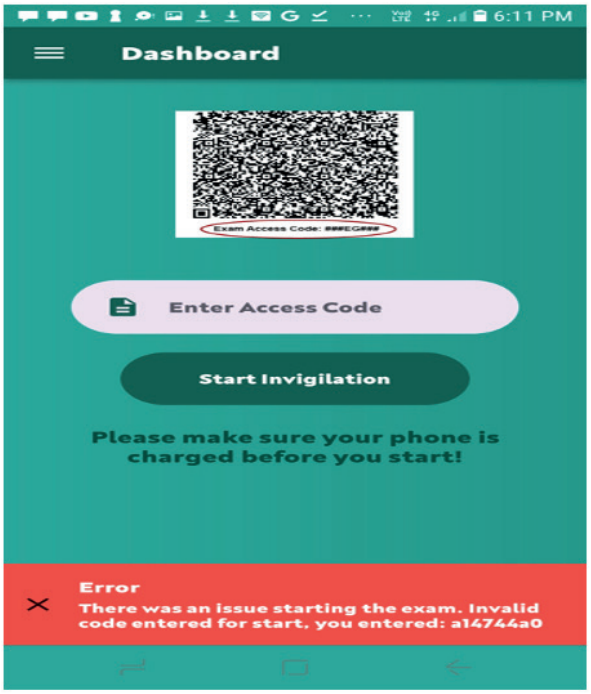

Figure 4. A screenshot of a QR code error the Invigilator app reported on a student's mobile phone during an online examination.

The same problem related to the QR code was flagged by some of lecturers during the interviews. For instance,(Lm2) mentioned that most of the queries that he had received had to do with the students' *"inability to scan the QR code"*.

DISCUSSION

In this section, we discuss the findings that emanated from the analysis of the responses of lecturers (n = 7) and of student queries (n = 5). The discussion focuses on some of the VUCA elements triggered by the Invigilator app in students and lecturers during and after online examinations.

Lecturers' and Students' VUCA Feelings towards the Invigilator App

The findings from both data sets confirm the presence of VUCA elements as lectures and students dealt with the Invigilator app. This is evidenced by the choice of words used by the two groups of participants. Lf4 alluded to this through this comment: "*The app has become an inconvenience for both lecturers and students"*. Seemingly, the intentions to employ the Invigilator app were good, but its use triggered some negative and unpleasant feelings in lecturers and students. On the side of the students, it becomes apparent from some of their queries that the Invigilator app had brought added stress to them. The following comment captures the possible consequences of failing to use the Invigilator app successfully: *"I couldn't write due to a problem that occurred to my Invigilator app, I think the main problem was that we were experiencing load shedding as the Invigilator app took time to proceed, this whole thing has made to have emotional break downs as I submitted a wrong script last year second semester ... this year it is this please assist me"* (Student email query).

This comment demonstrates that students can feel high levels of anxiety emanating from the volatile and uncertain conditions under which they write their online examinations. The Invigilator app could not work due to circumstances beyond this student's control, factors which had to do with the non-availability of electricity that was needed to power not only the Invigilator app but also the student's mobile device. Often when the electricity goes off, which in the South African context is referred to as load-shedding, the network coverage of most mobile network operators through which mobile phone users access the Internet connectivity becomes low or non-existent. All of this adds to the volatility and uncertainty most students experience during their online examinations. So, these factors render the Invigilator app unstable as exemplified by the view: "*The Invigilator app took time to proceed*". Most crucially, cumulatively, all of these factors lead to techno-uncertainty, techno-anxiety, and techno-stress (cf. Woldeab & Brothen, 2021) for the affected students.

Further instances of the VUCA elements related to the use of the Invigilator app are those raised by lecturers in varying degrees. These elements are instantiated by the responses provided by Lf2 and Lf3. For example, Lf2's reference to "*There was a lot of panic among students who did not scan the app code within the required timeframe*" and "*Students were given a WhatsApp number to call in case of technical or other difficulties – many reported not receiving responses*", underscore the techno-stress and techno-panic some of the students experience when accessing the Invigilator app and when trying to get assistance about technical glitches from the Invigilator app's WhatsApp mobile phone number. The failure by students to have a QR code provided to them scanned by their mobile phone handsets within 45 minutes from the commencement of the online examination disqualifies them from having their examination answer scripts marked. The stress induced by this QR code scan failure, together with the one caused by the non-response of the Invigilator app technical help desk, makes online examinations a traumatic experience characterised by VUCA elements for both lecturers and students. This collective VUCA experience is aptly captured by Lf3's sentiment that, "*we were unable to assist students with technical queries and they reported that the WhatsApp helpline referred them back to us"*. Herein lie the elements of uncertainty and ambiguity within the VUCA spectrum about how and who should help students encountering technical problems related to the Invigilator app.

These two elements are also evident from Lf5's observation: "*At times, I could not understand what the students needed assistance with as they could not articulate their issues clearly and as lecturers, we could not see what was*

happening on their side of the screen and provide suitable answers". Again, the foregoing students' and lecturers' comments foreground the collective VUCA elements induced by the Invigilator app that students and lecturers experienced during the online examinations. Again, borrowing from Woldeab and Brothen (2021), the two standout VUCA elements in this case are techno-uncertainty and techno-ambiguity.

In a different but related context, Majola and Mudau (2022) highlight the uncertainty and ambivalence lecturers have about dealing with the Invigilator app issues. They maintain that lecturers need technical support irrespective of the level of training received for the implementation and usage of e-learning platforms. Even though online proctoring may seem like a solution to the problem of cheating in online examinations, Lee and Fanguy (2022) argue that a decision to use online proctoring technologies is deeply rooted in rather problematic and authoritarian educational approaches. They also point out that although there are optimistic views about the effectiveness of online proctoring technologies in reducing the amount of student malpractice during online examinations, decisions informing their use are rather ruthless. In our view, the ruthlessness associated with the use of the Invigilator app is manifest in lecturers' responses and in student email queries, which paint a bleak picture of the Invigilator app-related challenges. Moreover, this ruthlessness is nothing short of invasive surveillance that has the elements of Foucauldian panopticon (Foucault, 1977, 1980) and of "self-disciplining governmentality" (Nguyen & Beijnon, 2023, p. 5). It has everything to do with the AI-based algorithms of controlling, monitoring, and policing students, which are part of online examination surveillance data practices.

Technical Challenges and Socio-Economic Issues Related to Using the Invigilator App by Students

In addition to learning about the frustrations and the predicaments that the students experienced with the Invigilator app, some lecturers also bemoaned the conditions under which some students wrote their online examinations after listening to the Invigilator app recordings. Lf3 crisply encapsulates this comment: "*There were hundreds of recordings randomly identified for cheating, yet a handful revealed actual plagiarism. In the rest of the recordings, we heard evidence of the difficult conditions under which students write their exams – lots of babies crying, children demanding attention, and spouses asking questions relating to domestic tasks.*" For one thing, this comment reveals the difficulties that students face when they write online examinations in their homes. For another thing, it exposes the invasive nature of the Invigilator app on the personal privacy of students in their private personal spaces. Importantly, it highlights how certain home conditions are not conducive to writing any form of examination as students' attention gets diverted from writing an examination by unavoidable distractions going on in their respective home environments. One irony of these forms of distraction is that these are the very students that their lecturers and their university expect to excel in and pass their examinations. Another irony is that when lecturers mark these students' examination answer scripts, they do not have any inkling of the challenging conditions under which these students would have written their examinations. To this end, Shange (2023) maintains that students may sometimes not have any control over the environment in which they take their examinations like noise in the background. In this case, there is a danger that the differentiation between public spaces and private spaces may be blurred if students are required to keep their webcams on during online examinations (Gordon et al., 2021; also see Terpstra et al., 2023). More often than not, it is not easy to determine if the benefits that online invigilation technologies such as the Invigilator app may have outweigh the concerns raised about them (see Nigam et al., 2021). In this study, though, the latter tended to prevail over the former.

Elsewhere, Eaton and Turner (2020) raise concerns about the relationship between proctoring systems and student mental health. In addition to the issue of digital inequalities which may impact the students' problems with the Invigilator app, some researchers have highlighted the unfairness that has been exposed by online assessments. Lee and Fanguy (2022) concede that the narrowly focused discourse about fairness on online examinations unintentionally, but unavoidably, neglects the importance of the surrounding environments of each student. A typical example is when students from different geographic and social backgrounds do not experience the same challenges. To this effect, Hussein et al. (2020) suggest a fit-for-purpose online examination proctoring technology to possibly address the inequalities that may exist among diverse students.

CONCLUSION

The lecturer's semi-structured interviews and the student email queries employed in this study have provided a glimpse into the VUCA elements that get triggered when students use the Invigilator app during online examinations at UNISA. What is evident is that not only did students suffer the negative consequences of this online invigilation tool, but lecturers also had difficulty trying to resolve student Invigilator app-related queries during online examinations. While lecturers empathised with their students, they also lamented the extra burden that the Invigilator app placed on them in addition to their everyday module-related responsibilities. It is therefore evident that the Invigilator app may serve as a deterrent against student cheating during online examinations, but its proclivity to trigger VUCA elements in both students and lecturers, including its invasion of student personal privacy, is a grave cause for concern that remains unresolved. In view of this, we recommend that future research should focus on ways of mitigating the negative impact of the Invigilator app on both students and lecturers during online examinations. We also recommend that the Invigilator app's technical team should eliminate the confusion and ambiguity they create by conflating some of the technical issues students experience when using the Invigilator app with the fact that lecturers will resolve those issues. Lecturers are not technicians; rather, they are module teachers. Some of the less evasive methods to be considered – with the word less being understood as relative and as varying with contexts – could be monitoring the applications running on students' devices, the contents students have on their clipboards, and the websites students visit during online examinations (cf. Terpstra et al., 2023).

Most importantly, we feel that the future use of the Invigilator app should comply with the provisions of the Protection of Personal Information Act (POPIA or POPI) together with the provisions governing the other related electronic regulations prevailing within the South African jurisdiction. Finally, lecturers should be encouraged to design online examinations that test less of the regurgitation of module content knowledge and more of the personalised critical thinking and creative skills needed to handle module content online. These types of online examinations may obviate the need for the use of invasive AI-powered online examination invigilation tools.

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CLOSING THE TALENT GAP: A PROPOSED MICRO-CREDENTIAL MODEL IN MALAYSIAN FORMAL EDUCATION

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ABSTRACT

The global talent gap is a consequence of skills mismatch among job seekers. Although micro-credentials appeared to be a potential solution to narrow the talent gap, it is unclear how they can be effectively implemented in a structured academic pathway. The purpose of this study is to explore the potential of a proposed micro-credential model for formal education via the Accreditation of Prior Experiential Learning Micro-credentials (APEL.M), to support the talent gap challenges faced by companies in Malaysia. The study used a qualitative case study method with data collected mainly from a focus group discussion among relevant faculty heads, administrators, and senior management team members. The findings indicated that despite potential challenges and issues towards implementing the new micro-credential model, the proposed model is significant for policymakers, higher education providers, and industry stakeholders interested in addressing the talent gap and creating alternative pathways to formal academic qualifications.

Keywords: Micro-credentials, talent gap, MQA, APEL.M, formal academic qualification pathways, higher education providers.

INTRODUCTION

The COVID-19 pandemic and economic and geopolitical instabilities have made the past three years challenging. The World Economic Forum's 2023 Future of Jobs report predicts that by 2027, 83 million jobs will be lost globally, while close to 70 million new ones will be created (World Economic Forum, 2023). This situation implies employees need to improve their skills to adapt to shifting norms. The report also highlights that the huge talent gap is a significant obstacle for companies looking to transform their business model.

The talent gap is a mismatch between job seekers' skills and employers' requirements, caused by technological advancements, changing job needs and skills shortages in specific fields (World Economic Forum, 2023). This gap can lead to unfulfilled job openings and talent shortages in major industries, significantly impacting the economy. The global talent gap is a growing concern for many organisations and industries worldwide. In the current dynamic and often disruptive business environment, companies struggle to meet the demand for new skills and competencies. Agrawal et al. (2020) reported that companies are adopting hiring, reskilling, contracting, redeploying or releasing employees to address the talent gap. Additionally, 87% of surveyed companies revealed they are currently experiencing or expecting workforce skills gaps within the next five years, due to the shifting market, technology trends and changing talent needs.

As a result, closing the talent gap has become a priority for many companies, but they lack strong capabilities in curriculum design of their skills-building programmes. The high 10% unemployment rate among Malaysian youths is caused by a mismatch of skills with industry demand (Tay, 2023), and even existing technical and vocational education and training (TVET) is outdated. Employer focus more on job seekers' skills 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 micro-credentials, which provide targeted training in specific skills and high-demand competencies (Brown et al., 2021). The World Economic Forum (2023) predicts employers will increasingly turn to alternative credentials, such as micro-credentials, to identify and evaluate job seekers. This study will explore the potential of micro-credentials in addressing the talent gap, focusing on developing a new micro-credentials model for formal academic qualifications. The new model supports the challenges companies face in building their own skills building or reskilling programmes by offering on-demand micro-credential courses that are shorter, affordable and more flexible. These courses are sub-certifications that can lead to a pathway for formal academic qualifications.

LITERATURE REVIEW

The Emerging 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 micro-credentials in HEPs (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).

The Opportunities and Challenges of Micro-Credentials

Micro-credentials have gained popularity recently due to their potential benefits and opportunities. According to Che Ahmat et al. (2021), micro-credentials offer flexibility in design and delivery, allowing learners to control their professional development and customize their learning pathways. They are also demand-driven, cost-effective and can help learners enter the workforce faster. A series of stackable micro-credentials in Malaysia can lead to a formal academic qualification, provided the Malaysian Qualifications Agency's micro-credentials regulations and guidelines are complied with. However, some challenges must be addressed, especially in the Malaysian context. These include handling the huge influx of online learners (Alias, 2020), institutional readiness (commitment on financial and non-financial support, facilities, and infrastructure), awareness and acceptance of micro-credentials (Che Ahmat et al., 2021), the lack digital skills and knowledge among HEP educators, and limited resources in developing micro-credential courses (Che Ahmat et al., 2022). Overall, the current study on the new micro-credentials model for formal academic qualifications can act as a practical guideline for future micro-credentials implementation, filling the knowledge gap and promoting the benefits of this innovative educational approach.

Micro-Credentials in Malaysia

In Malaysia, micro-credentials implementation among HEPs has gained momentum due to the Malaysian Qualifications Agency (MQA's accreditation guidelines and policies since 2019. According to information from the Malaysian Qualifications Agency (MQA) website and the Enhancement Themes (2022) webinar, micro-credential guidelines for Malaysia were introduced in 2019 under "Continuous Professional Development". Phase 2 in 2020 established "Guidelines to Good Practices: Micro-Credentials", while Phase 3 in 2022 launched "Guidelines to Good Practices: Quality Verification of Stand-alone Micro-Credentials". These policies consolidate short, non-credentialed courses under the Malaysian Qualifications Framework to offer flexible, lifelong learning opportunities and ensure no one is left behind. HEPs and training providers are responsible for implementing and adapting the programmes to their internal processes while aligning with MQA requirements (Sugathan et al., 2021).

As of April 21, 2022, 67 HEPs have unbundled 648 accredited programmes into 11,763 micro-credential courses (Enhancement Themes, 2022). The high number of micro-credential courses implies that with proper guidelines and policies, HEPs are more confident in unbundling their programmes according to the MQA requirements. The new MQA stand-alone micro-credentials policy expands the market to training providers and industry players (Chua, 2022), and APEL.M (Accreditation of Prior Experiential Learning with Micro-Credentials) was introduced in early 2023 as a pathway for learners to access academic programmes even if they do not meet entry requirements (see Figure 1).

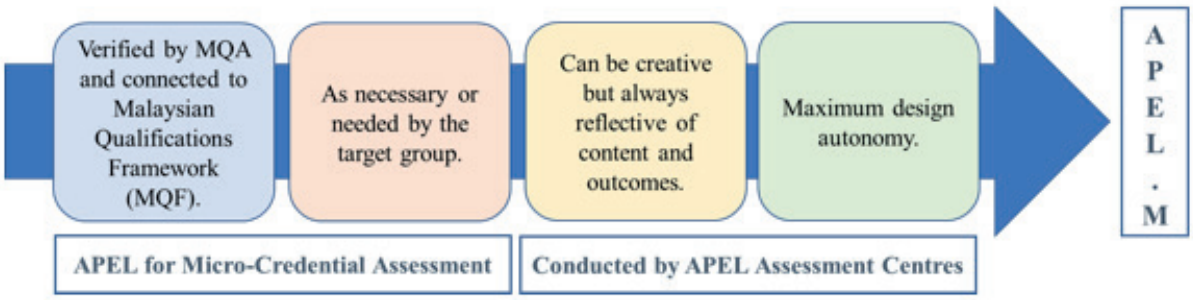

Figure 1. Overview of APEL.M Good Practices Guideline (Adapted from Enhancement Themes, 2022)

Furthermore, the Human Resource Development Corporation (HRD Corp), under the Ministry of Human Resources, collaborated with the Ministry of Higher Education to introduce the first industry-based micro-credential initiative in 2022. From an industry perspective, micro-credentials support employees in gaining expertise through short, bite-sized learning certificates and recognition of non-traditional career paths (HRD Corp, 2022). As of 2022, HRD Corp has approved 11,493 micro-credential courses, while 13,224 applications await approval (HRD Corp, 2022). This large number of micro-credential courses reflects the government's commitment to narrow the talent gap and encourage innovative means of llifelong learning through the micro-credential initiative.

Even though micro-credentials have the potential to bridge the talent gap, research on micro-credentials in Malaysia is still in its infancy stage (Che Ahmat et al. 2022; Kumar et al., 2022). A literature review search revealed limited studies on micro-credential implementation in Malaysia. For instance, Lim et al. (2018) presented six potential ways of implementing micro-credentials for undergraduate programmes at a private university, while Che Ahmat et al. (2021) provided an overview of micro-credentials, examined their challenges and benefits, and shared UiTM's (a public university in Malaysia) micro-credential framework. Sugathan et al. (2021) conducted a desk review on micro-credential implementation in three top public universities in Malaysia. Kumar et al. (2022) explored pre-service teachers' perceptions of micro-credentials used to address online learning challenges during COVID-19 pandemic. Despite positive reactions towards micro-credentials, these teachers lack awareness of the micro-credentials' professional value. Che Ahmat et al. (2022) conducted a qualitative study with micro-credential content developers at a public university, highlighting their understanding of micro-credentials and lack of digital skills and resources affecting the development of micro-credentials.

Based on these extant studies, micro-credential research in Malaysia has been limited to concept papers or case studies based on private or public universities. However, none of the studies has focused on the experience of open and distance learning (ODL) universities like Wawasan Open University (WOU), which has a robust online learning platform to offer flexible, affordable and accessible micro-credential courses to learners. WOU's Centre for ODL Experiences (COLE) supports its internal course developers to improve the learner experience and engagement, minimizing challenges related to digital skills and knowledge that were mentioned by Che Ahmat et al. (2022). Additionally, none of of the extant studies share a clear micro-credential model model that benefits the industry and the individual learner by closing the talent gap and acquiring formal academic qualifications. Therefore, there is a research gap and an opportunity to explore the role and impact of micro-credentials in a broader context (Che Ahmat et al., 2022; West et al., 2020).

METHOD

The study used case study as the research method due to its usefulness in exploring the "how" and "why" of a phenomenon (Yin, 2014) and as a result, enable an understanding of that particular phenomenon situated in a wider context (Yazan, 2015). In particular, the phenomenon of interest in this study refers to the new micro-credential model for formal academic qualifications situated under the context of the Wawawan Open University. The new model focuses on the progression from micro-credentials to formal academic qualifications, including identifying suitable micro-credential courses, and pathways to formal academic qualifications.

The research questions of the study focus on the following:

1. What are the factors to consider when developing a new micro-credential model with academic qualification pathways?
2. What are the issues and concerns to consider when developing and implementing the new micro-credential model with academic qualification pathways?
3. What does the new micro-credential model look like?

Data Collection Process

The following activities are carried out in stages to address the research questions and establish the basis for the new micro-credential model with academic qualification pathways:

Stage 1. Analyzing Documents and Designing the New Micro-Credential Model

Two representatives, who are the Head of School of Digital Technology and the Dean of School of Science and Technology, reviewed the requirements of the MQA and APEL.M guidelines and designed a first draft of an unbundled micro-credential model leading to formal academic qualifications, while at the same time, meeting the industry needs.

Stage 2. Conducting Focus Group Discussion with Faculty Heads and Administrators

A focus group discussion was conducted to get feedback on the first draft of the new micro-credential model and to discuss potential challenges and constraints. All Heads of School, Head of WOU Academy, Director of Marketing & Regional Centre Operations, and the Head of Quality and Government Relations were included in the focus group.

Stage 3. Finalizing the New Micro-Credential Model

Based on the feedback gathered during the focus group discussion, appropriate actions were taken to establish a finalized version of the new micro-credential model with academic qualification pathways.

Stage 4. Getting Endorsement from Senior Management

Senior Management reviewed the new micro-credential model and validated it to be pilot tested on two programmes, namely Bachelor of Software Engineering (Honours) (BDSE) under the School of Digital Technology and Bachelor of Technology in Electronics (Honours) (BTEL) under the School of Technology and Engineering Science.

Research Participants

The current study was conducted with nine research participants, all of whom were purposively selected based on their experience and willingness to design the new micro-credential model. The four faculty heads from differenc schools, including School of Business and Administration, School of Education, Humanities and Social Sciences, School of Digital Technology, and School of Technology and Engineering Science, were among the key research participants. Additionally, five other research participants, including the Head of WOU Academy, the Director of Marketing & Regional Centre Operations, the Head of Quality Assurance and Government Relations, and two senior management team members, were also invited to share their insights on the potential benefits and challenges of implementing the new micro-credential model, as well as to validate its design.

Data Analysis

The data collected from all the various data collection stages, hugely from the focus group discussion, were analyzed using qualitative content analysis which involved coding and categorization of data, and comparison and conclusion of data patterns that emerge from the information gathered (Cohen et al., 2018). To ensure validity and reliability, the data evidences were also compared and contrasted with existing literature.

FINDINGS AND DISCUSSION

The study's findings are structured according to the research questions.

Factors to Consider When Developing a New Micro-Credential Model

Based on the outcome of the Stage 1 of Analyzing Documents, two important factors that need to be considered when developing a new micro-credential model are as follows:

1. Learners can join the academic programme via APEL.M after completing a minimum of 50% of credits via micro-credential courses
2. A flexible learning approach is endorsed for delivering micro-credential courses, encompassing Open and Distance Learning (ODL) as well as hybrid models.

As a result of this finding, a new generic micro-credential model was designed (see Figure 2).

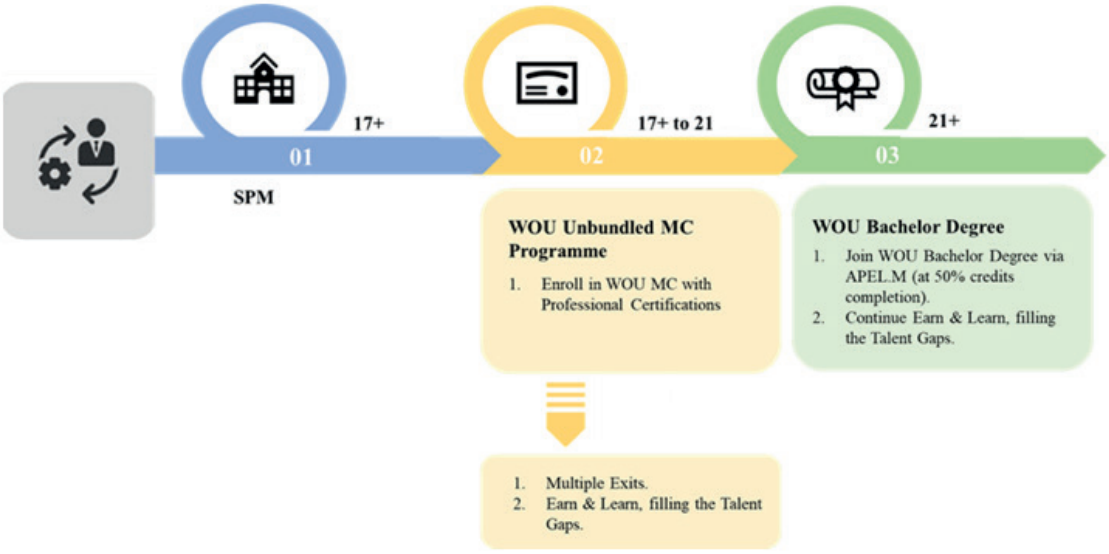

Figure 2. The Generic Micro-Credential Model

Figure 2 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 Micro-Credential programme.

The WOU Unbundled Micro-Credential 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 Micro-Credential 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.

Issues and Concerns to Consider when Developing and Implementing a New Micro-Credential Model

Some of the issues and concerns raised during the Stage 2 of Focus Group Discussion with Faculty Heads and Administrators regarding the development and implementation of micro-credentials were similar with those indicated in past studies (see Table 1).

Table 1.

Issues and Concerns from Focus Group Discussions

Emerging Theme	Issue & Concern	Remarks
Industry	• Lack of recognition.	• Build confidence in value and credibility of micro-credentials as an alternative academic qualification pathway.
Public	• Lack of public and parental acceptance.	
Marketing	• Length and duration of unbundled certifications.	• Design or improve the micro-credential model with professional certifications comprising limited number of courses.
	• Acceptance of professional certifications by parents.	• Work towards industry recognition of professional certification.
Quality	• Compliance with MQA and APEL.M requirements.	• Award professional certifications under WOU Academy.
Academic	• Lack of foundational knowledge for unbundled courses in a degree programme.	• Offer bridging or remedial classes to strengthen learners' foundation.
Learner	• Financial constraint	• Develop strong funding mechanism.

Industry and Public: Lack of Recognition and Acceptance

A specific concern raised 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.

Marketing: Duration of Micro-credentials and Parental Acceptance

Several things need to be considered from the marketing aspect. One of them is the length and duration of the unbundled certifications. It was highlighted that the unbundled certification's duration should not exceed one year for better learner retention and completion rates. Furthermore, it is crucial to ensure that parents accept these certifications, as they will be the ones who ultimately decide if their children will enrol in a particular programme. To improve the micro-credential model, it is also necessary to create professional certifications that comprise a limited number of courses. This will make it easier for learners to complete the certifications and make them more appealing to parents. Another point revealed during the focus group discussion is the need to work towards industry recognition of the professional certifications as it will help create a standard for what is considered "professional" and make it easier for learners to find jobs upon completion of the certifications.

Quality: MQA Compliance

The concern raised for quality is regarding the need to ensure quality and compliance with MQA and APEL.M requirements. Here, the focus group suggests that WOU Academy should award the professional certifications. These certifications are designed to meet industry standards and provide students the necessary skills and knowledge to suceed in their future careers.

Academic: Lack of Foundational Knowledge

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.

Learners: Financial Constraints

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.

The New MC Model with Academic Qualification Pathways

Based on the document analysis, focus group discussion with faculty heads, members and administrators, and feedback given during the endorsement approval process, the new micro-credential model was validated and finalized for two academic programmes of Bachelor of Software Engineering (Honours) (BDSE) and Bachelor of Technology in Electronics (Honours) (BTEL) to be pilot tested for unbundling according to the new micro-credential 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 and BTEL models were launched in May and September 2023 respectively.

The BDSE Model

For the BDSE model (see Figure 3), 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.

Figure 3. The BSDE New Micro-Credential Study Pathway Model

The BTEL Model

Figure 4 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.

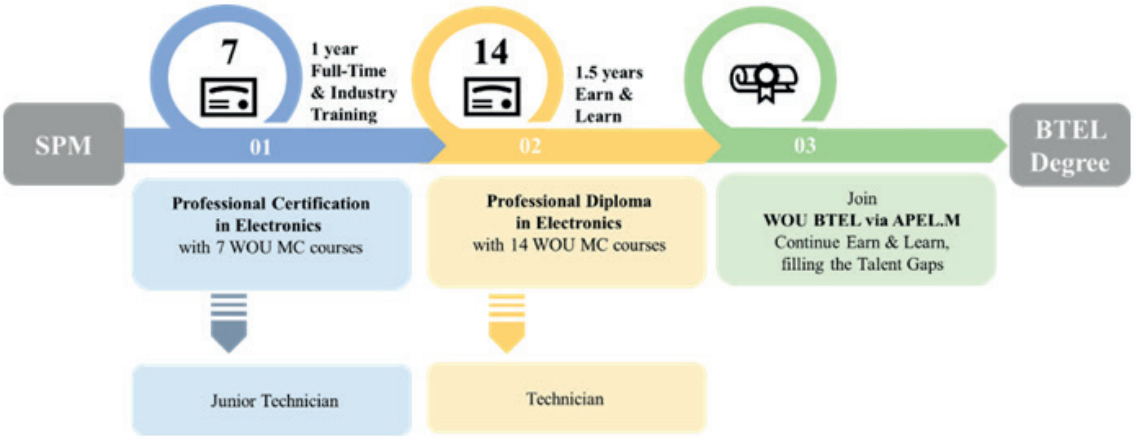

Figure 4. The BTEL New Micro-Credential Study Pathway Model

In contrast to the BDSE Micro-Credentials Model which enables learners 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.

LIMITATIONS AND FUTURE RESEARCH

The current case study has three limitations. First, the current study is based on a single case study from an ODL university in Malaysia. Due to the limited sample size, the findings of the study cannot be generalized. However, the findings and discussion would be able to provide future researchers with a good reference on developing micro-credentials. Moreover, practitioners from other Higher Education Providers would be able to benchmark against and improve on WOU's new MC model with academic qualification pathways. Second, the micro-credentials model is still fairly new and tested on two formal academic programmes, the model's effectiveness cannot be ascertained yet. Third, 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.

CONCLUSION

In conclusion, this study highlights that micro-credentials plays 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:

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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INTRINSIC MOTIVATION OF DISTANCE LEARNERS IN HIGHER EDUCATION INSTITUTIONS

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ABSTRACT

As information and communication technologies and learner characteristics in higher education develop, so do distance education methods, which are implemented at various levels by higher education institutions. The involvement of students in the learning process is one of the most crucial factors to consider throughout the distance education application transformation, which might change depending on the conditions. At this point, it can be stated that the intrinsic motivation levels of learners involved in distance learning play a decisive role in participating in learning processes. Therefore, examining the intrinsic motivation levels of distance learners is seen as an element that needs to be emphasized. This justifies the study's goal, which is to analyze the intrinsic motivation levels of students who get distance education from higher education institutions concerning factors including age, gender, employment, and educational status. The relational survey model, one of the general survey models, was utilized in this study, which included 327 distance learners. In terms of distance education applications, the findings of the study have a guiding nature for the administrators working in higher education institutions. The analyses carried out revealed that there were no significant differences in the intrinsic motivation levels of distance learners according to their gender, employment situation, or level of education. Furthermore, it has been found that as people get older, their intrinsic incentive for learning grows. A list of recommendations based on the data gathered within this study is provided at the end.

Keywords: Distance learning, distance learners, higher education, intrinsic motivation, survey model.

INTRODUCTION

In distance learning, intrinsic motivation is a factor that starts and maintains the learner's self-directed learning (Moore, 1993), which is an important determinant of academic performance in distance learning environments and is needed by learners in these milieus (Alonso, Velez & Martinez-Monteagudo, 2023; Aydug & Altinpulluk, 2022; Cerasoli, Nicklin, & Ford, 2014; Zhou & Zhang, 2023). In addition, students participating in distance learning environments require greater levels of intrinsic motivation than students participating in face-to-face learning milieus (Alamri, Lowell, Watson, & Watson, 2020; Firat, Kilinc, & Yuzer, 2018; Malinauskas & Porien, 2020; Mendoza, Yan & King, 2023). For this reason, intrinsic motivation must be thoroughly researched across all domains, particularly in distance learning contexts (Chen & Jang, 2010; Firat et al., 2018).

There are many studies on the intrinsic motivation levels of learners in online environments (Borkowska, 2022; Cerasoli et al., 2014; Kilinc, 2020; Simons, Leverett, & Beaumont, 2020; Senocak, Buyuk, & Bozkurt, 2019; Yildirim et.al., 2023). In the studies, intrinsic motivation has been examined in terms of variables such as academic achievement (Nadile, 2019; Simons et al., 2020), satisfaction (Shonfeld & Magen-Nagar, 2020), engagement (Wei, Wang, Yang, Wang, & Cheng, 2019), perceived learning (Horzum, Kaymak, & Gungoren, 2015). However, the number of studies examining intrinsic motivation levels within the scope of the characteristics of learners in distance learning environments is insufficient (Alamri et al., 2020; Firat et al., 2018; Yildirim et.al., 2023). Considering that the element of intrinsic motivation in distance learning environments significantly affects the participation of learners in the learning processes (Firat et.al. 2018), it can be stated that it is necessary to examine this variable in more detail within the scope of the relevant literature. Examining the variables related to the intrinsic motivation of distance learners in detail is considered an important point so that learners can have more intrinsic motivation and richer learning experiences in distance learning environments (Alonso, Velez & Martinez-Monteagudo, 2023). Otherwise, the intrinsic motivation of learners involved in distance learning environments may not increase. This situation may lead to learners showing drop-out behavior, poor learning outcomes, and an inability to actively participate in the learning processes. In addition, the demographic characteristics of learners affect intrinsic motivation (Alamri et al., 2020), examining intrinsic motivation in the context of demographic characteristics emerges as an area that needs to be studied. In support of this view, Keser (2019) emphasized that there are demographic factors that affect intrinsic motivation, such as age, gender, education level, marital status, seniority, status of the employee, and cultural and ethnic differences. Additionally, Kiroglu (2007) noted that one of the elements affecting intrinsic motivation is the fact that people have various demographic traits, which cause personal variations. Accordingly, it is believed that this study, which intends to evaluate intrinsic motivation in terms of factors like age, gender, employment, and educational status, which are among the demographic features of learners, will help to close the knowledge gap in the area. In addition, it can be noted that this study's findings have a guiding nature for administrators working in higher education institutions who are considering distance learning applications. In this context, the research questions identified in this study are as follows: Do the intrinsic motivation levels of distance learners show;

- a significant difference according to their age?
- a significant difference according to their gender?
- a significant difference according to their employment status?
- a significant difference according to their education level?

THEORETICAL FRAMEWORK

Motivation, which is one of the most important factors affecting the speed, intensity, direction, and persistence of human behavior (Firat et al., 2018), is one of the most important components of learning processes (Chaiprasurt & Esichaikul, 2013). Motivation, which is defined as a process that initiates and sustains behaviors (McMillan & Forsyth, 1991), helps learners acquire knowledge, develop social qualities, participate more in learning processes, improve their performance, and develop a sense of discipline (Singh, Singh, & Singh, 2012). Schunk, Pintrich, and Meece (2008) define motivation, which has a positive relationship with academic achievement, academic performance, and willingness to learn (Frymier, Norris, Henning, Henning, & West, 1975), as the process of triggering and sustaining goal-oriented activity. Keller (1979) defines motivation as the process of stimulating, managing, and maintaining behaviors. According to this perspective, motivation can be thought of as the force that propels a person in the direction of a particular objective.

The process of teaching and learning heavily depends on the learners' motivation (Keller, 1979; Keller, 2010). From this vantage point, it can be concluded that factors that will favorably impact learners' motivation both throughout face-to-face and distance learning processes should be used. Motivation, however, explains one of the factors that contribute to a learner's success or failure in a learning environment (Fryer & Bovee, 2016). Motivation influences what, how, and when learners learn in distance learning settings (Barak, Watted, & Haick, 2016). According to conducted research, highly motivated students succeed in difficult learning conditions, like the learning process, engage in deep learning, and are dedicated and creative (Semmar,

2006). However, numerous research studies have demonstrated that learners' motivation levels in distance learning settings harm their ability to learn (Chen & Jang, 2010). In light of this, it can be claimed that motivation in distance learning settings is a factor that will boost ongoing interaction and engagement in these environments (Cerasoli, Nicklin, & Ford, 2014). However, some research has shown that preparedness for learning and perceived learning are strongly correlated with motivation (Ferreira, Cardoso, & Abrantes, 2011; Saeid & Eslaminejad, 2017). In this regard, it can be argued that understanding the variables that can favorably or unfavorably affect learners' motivation in distance learning environments—and building a learning environment in this direction—is crucial to the effectiveness of the learning process (Kilinc, 2020).

A person's motivation can be divided into three categories under the Self-Determination Theory, which was developed by Ryan and Deci (2000) and is based on learner autonomy: intrinsic motivation, extrinsic motivation, and demotivation. According to Ryan and Deci (2000), extrinsic motivation is expressed by external rewards like avoiding punishment, competing for rewards, and doing well in school, but intrinsic motivation, which enables the individual to behave willingly, constitutes the individual's reactions to internal demands. On the other hand, demotivation is defined as a circumstance in which the person has no intention of doing it (Ryan & Deci, 2000).

Intrinsically motivated students don't require outside rewards, in contrast to extrinsically motivated ones (Deci, Koestner, & Ryan, 2001). Moreover, intrinsic motivation is the interest in, and enjoyment of, an activity that cannot be attributed to external factors (Zheng, Janiszewski & Schreier, 2023). However, whereas extrinsically driven learners embrace elements of gain and loss that are purely instrumental (like rewards), intrinsically motivated learners embrace elements that they view as valuable (like enjoying the task) (Fishbach & Woolley, 2022). Extrinsically motivated learners prefer to be more passive, whereas highly intrinsically motivated learners frequently find sufficient reasons to continue with the work (Benware & Deci, 1984).

According to several research (Bonk & Khoo, 2014; Brophy, 2010; Keller, 2008; Zhou & Zhang, 2023), learner motivation is a required and even sufficient requirement for success in distance learning processes. It is thought that a motivated learner will have the opportunity to quickly overcome limitations such as space and time with distance learning to achieve the system's targeted learning outcomes and be successful. However, the extent to which people are intrinsically motivated predicts persistence and performance in the workplace, academics, health behaviors, and more (Fishbach & Woolley, 2022).

Learners' motivation in distance learning is influenced by numerous factors (Yildirim et.al., 2023). Both internal and extrinsic factors apply to these variables (Kim & Frick, 2011). The technologies utilized in the learning process, instructional design, learner support services, and the degree of teacher-learner interaction are examples of extrinsic variables. On the other hand, intrinsic factors make up the components in which the demand for learning and a sense of achievement emerge in particular situations (Firat et al., 2018; Yildirim et. al., 2023). Because they spend the majority of their learning time alone and lack the extrinsic motivational factors found in face-to-face learning environments, learners participating in distance learning environments need intrinsic motivation (Alamri et al., 2020; Firat et al., 2018). Additionally, as there is frequently no teacher or counselor present in distance learning environments to support and encourage the learner during the learning process, the intrinsic motivation element is crucial for students' performance in these settings (Firat et al., 2018; Zhou & Zhang, 2023). In addition, to increase students' intrinsic motivation in class, teachers relied on need-supportive teaching, which creates a learning environment that supports students' basic psychological needs for relatedness, competence, and autonomy (Mendoza, Yan & King, 2023).

One of the variables examined within the scope of the study is gender. Studies examining gender differences in students' intrinsic and extrinsic motivation have reported mixed results. Green and Foster (1986) found women to be more intrinsically motivated than men according to classroom curiosity levels. On the contrary, other studies have found women to be more extrinsically motivated (Davis, Winsler, & Middleton, 2006). With this, Makedonka, Elena & Snezana (2022) stated that there was no significant difference between gender and intrinsic motivation. Therefore, it can be stated that different results were obtained on this issue depending on the contexts of the studies and the participant groups.

Another variable examined within the scope of the study is education level. For this variable, as with the gender variable, it is not possible to reach a clear conclusion about its relationship with intrinsic motivation. In one of the studies conducted on this subject, Firat et al. (2018) concluded that there is no significant

difference between education level and intrinsic motivation. Similar to this situation, Liu and Fang (2010), Park and Choi (2009), and Wilkesmann, Fischer & Virgillito (2012) could not find a significant relationship between the two variables in their studies. In contrast, Keumala et al. (2019) states that learners' intrinsic motivation is related to their education level. According to this, the fact that the level of education is related to the experiences of the students and their ability to transfer the information they have learned during the education process can affect the motivation of the learners. Therefore, it can be stated that as the level of education increases, experiences become richer, and this may have an impact on intrinsic motivation.

Another issue examined within the scope of the study is employment status. Riggert et al. (2006) stated in their study that there was no significant relationship between employment status and intrinsic motivation. However, Cain (2008) found a significant relationship between intrinsic motivation and employment status. Accordingly, learners who have a job and do not experience financial difficulties have higher intrinsic motivation. This can be interpreted as an indication that learners who do not experience financial difficulties can devote more time to their learning processes.

Another variable examined within the scope of the study is age. Studies conducted in the literature (Borkowska, 2022; Chyung, 2007; Hoskins & Van Hooff, 2005; Inceoglu et al., 2012; Ransdell, 2010; Inceolu et al., 2012) state that intrinsic motivation increases with age. This situation is explained by the fact that learners give priority to extrinsic motivation elements such as title and seniority at a younger age. Based on this point, it is possible to say that as learners get older, they move away from extrinsic motivational elements and give more importance to emotional satisfaction and defending their own identities.

METHOD

Descriptive research, a type of quantitative research, was employed in this study. The objective of the descriptive research approach, which is popular in the field of education, is to examine and ascertain the current state of a subject (Karasar, 2008). As stated by Buyukozturk, Akmak, Akgun, Karadeniz & Demirel (2016), it is crucial to shed light on a situation, make assessments that adhere to standards, and identify any potential connections between events while using the descriptive research approach. The event, person, or thing that is the focus of the inquiry is attempted to be characterized inside its context and as it is in this method (Karasar, 2008).

Research Model

In this study, in which the descriptive research method was used, the relational survey model, one of the general survey models, was employed. The general survey model is a survey conducted on the whole universe or a group, sample or sample to be taken from it to make a general judgment about the universe in a universe consisting of a large number of elements (Karasar, 2008). This approach aims to depict a situation as it is in the past or present (Karasar, 2008). The relational survey model is a study design that tries to ascertain the existence and/or magnitude of change between two or more variables (Fraenkel & Wallen, 2009; Karasar, 2008). One of the general survey models, the relational survey model, was used in the context of this study to describe the relationship between intrinsic motivation and demographic factors like age, gender, employment status, and educational attainment of students in distance learning environments. The age, gender, employment situation, and level of education are independent variables in this study, whereas the intrinsic motivation of learners is the dependent variable.

Participants

The participants in this study are continuing online students at the Anadolu University Open Education Faculty. 327 online students who willingly replied to the data collecting tool supplied to them through the learning management system employed by the Anadolu University Open Education Faculty make up the study's sample. In this sense, convenience sampling, one of the non-random sample techniques, can be said to have been applied. To gather information rapidly in some study fields, the convenient sampling method—which is based on accessibility and convenience—is preferred. With this sampling technique,

the researcher works with people who are accessible and willing to volunteer for the study (Erkus, 2005). Information about the sample of the study is given in Table 1.

Table 1. Demographic information of the participants constituting the sample of the study

Variables	Frequency	Percentage
Age		
15-24	60	18.348
25-54	230	70.336
55-64	37	11.316
Total	327	100
University Status		
I am studying at a second university	269	82.263
I'm studying at university for the first time	58	17.737
Total	327	100
Employment Status		
Not working	109	33.333
Retired	38	11.620
I work in the public sector	95	29.051
I work in the private sector	69	21.100
I am self-employed	16	4.896
Total	327	100
Gender		
Female	220	67.278
Male	107	32.722
Total	327	100

Data Collection Tool

The intrinsic motivation measure created by Firat et al. (2018) was utilized as part of this study to examine the impact of various demographic factors on the intrinsic motivation status of distance learners. The relevant author of the study gave his consent for the use of the scale. A questionnaire was also used to obtain demographic data from the students, including their age, gender, employment, and education status.

The Scale

A previously constructed scale, the intrinsic motivation scale employed in this study has been validated and shown to be reliable. A previously established and constrained structure is validated as a model using Confirmatory Factor Analysis (CFA), a technique from the family of structural equation modeling (Cokluk, Sekerciolu, & Buyukozturk, 2012). As a result, CFA was able to demonstrate the construct validity of the scale that was used to gather data for the study. As a result, the fit indices of the intrinsic motivation scale that was employed in the research. According to this, compliance values are respectively; $\chi 2$/sd as 3.30, RMSEA as .090, CFI as .98, TLI as .96, and SRMR as .026 obtained.

When the values are analyzed, it is seen that the $\chi 2$/sd value indicates good model-data fit (3.30). The SRMR value indicates excellent model-data fit (.026<.050). CFI (.98>.95) and TLI (.96>.95) also indicate excellent fit. The RMSEA value showed acceptable model-data fit (.090<1) at a mediocre level. Other statistics of the intrinsic motivation scale are reported in Table 2.

Table 2. Statistics of the intrinsic motivation scale

Item No	Factor Load	SH	p
1	.83***	.05	<.001
2	.87***	.05	<.001
3	.80***	.05	<.001
4	.81***	.05	<.001
5	.41***	.05	<.001

Cronbach α: .85

As seen in Table 2, the factor loadings of the intrinsic motivation scale range between .41-.87, and these values are statistically significant at p<.001 level. In this context, it can be interpreted that the factor loadings are quite high. In addition, the Cronbach α coefficient obtained to determine the reliability of the intrinsic motivation scale in terms of internal consistency is .85. Considering that the lower limit for Cronbach α coefficient is .70 (Takavol & Dennick, 2011), it was seen that the reliability of the intrinsic motivation scale in terms of internal consistency was achieved. In light of all these data and their interpretations, it can be concluded that the fit between the unidimensional model and the data is at an acceptable level. In other words, the unidimensional hypothetical structure was confirmed.

Figure 1 shows the standardized coefficients obtained as a result of CFA applied to the intrinsic motivation scale.

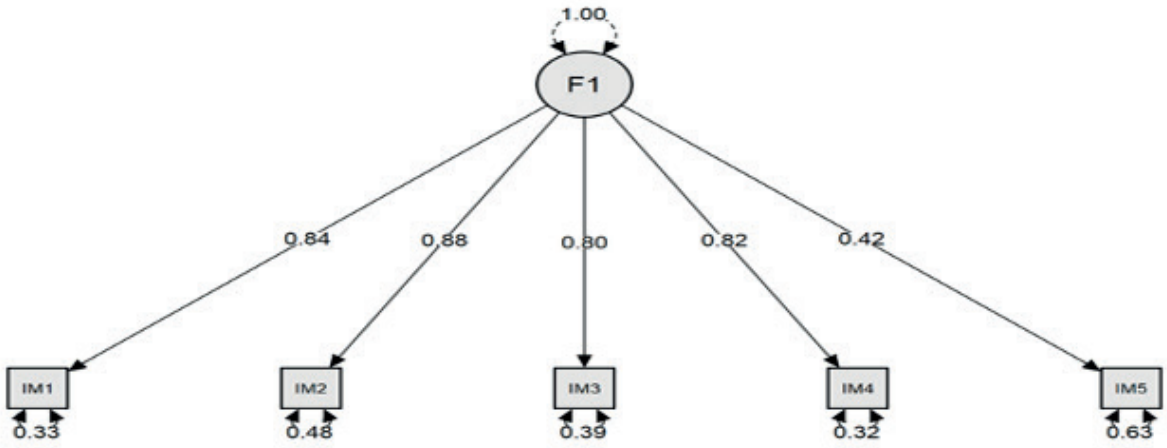

Figure 1. Standardized coefficients obtained as a result of CFA for intrinsic motivation scale

Data Collection Process

Firstly, the study's conformity report from the ethics committee at a State University was acquired. The information was then gathered using the "Google Forms" application. The learning management system used by a State University was utilized to show the data collecting tool produced through Google Forms to the participants, who were first asked to consent to the voluntary participation form. This allowed researchers to contact participants who were willing to actively participate in the study. The participants' demographic data was initially gathered in the subsequent phases, and after getting their permission, scale items were presented to them.

Data Analysis

The study's quantitative data were downloaded from Google Forms and opened in Microsoft Office Excel, and the appropriate preparations were done for SPSS 24.0 to process them. Since the type of tests to be performed in data analysis needed to be chosen before studying the research data, it was determined whether the data displayed a normal distribution. The data set's outliers were looked at in this situation. The intrinsic motivation scale collected 327 data, of which the skewness value was estimated as 054 and the kurtosis value as -.631. The acquired data are believed to be normally distributed because the distribution's skewness and kurtosis values fall within the range of -2 and +2 (George & Mallery, 2016; Tabachnick & Fidell, 2014).

The one-way analysis of variance (ANOVA) and independent samples t-test was utilized as parametric tests because the data were regularly distributed. Independent samples t-test was conducted for gender and university status variables; one-way ANOVA analysis was conducted for age and employment status variables. For the significance level of all statistical calculations, a value of .05 was accepted as a criterion. In addition, the effect size value, which is considered the perceived effect of the result obtained, was also calculated for the results with a significant difference. In analyzing the effect size, eta squared (η2) values were calculated. In the interpretation of the eta square value, 0 to 0.01 is considered a very small effect, 0.01-0.06 as a small effect, 0.06-0.14 as a medium effect, and 0.14 and above as a large effect (Cohen, 1988).

Ethics Statement

This study is supported by the Ethics committee document received by A State University.

FINDINGS

In this heading, the findings obtained for each research question of the study are presented under separate headings.

Examination of Distance Learners' Intrinsic Motivation Levels Based on Their Age

A one-way ANOVA test was conducted to examine whether there is a significant difference between the intrinsic motivation levels of distance learners and their ages. The results of the analysis are presented in Table 3.

Table 3. Results of a one-way ANOVA between the age variable and the intrinsic motivation levels of distance learners

	KT	sd	KO	F	p	η^2
Between Groups	162.617	2	81.309	5.190	.006	.033
Within Groups	5076.319	324	15.668			
Total	5238.936	326				

As a result of the Levene test performed in the analysis, it was seen that the variances were equal (p=.491). According to the results of the analysis, there was a differentiation between the groups (F=5.190; p<.05, η^2=.033). The effect size was small (η^2=.033). Tukey test was used as a post-hoc test to determine from which groups the statistically significant difference originated. The findings obtained as a result of the post-hoc test is presented in Table 4.

Table 4. Results of the post hoc test between distance learners' levels of intrinsic motivation and the age variable

(I) Age	(J) Age	Mean Difference (I-J)	sd	p	η^2	95% Confidence Interval Lower Limit	95% Confidence Interval Lower Limit
15-24	25-54	-.9428	.5738	.229		-2.294	-2.294
	55-64	-2.6626*	.8274	.004	.033	-4.611	-4.611
25-54	15-24	.9428	.5738	.229		-.408	-.408
	55-64	-1.7199*	.7011	.039	.021	-3.371	-3.371
55-64	15-24	2.6626*	.8274	.004	.033	.714	.714
	25-54	1.7199*	.7011	.039	.021	.069	.069

*p<.05

According to the results of the Tukey test, it is seen that the significant difference is between the age range of 15-24 and 55-64 and between the age range of 25-54 and 55-64. Accordingly, the intrinsic motivation of learners aged 55-64 was significantly (p=.004, η^2=.033) higher than that of learners aged 15-24. The effect size obtained is at the level of a small effect size (η^2=.033). In addition, it was also found that learners aged 55-64 had significantly (p=.039, η^2=.021) higher intrinsic motivation than learners aged 25-54. A small effect size (η^2=.021) was also obtained here. No significant difference was found between learners aged 15-24 and learners aged 25-54 in terms of intrinsic motivation.

Examination of Distance Learners' Intrinsic Motivation Levels Based on Their Gender

Independent samples t-test was conducted to examine whether there is a significant difference between the intrinsic motivation levels of distance learners and their gender. The results of the analysis are presented in Table 5.

Table 5. Results of an independent samples t-test between a gender variable and the intrinsic motivation levels of distance learners

Variable	Gender	n	$\bar{X}$	sd	t	sd	p
Intrinsic Motivation	Female	220	16.291	3.97	-.279	325	.780
	Male	107	16.159	4.10			

According to the results of the t-test analysis conducted in the context of gender variable, it was determined that the intrinsic motivation levels of distance learners did not differ statistically significantly in the context of gender (t(325)=.780; p>.05).

Examination of Distance Learners' Intrinsic Motivation Levels Based on Employment Status

A one-way ANOVA test was conducted to examine whether there is a significant difference between the intrinsic motivation levels of distance learners and their employment status. The results of the analysis are presented in Table 6.

Table 6. Results of a one-way ANOVA between distance learners' intrinsic motivation levels and the variable of employment status

	KT	sd	KO	F	p
Between Groups	82.158	4	20.539	1.283	.277
Within Groups	5156.778	322	16.015		
Total	5238.936	326			

The Levene test used during the analyses revealed that the variances were equal (p=.118). It was found that there was no discernible difference between the groups in accordance with the analysis's findings. It was shown that distant learners participating in distance learning environments did not differ in their degrees of intrinsic motivation based on their employment status.

Examination of Distance Learners' Intrinsic Motivation Levels Based on Their Educational Status

The level of intrinsic motivation of distance learners and their educational status were compared using an independent samples t-test to see if there was a statistically significant difference. Table 7. displays the findings of the analysis.

Table 7. Results of an independent samples t-test between a variable measuring educational status and the intrinsic motivation of distance learners

Variable	**Education Status**	**n**	$\bar{X}$	**sd**	**t**	**sd**	**p**
Intrinsic Motivation	I am studying at a second university	269	16.279	4.03	.302	325	.763
	I'm studying at university for the first time	58	16.103	3.91			

According to the results of the t-test analysis conducted in the context of the educational status variable, it was determined that the intrinsic motivation levels of distance learners did not differ statistically significantly in the context of educational status (t(325)=.763; p>.05).

DISCUSSIONS AND CONCLUSION

Within the parameters of the study, the relationship between learners' ages and levels of intrinsic motivation was the first research question that was intended to be addressed. It was determined in this situation that learners' intrinsic motivation levels rose with age. This result is similar to the results obtained in studies conducted by Borkowska (2022), Chyung (2007), Hoskins and Van Hooff (2005), Inceoglu et al. (2012), Ransdell (2010). Therefore, it can be concluded that intrinsic motivation grows stronger with age. This can be viewed as a circumstance that results from students placing a higher value on elements that will boost extrinsic motivation, such as careers, success, and beginning to earn money young. Similarly, it is thought that turning learners' attention away from career, success, and money-making elements that they have acquired in the process as they grow older is a situation that may be effective in the formation of this

situation. Similar to this perspective, Inceolu et al. (2012) claimed that as students get older, they place a greater emphasis on emotional fulfillment and defending their own identities, which highlight intrinsic motivation. Super (1980) asserts that young learners exhibit higher levels of extrinsic motivation than older learners since they are just starting their jobs and are motivated to advance in them. According to Ryan and Deci (2000), intrinsic motivation is formed as a result of the individual's reactions to internal needs, while extrinsic motivation is formed as a result of external factors such as avoiding punishment, competition, reward, and getting good grades. Similarly, Borkowska (2022) stated that older learners are more advanced in terms of intrinsic motivation.

The second research question sought to be answered within the scope of the study was whether the intrinsic motivation levels of distance learners vary according to gender. In this direction, an independent samples t-test was conducted. According to the results of the t-test, it was determined that the intrinsic motivation levels of distance learners did not differ statistically significantly in terms of gender ($t(325)=.780$; $p>.05$). This finding agrees with findings from studies by Hoskins and Van Hoof (2005), Makedonka et. al. (2022), Park and Choi (2009), and Spinath et al. (2014). In light of this, gender is not a factor that influences students' intrinsic motivation. However, certain studies in the relevant literature (Chyung, 2007; Ferssizidis et al., 2010; London, 2016; Song, 2006; Yoo & Huang, 2013) discovered a significant difference between learners' levels of intrinsic motivation and gender. Accordingly, whereas other studies suggest that women have greater intrinsic motivation than men, London (2016) asserts that men have higher intrinsic motivation than women. However, Makedonka et al. (2022) stated that there was no significant difference between gender and intrinsic motivation. In this context, it is clear that studies in the pertinent literature examining the connection between gender and intrinsic motivation have not been able to reach a consensus conclusion. This viewpoint allows us to say that the relationship between gender and intrinsic motivation level may change depending on the participant's characteristics and the contexts of the studies.

The intrinsic motivation levels of distance learners and their employment status were the third research question that the study set out to address. In this case, a one-way ANOVA test was utilized to determine whether the employment status of distance learners in different professions had a significant impact on their intrinsic motivation levels. The findings indicate that there is no noteworthy distinction between the groups. As a result, it was found that the intrinsic motivation levels of distance learners participating in distance learning settings were unaffected by their employment status. This outcome is consistent with what Riggert et al. (2006) found in their study. Therefore, employment status is not a reliable indicator of intrinsic motivation for distant learners. Additionally, a study by Cain (2008) with distance learners found a substantial relationship between intrinsic motivation level and employment status. The intrinsic motivation levels of students who are employed and do not have financial difficulties are higher as a result. From this vantage point, it is possible to assert that students who do not have financial challenges can concentrate more on their own personal growth during the learning process, which has a beneficial impact on intrinsic motivation. The participants' wages are unknown for the purposes of this study. It is possible that the near similarity of the participants' income levels contributed to the outcome within the parameters of the study. Again, in the same study by Cain (2008), it was noted that studies on employment status and higher education students yielded erratic results.

In order to assess whether distance learners' educational status has an impact on their levels of intrinsic motivation, the study's last, fourth research question sought an answer. In this situation, the independent samples t-test was used. The findings of the t-test analysis conducted in relation to the educational status variable showed that there was no statistically significant difference between the intrinsic motivation levels of distance learners and on-campus students ($t(325)=.763$; $p>.05$). This outcome resembles that of Bopp's (2007) research. As a result, it is claimed that factors like educational attainment and gender have little bearing on students' motivation. Additionally, Firat et al. (2018) came to the conclusion that there were no appreciable differences in the intrinsic motivation of distance learners based on gender, educational status, mode of instruction (distance-blended), or academic discipline. Additionally, it was stressed by Liu and Fang (2010), Park and Choi (2009), and Wilkesmann, Fischer & Virgillito (2012) that motivation is unrelated

to one's level of education. On the other hand, Keumala et al. (2019) came to the conclusion that learners' levels of intrinsic motivation are influenced by their educational status. Currently, it is believed that the activities and goals in the learning process, rather than the educational status, play a more effective role in the context of intrinsic motivation than the educational status, despite the fact that there is no consensus in the studies on the subject. Despite all this, it can be stated that as the level of education increases, experiences can be enriched and this situation can have an impact on intrinsic motivation.

Limitations and Recommendations

This study examined the intrinsic motivation levels of distance learners involved in distance learning environments in terms of various variables,

- With a distance learning environment,
- With distance learners,
- With the intrinsic motivation scale,
- Participants' age, gender, employment, and educational status variables are limited.

The following recommendations are offered for future studies after the study done within these constraints:

- Within the parameters of this investigation, it was determined that the research examining the connection between gender and intrinsic motivation in the pertinent literature was unable to reach a consensus conclusion. From this, it can be concluded that additional research on the gender and degrees of intrinsic motivation of distance learners is necessary. This will make it easier to see how the gender variable affects intrinsic motivation.
- Given that studies on employment status and higher education students have produced mixed results (Cain, 2008), it may be concluded that qualitative research should be done on this subject. In this way, answers can be sought to the questions of how distance learners work in which fields of study, what their employment status is, and what role these situations play in their intrinsic motivation.
- In the context of the study, it was discovered that similar to the gender variable, there is no agreement in the relevant literature regarding the relationship between the educational status variable and intrinsic motivation. This conclusion suggests that additional research is required to fully understand how intrinsic motivation levels in distance learning settings relate to learners' educational status. It may be possible to more clearly understand the relationship between educational attainment and intrinsic motivation in this situation by performing studies using the mixed research method and asking students for their own thoughts as well as the findings of the student survey.
- More demographic information can be used in studies on the intrinsic motivation of distance learners, and learning environments can be designed differently in light of the results to be obtained, taking into consideration the importance of designs that will increase intrinsic motivation, which is a necessary element for learners to have richer learning experiences in distance learning environments, whose importance in learning processes has come to light with the post-pandemic process we are in.
- -Some suggestions can be made in the context of issues not covered in this study. Accordingly, implementing the teaching techniques applied in the distance learning process in accordance with the wishes and needs of the participants can be considered as a factor that will increase intrinsic motivation.
- -In addition, it can be said that the instructional designs applied in the teaching processes should appeal to the participants in order to increase intrinsic motivation in distance learning environments.
- -Another issue that can increase intrinsic motivation is learning materials. At this point, designing learning materials interactively is an important point so that learners can participate in the distance learning process more willingly.

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ADAPTATION OF STUDENTS' ACCEPTANCE OF ONLINE LEARNING SCALE INTO TURKISH: VALIDITY AND RELIABILITY STUDY

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ABSTRACT

Online learning has been conducted in recent years, especially during crises. There have been some studies to increase its effectiveness. Acceptance of online learning is important and affects learners' comfort and their future use. The purpose of this study was to adopt the acceptance of online learning scale into Turkish culture which was developed to determine students' acceptance of online learning in a developing country Survey model was adapted in this study, and data were collected from 384 participants studying in a public university. Confirmatory Factor Analysis (CFA) was performed to check the validity of the scale and Cronbach's alpha coefficient was calculated to assess the reliability of the adapted scale. Five-factor structure of the scale was confirmed, and multiple goodness-of-fit indices, X^2/sd, CFI, RMSEA, SRMR, GFI, and TLI/NNFI were in the range of acceptance levels in the literature. The calculated Cronbach's Alpha values ranged between .81 and .94 in the total and sub-factors, which were above the recommended value in the literature. The adapted scale could be used by researchers and educators to detect the acceptance of online learning at different intervals.

Keywords: Acceptance of online learning scale, adaptation, validity, reliability.

INTRODUCTION

Distance education is a concept with a long history and continues its development with evolving technology from past to present, although it has become well-known in society recently. In this developmental process, different terms such as online learning, remote learning, and mobile learning were coined under the umbrella of distance education. It is possible to state that online learning encompasses all of these concepts (Battal vd., 2023; Zhang et al., 2022).

Online learning is based on the use of internet technology to access educational content and to facilitate learner, teacher, and content interaction (Singh & Thurman, 2019). Internet technology enables education to continue in both synchronous and asynchronous modes (Morrison, 2003). With the development of internet technology and its widespread use, the quality of online education has increased (Celen, Celik, & Sadi, 2011). This issue draws the attention of higher education institutions, and they have been investing in online learning platforms for various reasons. Howell, Williams, and Lindsay (2003) have listed some of them as a) increasing demand for higher education, b) changing profiles of students and their search for suitable classes c) shifting interest from course completion to competence d) increasing importance of lifelong learning, e) increasing internet infrastructure and its contribution to distance education platforms,

f) changing traditional campus life. With its increasing role, online learning takes place mostly in open and distance education programs, and face-to-face education programs integrate their traditional courses with online learning as a supportive element under the concept of blended or flipped learning (Sonmez, 2023).

Distance education, in its well-known form, online education has been conducted in line with face-to-face education. However, in times of crisis when face-to-face education cannot continue, it was replaced with online education. This shift became particularly evident during the recent COVID-19 pandemic. Throughout the pandemic, traditional education was temporarily suspended and replaced with online education at all levels of education from kindergarten to higher education worldwide (Bozkurt & Sharma, 2020). Unfortunately, another crisis happened in Turkiye, two significant earthquakes hit 10 cities in February 2023, affecting millions of people in those regions (Yamamoto & Altun, 2023). In response to this situation, the Council of Higher Education recommended that institutions conduct their educational activities online and most higher education programs have been continuing their education through online education for the spring semester of 2023 (COHE, 2023a). Today, it is possible to argue that almost all learners in higher education have experienced online education for a period in their lives.

Online learning made it possible to access programs flexibly and affordably (Zhang et al., 2022). It provides learners and educators meet independent of time and space. Besides, in online learning environments, different sources of information can be used, and it provide dynamic interfaces to the learners (Korkmaz & Kaya, 2012). Numerous studies have highlighted the advantages of online learning, including flexibility in scheduling, accessibility to a broader audience, cost-effectiveness, and the ability to accommodate various learning styles (Panigrahi, Srivastava, & Sharma, 2018). Additionally, online learning is often praised for its potential to promote lifelong learning and personalized education (Salloum, Al-Emran, Shaalan, & Tarhini, 2019).

Research has been conducted to increase the effectiveness of online learning (Zhang et al., 2022), and has revealed some deficiencies behind its widespread adoption such as a lack of technical support and infrastructure, gaps in legal regulations, and insufficient information for decision-makers (Celen, Celik & Sadi, 2011). Since online education is different than face-to-face education, using the same strategies and theories of traditional education is not suitable for online education (Yavuzalp & Ozdemir, 2020), which could be argued behind the failure of online education (Diaz, 2002). The roles of learners and educators are also unique in online education. To succeed in online learning environments, learners should have self-regulation, self-motivation, technical capabilities, motivation to learn, enhanced online discourse skills, collaborative and time management skills, and they should be persistent towards targeted goals (Berigel & Cetin, 2019). On the other hand, learners' acceptance of online learning is another important issue that affects the adaptation to online learning and their future use. Acceptance of online learning is mostly related to students' comfort in the online learning environment (Rajeb, Wang, Man, & Morett, 2023) and it is an important issue for the effectiveness of online learning (Tarhini, Hone, Liu, & Tarhini, 2017)

Research has shown there were many factors affecting students' acceptance of online learning (Panigrahi et al., 2018). In the literature, some of the factors stated as perceived ease of use and usefulness (Mahmodi,2017), usefulness and attitude (Farahat, 2012), quality and trust (Salloum, 2019), satisfaction (Ilgaz & Gulbahar, 2015), future intention to use (Beldad & Hegner, 2018). Besides, these factors were grouped in the literature. Panigrahi et al., (2018) listed them into two groups as environmental and personal factors. Similar to Panigrahi et al., (2018), Rajeb et al., (2023) grouped them as institutional and student-related factors based on the extensive review of the related scales. They listed institutional factors as support system, instructional quality, instructor efficiency, technical assistance, technological sufficiency, and student-related factors as resistance to change and digital literacy.

In the literature, there were some scales measuring the acceptance of students from only one dimension based on the aforementioned factors. Some of them prioritized the student-related factors (i.e. Tarhini et al., 2016), while some of them focused on the institutional factors only (i.e. Alenezi et al., 2011, Tee, 2010). However, both dimensions were dependent on each other and affected them (Rajeb et al., 2023). At this point, there was a need to assess students' acceptance from both dimensions. On the other hand, the previous scales were developed mostly in developed nations by considering the situation in those countries. However, the situation was different in developing countries such as the condition of infrastructural issues. Therefore, students' needs in developing countries might change, which would affect the acceptance of online learning. Although some

scales exist in Turkish such as the Online Learning Readiness Scale (Ilhan & Cetin, 2013) no such scale was met focusing on both dimensions, institutional and student-related factors to our knowledge. Turkiye, with its increasing young population and higher education learners, applies online learning in distance education programs and in some circumstances such as crisis times. The adapted scale will help to reveal the factors that influence students' acceptance of online learning and inform stakeholders about online learning.

Online learning and teaching entirely depend on technology and internet use, thus, learners and educators need to access technology and use it efficiently (Adedoyin & Soykan, 2023). Digital competencies and technological capabilities are important factors in the acceptance of online learning (Hamad, 2022). The suitable technology access of learners differs across the countries (Aguilera-Hermida et al., 2021), and even within the countries (Soomro, Kale, Curtis, Akcaoglu, & Bernstein, 2018). According to Rajeb et al., (2023), the technology-related issues were worse in developing countries in terms of internet speed, students' digital skills, intuitions' technological affordances, and instructors' ability to conduct online education.

PURPOSE OF THE STUDY

Rajeb et al. (2023) developed a scale determining students' acceptance of online learning in a developing country and they conducted the validity and reliability of the scale. They proposed a scale to measure the effectiveness of online learning in a developing country. Turkiye is a developing country that has 204 universities and millions of learners in higher education according to a report of the Council of Higher Education (CoHE, 2022). During the pandemic and two earthquakes, online education was conducted for a period. At this point, a valid and reliable measurement tool is needed in Turkiye to determine students' acceptance of online learning in higher education. In this direction, adapting the scale developed by Rajeb et al. (2023) to Turkish culture and determining its validity and reliability will contribute to researchers studying online learning.

The purpose of this study was to adopt the acceptance of the online learning scale developed by Rajeb et al. (2023) in Turkish culture. For this purpose, the following research questions guided the current study.

1) Is the Acceptance of Online Learning Scale a valid measurement tool in Turkish culture?
2) Is the Acceptance of Online Learning Scale a reliable measurement tool in Turkish culture?

METHOD

In this study, a quantitative methodology was employed to evaluate the reliability and validity of the Turkish version of the Acceptance of Online Learning Scale (AOLS), which was originally developed by Rajeb et al. (2023). The study utilized a survey model, and quantitative techniques were employed to analyze the collected data.

Participants

The sample size required was calculated based on the 95% confidence interval calculation (Gurbuz & Sahin, 2014). The population of the current study consisted of 27981 undergraduate students studying at a public university in Turkiye (CoHE, 2023b). According to the 95% confidence interval, the lower limit for the sample size of the study is 379, and the research sample consisted of 384 undergraduate students studying at a public university in the 2022-2023 academic year. Thus, the sample size of this study is deemed sufficient according to the 95% confidence interval. Simple random sampling was used to select the participants of the current study.

Of the participants, 311 (81%) were female, and 73 (19%) were male. The age distribution of the participants changed from 19 to 25. Out of the total participants, 81 were aged 19 and under (21.4%), 160 were aged between 20-22 (41.7%), and 142 were aged 23 and over (37%). The majority of the participants were in the first grade (f=149, 38.8%). The number of second graders was 46 (12%), third graders were 67 (17.4%), and there were 122 in the 4th grade and above (31.8%). As seen from Table 1, the majority of the participants are female, between the ages of 20-22, and university students studying in their first year. This may be due to the selection of participants through simple random sampling. It may also reflect the average characteristics of students studying at the relevant state university.

Table 1. Descriptive Statistics on Demographic Variables

Variables		N	%
Gender	Female	311	81
	Male	73	19
Age	19 and under	81	21.4
	20-22	160	41.7
	23 years and older	94	37
Grade	First	149	38.8
	Second	46	12
	Third	67	17.4
	Fourth	122	31.8
Total		384	100

Data Collection Tool

In this study, the Turkish version of AOLS developed by Rajeb et al. (2023) was used to collect data. AOLS is a seven-point Likert-type data collection tool with five factors and 20 items. The scale's factors include technological sufficiency (four items), instructors' efficiency (five items), digital literacy (three items), technical assistance (three items), resistance to change (two items), and students' acceptance (five items). During the adaptation of AOLS into Turkish, data was collected from a sample of 441 university students.

The Cronbach alpha coefficient of the original AOLS is .83 in the dimension of technological competence of the students, .84 in the dimension of the effectiveness/competence of the instructors in conducting online education, .82 in the dimension of digital literacy of students, .87 in the dimension of technical support for online activities and .94 in the dimension of general acceptance for online learning activities. The item load values of the items in the AOLS (20 items) varied between .65 and .88. Confirmatory factor analysis was performed to test the validity of the AOLS. As a result of confirmatory factor analysis, the five-factor structure of AOLS was confirmed (X^2/sd= 2.77, RMSEA= .06, NFI= .93, and CFI= .95).

Language Equivalence Study

The Turkish Draft Form of AOLS (AOLS-TDF) was used to collect data in the study. Firstly, permission was obtained from the developers of the AOLS, Rajeb et al. (2023). After obtaining permission, the language equivalence process of AOLS was initiated. For this purpose, three English and two Turkish language experts contributed to the language equivalence of the adapted scale. Firstly, the items in the AOLS were translated into Turkish by the first English language expert. The translated TDF was translated back into English by a second English language expert. Then, the original and re-translated English scale forms were checked by the third English language expert to see if the scale had any loss of meaning. At the end of this process, it was concluded that there was no loss of meaning in the scale.

The final TDF of the scale was checked by two Turkish language experts in terms of any expression disorder and intelligibility. Some corrections were made on the items in a way that the original meanings were preserved, depending on the feedback given. Lastly, the scale was applied to a limited number of students as a pilot study. Based on the opinions of 15 students, some corrections were made to the items, preserving the original meanings according to their feedback. At the end of the process, the final version of the Turkish AOLS scale was completed by the researchers. In addition, just before the final version, it was re-examined by English language experts. As a result of the studies carried out within the scope of language equivalence, the pilot implementation phase of AOLS-TDF was initiated.

Procedures and Data Analysis

Before the data collection process, Ethics Committee Approval from the Scientific Ethics Evaluation Committee of a public university dated 04.07.2023 and numbered E-16343714-605.02-544158) was received to carry out this study. The data were collected via Google Forms in the 2022-2023 academic year. It took an average of 15 minutes to complete the scale.

The data were coded into Google Sheets and in the coded data, primarily erroneous entries were checked and errors were corrected manually. Then, missing data analysis was applied and the approximate value assignment method was used. For the validity and reliability analysis of the sample size, the literature on the adequacy of the sample size was reviewed (Tabachnick & Fidel, 2012). In line with the recommended sample size in the aforementioned literature, it was decided that the sample consisting of 384 participants was suitable for validity and reliability analysis.

Within the scope of the analysis of the data, first of all, the normality assumption was checked. In this context, standard deviation, skewness, kurtosis coefficients and mean, median, and mode values were examined. The calculated standard deviation, skewness, and kurtosis values, respectively, were 1.13, -.22, .36 in AOLS; 1.48, -.38, -.43 in the factor of technological sufficiency; 1.27, -.30, -.02 in the factor of instructors' efficiency; 1.36, -.37, -.10 in the factor of digital literacy; 1.54, -.30, -.47 in the factor of technical assistance. They were in the factor of the general acceptance of online learning activities were 1.76, .22, -.99, respectively. Skewness and kurtosis values were between ±2. In addition, mean, median and mode values calculated respectively were 4.17, 4.20, 4.35 in AOLS; 4.43, 4.62, 4.75 in the factor of technological sufficiency; 4.29, 4.40, 4.00 in the factor of instructors' efficiency; 4.65, 5.00, 5.00 in the factor of digital literacy; 4.31, 4.33, 4.00 in the factor of technical assistance; 3.47, 3.40, 3.00 in the factor of the general acceptance for online learning activities. The results showed that the data was normally distributed. After meeting the necessary assumptions, confirmatory factor analysis was performed using the AMOS 22 package program for validity analysis, and Cronbach alpha internal consistency coefficient and item-total correlation techniques were employed for reliability analysis.

FINDINGS

Findings Regarding the Validity of the AOLS

The tool consisting of 20 items aims to measure the acceptance level of online learning and was developed based on five theoretical factors. These factors were students' technological sufficiency, instructors' efficiency in conducting online education, students' digital literacy, technical assistance for online activities, resistance to change, and general acceptance for online learning activities. The scale was prepared in a seven-point Likert type. The rating range of AOLS is as follows; strongly disagree (1.00-1.84), disagree (1.85-2.70), strongly disagree (2.71-.3.56), neither agree nor disagree (3.57-4.42), somewhat agree (4.43-5.28), agree (5.29-6.14), strongly agree (6.15-7.00). Confirmatory factor analysis was performed to verify the factor design of the instrument within the framework of the validity analysis of the AOLS.

As a result of the confirmatory factor analysis, the t values of the latent variables explaining the observed variables were found to be statistically significant at the .01 level. In the context of parameter estimations, it is statistically significant at the level of .05 if the t values exceed 1.96 and at the level of .01 if it exceeds 2.56 (Cokluk et al., 2014). In addition, it was determined that the error variances of the observed variables were normal (Cokluk et al., 2014). Since there were significant t values for all items in the model, all indicators were included in the model. The path diagram obtained from the confirmatory factor analysis is presented in Figure 1. The results of the confirmatory factor analysis of the AOLS are presented in Table 2.

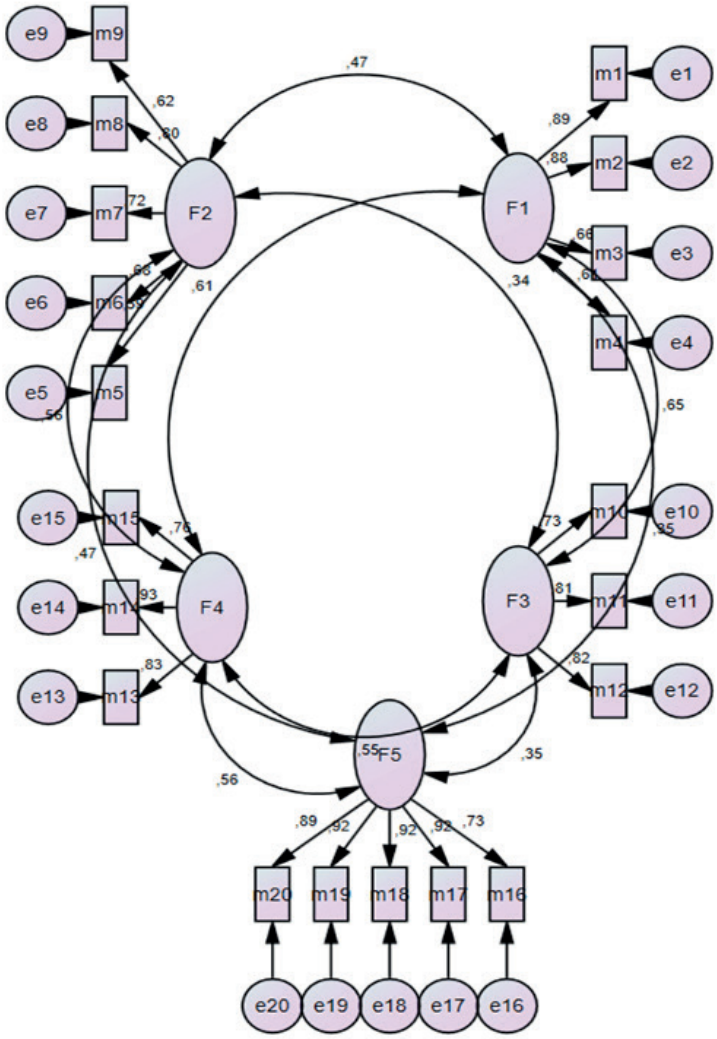

Figure 1. Path Diagram of the Acceptance of Online Learning Scale

According to Table 2, the p value is significant at the .01 level. In many confirmatory factor analyses, it is normal for the p value to be significant due to the large sample size (Cokluk et al., 2014). For this reason, alternative fit indices regarding the fit between the two matrices were evaluated. As a result of the analysis, X^2/sd and CFI values were excellent; it can be stated that the RMSEA, SRMR, GFI, and TLI/NNFI values have good compatibility (Cokluk et al., 2014). According to the analysis values, the five-factor structure [technological sufficiency of the students (four items), instructors' efficiency in conducting online education (five items), digital literacy of the students (three items), technical support for online activities (three items), and general acceptance for online learning activities (five items)] of the AOLS consisting of 20 items was confirmed.

Table 2. The results of the Confirmatory Factor Analysis of the Acceptance of Online Learning Scale

Compliance measurements	Measurement value	Reference range
P	.00	< .01
X^2/sd	2.79	≤ 3
RMSEA	.06	≤ .08
SRMR	.06	≤ .08
GFI	.91	≥ .90
TLI/NNFI	.94	≥ .90
CFI	.95	≥ .95

Findings Regarding the Reliability of the AOLS

Reliability analyses were conducted by examining item analysis using item-total correlations and Cronbach's alpha to assess the reliability of the scale. The reliability analysis results of AOLS are presented in Table 3.

Table 3. The results of the Confirmatory Factor Analysis of the Acceptance of Online Learning Scale

Dimensions	Alpha value	Item-total correlation
Technological sufficiency of students	.85	.62-.73
Instructors' efficiency in conducting online education	.81	.51-.79
Digital literacy of students	.83	.61-.73
Technical assistance for online activities	.87	.69-.84
General acceptance for online learning activities	.94	.70-.89
Acceptance of online learning scale	.92	.40-.74

According to Table 3, the internal consistency coefficient (Cronbach's alpha) values are .92 in the AOLS, .85 in the factor of technological sufficiency of students, .81 in the factor of instructors' efficiency in conducting online education, .83 in the factor of digital literacy of students, .87 in the factor of technical assistance for online activities, .94 in the factor of the general acceptance for online learning activities. In this context, it can be stated that the internal consistency coefficient (.70 and above) in the total and factors of the AOLS is sufficient for reliability (Buyukozturk, 2013).

The item-total correlations were between .40-.74 in the AOLS, .62-.73 in the factor of technological sufficiency of students, .51-.79 in the factor of instructors' efficiency, .61-.73 in the factor of digital literacy, .69-.84 in the factor of technical assistance for online activities and, between .70-.89 in the factor of the general acceptance for online learning activities. In this context, considering the item-total correlations (.30 and above) in the general dimensions of AOLS, it can be interpreted that the items in the scale distinguish individuals well (Buyukozturk, 2013).

DISCUSSIONS AND CONCLUSION

Online learning has been conducted for over two decades, but it was widely implemented especially in crisis times such as the global outbreak. In Turkiye, online learning has been applied in higher education during two crisis times; recent earthquakes that happened in a vast geographical area and the pandemic. With its increasing popularity recently, the acceptance of online learning has become an important issue for the effectiveness of online education (Tarhini et al., 2017). Rajeb et al. (2023) developed a scale to measure the acceptance of online learning in Bangladesh and confirmed its validity and reliability. There was also a need for a valid and reliable scale to assess students' acceptance of online learning in Turkiye. The purpose of the current study was to adopt the scale into Turkish culture and confirm its validity and reliability. For this purpose, firstly, necessary permission from the developers of the scale was granted and ethical approval from a public university was obtained before the data collection process. Then, the items in the scale were translated into Turkish by the language experts. In this process, an English language expert translated the items into Turkish, and another expert back-translated them into English to identify any differences from the original items. Turkish language experts checked the items and recommended some revisions regarding meaning and grammatical issues. After establishing language equivalence for the items, the draft form was tested by a group of target students to assess the comprehensibility of the items. The final version of the scale was refined according to the results of the pilot study.

Survey model, a quantitative methodology was followed in this study. The main phase of the study was conducted with 384 participants studying in a public university in Turkiye. The data was collected via an online survey. After the necessary assumptions were met, Confirmatory Factor Analysis (CFA) was performed to check the validity of the scale, and Cronbach's alpha coefficient was calculated to assess the reliability of the scale. According to the CFA analysis, the five-factor structure of the scale was confirmed. Multiple goodness-of-fit tests were evaluated, and X2/sd, CFI, RMSEA, SRMR, GFI, and TLI/NNFI values were in the range of

acceptance levels in the literature (Cokluk et al., 2014). The calculated Cronbach's Alpha values ranged between .81 and .94 in the total and sub-factors, which were above the recommended value (Buyukozturk, 2013).

To sum up, validity and reliability analyses were conducted within the framework of adapting AOLS into Turkish culture, originally developed by Rajeb et al. (2023). The Turkish form of the scale consisted of 20 items and five factors, identical to the original scale. This supports the argumentation of Rajeb et al. (2023), where they asserted that the scale could apply to a similar context. Additionally, it could be inferred that the theoretical foundation of the scale was strong, and culturally appropriate words and expressions were used in the scale (Yavuzalp & Ozdemir, 2020). It was concluded that the Turkish form of AOLS is a valid and reliable data collection tool.

The rise of online learning continues, and the number of programs offering online education in higher education is increasing (Singh & Thurman, 2019). This is especially evident with Massive Open Online Courses (MOOCs), making many online courses available to anyone at little or no cost (Cagiltay, Toker, & Cagiltay, 2023). Administrators and lecturers could assess the acceptance of online learning with this scale adapted into Turkish at different intervals. Thus, they could enhance the effectiveness of online learning, which could reveal the potential importance of online education. Educators and researchers should take precautions based on the results of the total and sub-factors of the scale.

This adaptation study had some limitations that future research should focus on. The data of the current study were obtained from undergraduate students of only a public university. The facilities of the universities vary. They all have different technical capabilities (i.e. computer laboratories, high-speed bandwidth internet, learning management systems) and institutional settings (i.e. offering lecturers in-service training regarding the pedagogy of online learning). They might offer different settings to their students, and private universities may implement online learning to learners in a well-established way. Therefore, data would be collected from more students studying at different universities, especially in private universities due to the various types of applications of online learning in those universities. The validity and reliability of AOLS can be tested in various contexts through larger and different sample groups, different university types, and education levels. Different perspectives can contribute to the literature on students' acceptance of online learning.

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APPENDIX

Acceptance Of Online Learning Scale

	Ogrencilerin teknolojik yeterliligi
1	Cevrimici ogrenmede kullanabilmek icin yeterli donanim mevcuttur.
2	Cevrimici ogrenmede kullanabilmek icin yeterli yazilim mevcuttur.
3	Bolgenizde internet erisimi kabul edilebilir olcude hizli ve sureklidir.
4	Uzaktan egitimde cevrimici ogrenme icerigini indirmek kolaydir.
	Ogretim elemanlarinin online egitim yurutmedeki etkililigi/yeterliligi
5	Ogretim elemanlari, cevrimici derslere ilgi uyandirabilir.
6	Ogretim elemanlari web teknolojisini kullanmada etkilidir.
7	Genellikle cevrimici derslerde soru sormaya tesvik ediliriz.
8	Ogretim elemanlari, ogrenci etkilesimini tesvik eder.
9	Ogretim elemanlari, her bir ogrenciye arkadasca yaklasir.
	Ogrencilerin dijital okuryazarligi
10	Cevrimici derslerde basarili olmak icin gerekli becerilere sahibim.
11	Cevrimici ogrenme surecinde belirli isler icin gerekli yazilim uygulamalari hakkinda detayli bilgiye sahibim.
12	Bilgisayar kullanma konusunda yeterliyim.
	Online etkinlikler icin teknik destek
13	Universitemiz tarafindan saglanan cevrimici olanaklara yeterli ve ihtiyacimiza uygun duzeyde erisimimiz bulunmaktadir.
14	Universitemiz ogrenciler icin uygun Bilgi Teknolojileri destegi saglamaktadir.
15	Universitemizde cevrimici egitimi desteklemeye yonelik olusturulmus bir Bilgi Teknolojileri birimi bulunmaktadir.
	Online ogrenme etkinliklerine yonelik genel kabul
16	Cevrimici ogretim ve ogrenim faaliyetlerinden memnunum.
17	Gelecekte, cevrimici derslere kaydolmak isterim.
18	Arkadaslarima cevrimici derslere kaydolmalarini tavsiye edecegim.
19	Cevrimici dersler benim icin uygundur.
20	Cevrimici ogrenme konusunda istekliyim.

- *Derecelendirme Araligi:* Yedili Likert tipi - 1. Kesinlikle Katilmiyorum (1.00-1.84), 2. Katilmiyorum (1.85-2.70), 3. Pek Katilmiyorum (2.71-.3.56), 4. Ne Katiliyorum Ne Katilmiyorum (3.57-4.42), 5. Biraz Katiliyorum (4.43-5.28), 6. Katiliyorum (5.29-6.14), 7. Kesinlikle Katiliyorum (6.15-7.00)
- *Cevrimici ogrenmeyi kabul olcegi (COKO), izin alinmadan ve atifta bulunularak kullanilabilir.*

AN EXAMINATION OF PERCEPTIONS REGARDING ONLINE STUDENT COMMUNITIES: A METAPHORICAL ANALYSIS FOR LEARNERS AND GRADUATES OF OPEN EDUCATION SYSTEMS

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ABSTRACT

The aim of this study is to determine the metaphorical ideas held by learners/graduates who engage in online student communities within the Anadolu University Open and Distance Education System, specifically with the concept of "online student communities". The study utilized a qualitative research methodology, specifically employing the phenomenology design, which is a well-established qualitative research strategy. The research sample consists of 637 students/graduates who are associated with student groups of the Anadolu University Open Education System. The acquired data underwent scrutiny through the content analysis method. The study revealed that participants evaluated online communities by taking into account multiple features instead of relying on a single notion. Hence, the metaphors used by individuals in virtual student communities were categorized into seven main groupings. The aforementioned areas include the exchange and generation of information, social connections, hobbies, advantages and life experiences, communication and engagement, technology, and monotony or boredom. After examining the participant responses on metaphors related to online student communities and their motivations, it became clear that the participants had positive views on acquiring information, building social connections, facilitating communication and interaction with other students and alumni, as well as personal enjoyment and benefits.

Keywords: Online communities, open and distance learning, educational institutions and metaphor analysis.

INTRODUCTION

A community is a group of individuals who are connected through their relationships, common activities, cognitive patterns, and shared ideals and values (Biza et al. 2014, p. 162). Pappas (2016) emphasizes the innate human desire to be part of a community and emphasizes the capacity of online learning communities to meet the needs of online learners and provide support, regardless of individual differences such as personal goals, previous personal-professional experiences, or physical limitations such as distance.

Within the domain of information and communication technology, contemporary communities are characterized as groups of individuals with shared interests who come together to exchange information and collaborate on solving problems (Luo, Zhang, and Qi, 2017). Presently, the previously described communities, popularly known as online communities or virtual communities, are generally defined as Internet communities or web communities. Within these communities, individuals predominantly interact with each other via digital platforms, creating a unified entity resembling a "virtual family of companions" (Cevrimici Topluluk,

2022). The notion of online community, as delineated by Rheingold (1993), refers to interpersonal networks formed in the digital domain. It includes online platforms that allow communication using digital methods. This term refers to various types of computer-mediated communication among large groups of individuals who exchange information, pursue their interests, engage in conversations, and have the ability to facilitate a wide range of activities related to seeking, providing, and sharing information. Moreover, online communities also function as platforms for socializing and other forms of engagement (Burnett, 2000).

An online community refers to a collective of persons who are linked over the internet and share common goals, interests, and experiences (Davidson-Shivers, Rasmussen, & Lowenthal, 2018). Online communities have various functions beyond simply sharing information and resources. Additionally, they function as social environments that satisfy individuals' social requirements (Rothaermel and Sugiyama, 2001, p. 299). Furthermore, these communities serve to enable commercial endeavors, provide psychological assistance, and deliver amusement (Phang, Kankanhalli and Sabherwal, 2009). In addition, they facilitate "conversations" that allow participants to get socio-emotional support and engage in a dynamic exchange of knowledge (Burnet, 2000). The main impetus for individuals to join online communities is frequently ascribed to their need for access to and exchange of information, as substantiated by several research studies. The dissemination of information inside online communities is essential for understanding the underlying dynamics of those communities. The viability of any online community relies on the exchange of information. The dissemination of knowledge among participants of an internet-based community is widely recognized as a vital and indispensable process (Butler, 2001). In their study, Ridings and Gefen (2004) investigated the underlying reasons for individuals' engagement in virtual communities. Their research revealed that individuals participate in online communities for several purposes, such as exchanging information, seeking social support, fostering friendships, and seeking entertainment. Moreover, the researchers observed that these motives may vary based on the particular category of society under examination.

From an educational institution's standpoint, online communities offer a valuable chance to enhance the learning process by providing access to educational resources and facilitating dynamic interactions between educators and students. Consequently, this helps to foster continuous involvement in the process of acquiring knowledge. As to the research conducted by Wachter, Gupta, and Quaddus (2000), the main goal of education is to cultivate a student's learning experience that goes beyond the limitations of a certain course, hence encouraging continuous learning throughout their lives. The writers emphasize the need to provide a wider range of materials in order to achieve this objective. Therefore, online communities provide several prospects for educational institutions in this aspect.

The creation of virtual communities in the context of open and distance learning is highly crucial as it enables many types of communication, such as interactions between learners, learners and instructors, and learners and institutions. These online communities function as platforms for sharing knowledge and cultivating social relationships among persons who are physically far from one other. Several open and distance education platforms provide students the opportunity to foster closer connection by creating specialized groups or communities. Students can partake in specialized groups focused on specific academic areas or interact with like-minded folks who have similar interests. Student clubs, considered as online communities in the context of open and distance learning, were created to improve students' social involvement, facilitate interactions with similar individuals, and promote a favorable learning environment.

Anadolu University is a known distance education institution in Turkiye that provides students with the opportunity to participate in various activities through virtual platforms called "Online Student Communities" within the Open Education System. The Open Education System Online Student Communities platform offers a dynamic virtual environment where students can participate in meaningful activities, regardless of their geographical location. At present, the platform accommodates eight "Online Student Communities," which have gained growing importance in 2021.

These communities play a crucial role in fostering continuous learning and enabling students to acquire the essential skills and knowledge for personal growth. Anadolu University's Online Student Communities program has successfully reached a substantial number of students, totaling 616,524. The Book Society has a total of 143,284 members, whilst the Photography Society has a total of 101,435 members. The Informatics Society has amassed a total of 86,848 individuals, while the Cinema Society has a slightly higher number of members with 96,171. The History Society boasts a membership of 78,126, whereas the Music Society has

garnered the interest of 64,572 persons. The Sociology Society boasts a substantial membership of 39,204, while the Design Society has the most modest membership, consisting of 6,884 members. These communities have effectively created social and interactive environments to promote participation among their members. Every month, several communities invite specialists in specific fields to participate in their activities, allowing community members to actively participate. Online events provide students with the chance to participate in interactive discussions with both their classmates and invited guests using a designated discussion platform. In addition, pupils have the potential to obtain diverse rewards by delivering precise answers to the questions presented to them. If desired, it is also possible to simultaneously participate in multiple communities. As per the Anadolu University e-newspaper (2022), the official website ekampus.anadolu.edu.tr and the university's social media accounts are where all event announcements are made. Furthermore, these occurrences are recorded for individuals who desire to retrieve them at a subsequent moment.

This study suggests that using metaphors to evaluate the perceptions of individuals who are currently enrolled or have graduated from Anadolu University Open and Distance Education System, regarding the established student communities and their motivations for working together, is valuable for conducting a comprehensive analysis of the perspectives held by the community members.

Metaphor is the cognitive process by which an individual understands and interprets a certain reality by connecting it to a separate occurrence (Lakoff & Johnson, 2005). Metaphors are seen as tools of the mind used to partially understand complex phenomena that are difficult to grasp, including sensory perception, personal knowledge, spiritual awareness (Lakoff and Johnson, 2005), and cognitive processes that help us better understand past experiences (Zhao, Coombs and Zahoa, 2010). Metaphors offer a flexible and ever-changing structure that can be understood by everyone. They allow individuals to express their fears, hopes, and commitments (Wyatt, 2021). Therefore, metaphors offer appropriate structures for distinguishing individual interpretations. Metaphors have the ability to influence people's thinking about a specific topic by creating and spreading discussions on important issues (Thibodeau, 2016). Furthermore, metaphors can aid learners in attaining a thorough understanding of issues that they have not extensively investigated. Metaphors are mental structures that function at a higher level of cognition. They act as frameworks that shape and define past experiences through analogical connections, making it easier to create meanings. Metaphors are considered excellent tools for gaining insights into topics that are not consciously known (Amin, 2015).

According to contemporary metaphor theory, it is suggested that metaphor is the basis of the conceptual framework used in language, as well as in cognitive processes and behavioral patterns (Aksehirli, 2007). Metaphors have a crucial role in clarifying the fundamental structures and concepts by amplifying the intentions, temporal features, circumstances, transformations, and rationales within this framework.

The current literature extensively examines numerous research that have explored the phenomenon of metaphors and their use as a tool to assess persons' perceptions in various academic fields. Metaphors have also been utilized in educational studies. Jensen (2006) asserts that metaphor analysis is a viable qualitative research method in the realm of education, with substantial pertinence to both educational theory and practice. Metaphors are often used in educational research to gain comprehensive insights on learners. Metaphor analysis is frequently used in qualitative research to achieve three main goals: improving the procedural aspects, clarifying the procedural dynamics, and understanding the resulting outcomes. The use of metaphors in qualitative research is aimed at clarifying the process, while their use in clarifying the conclusion is suggested as a logical technique for assessing the complex semantic frameworks of research by incorporating ideas from other disciplines (Gunes and Firat, 2016, p. 121).

According to Meyer (2005), metaphors are useful tools for understanding the viewpoints of distance learners towards different processes. Several studies have been undertaken and published in the existing literature on distance education, including works by Civril, Arugaslan, and Ozkara (2018), Yilmaz and Guven (2015), Bagriacik Yilmaz (2019), Usta (2019), and Aksoy, Bozkurt, and Kursun (2021). Metaphor analysis is a valuable instrument in open and distance learning for evaluating the perspectives of different stakeholders on the concepts within this domain. This enables a comprehensive analysis of the viewpoints held by various target demographics about the structure, functioning, system, learning settings, instructors, and the institution as a whole (Gunes and Firat, 2016). The use of metaphors and their subsequent analysis in the context of open and distance learning allows learners to cultivate their own expressions and viewpoints, hence facilitating outcomes that prioritize the individual (Gunes and Firat, 2016, p. 121). Thus, it is crucial

to evaluate the current situation in order to improve the effectiveness of online student communities, which have developed as a new entity in the field of open and distance education. This assessment will enable the creation of an operational, student-focused, and collaborative online community.

PURPOSE OF THE STUDY

The aim of this research is to determine the metaphorical understandings held by learners/graduates who engage in online student communities within the open and distance education system, specifically with the concept of "online student communities".

To achieve this main goal, investigations were conducted to obtain answers to the following questions:

1. Which metaphors do learners/graduates use to conceptualize "online student communities"?
2. What conceptual categories can be used to classify metaphors related to "online student communities" based on their shared attributes?

METHOD

The study utilized a qualitative research approach to examine the viewpoints of students and alumni associated with Anadolu University Open Education System online student communities regarding their encounters with these virtual communities. The study was carried out using the phenomenology design, a qualitative research methodology.

Phenomenology, as defined by Wilson (2015, p.38), is a qualitative research methodology that emerged from a philosophical movement. It functions as a medium for individuals to express their feelings, opinions, understandings, and perceptions about a certain phenomena or topic. This strategy is used to clarify how individuals experience and perceive the mentioned phenomenon (Rose, Beeby and Parker, 1995, p. 1124). Yildirim and Simsek (2016, p. 69) state that phenomenology is used in research to investigate phenomena that are commonly experienced in daily life but are not fully understood.

Metaphors are recognized as a significant technique in qualitative research for conducting thorough investigations in situations when conventional face-to-face research methods, including observation and interviews, are impractical. Metaphor analysis has been considered suitable for study in the field of open and distance learning because of the distinctive features of this educational context. The characteristics include the extensive arrangement of open and distance learning, the physical segregation between learners and instructors, and the imperative to proficiently express and comprehend intricate notions associated with open and distance learning (Gunes and Firat, 2016, p.124).

Participants

The participants consisted of persons who were registered in the online student communities of Anadolu University Open Education System, specifically the History, Cinema, Photography, Book, Music, and Informatics Communities, throughout the academic years of 2020-2021. The individuals encompassed both present students and graduates.

The study utilized criteria sampling; a planned sampling approach often employed in qualitative research. Criterion sampling entails the thorough assessment of all situations that meet a predetermined set of criteria. The researcher has the option to employ either a pre-existing set of criteria or develop their own criteria for the study (Yildirim and Simsek, 2016). The study included 627 students/graduates who actively participated in the book, photography, cinema, music, history, and informatics clubs of Anadolu University Open Education System during the autumn semester of the 2020-2021 academic year. These persons voluntarily participated in the survey. Table 1 presents the demographic characteristics of the participants, encompassing gender, age, and educational status. The table presents information regarding the frequency and percentages of participants' graduation programme, as well as their affiliations with other societies.

Table 1. Demographic characteristics of participants

		f	%
Gender	Female	315	50.2
	Male	312	49.8
Age	18-30	359	57.2
	31 and over	268	42.8
Education Statues	Students	484	77.2
	Graduate	143	22.8
Community Membership*	Book	366	58.4
	Photograph	338	53.9
	Cinema	285	45.5
	Music	272	42.5
	History	244	38.6
	Informatics	57	9.1
Total		**627**	**100.0**

* *The cumulative number surpasses 100 percent as a result of individuals who are members of numerous groups.*

Data Collection and Analysis

The data for this study were collected through a questionnaire form that was generated on the Google Forms platform. The questionnaire comprised two separate components. The first part of the form included questions about the demographic characteristics of the participants. The second phase of the study involved administering a questionnaire specifically tailored to evaluate the viewpoints of students and alumni who engage in online student communities, commonly known as student clubs, inside the open and distance education system. The aim was to collect their perspectives on these communities and acquire their viewpoints on the importance of online student communities, which have a significant number of users inside the Open Education System. The participants were instructed to fill in the blank in the statement *"Student communities are similar to .....; because....."* with metaphors. These metaphors were then used as the primary data for the research.

The inquiry data underwent analysis utilizing the content analysis methodology. The primary methodology utilized in content analysis involves collecting data that is comparable in relation to a particular concept and subject matter, and subsequently developing a method to efficiently convey this information to the reader. The main goal of content analysis is to discover and clarify the concepts and relationships that might serve as an explanatory framework for the data obtained from participants' perspectives, as well as file and document analysis (Yildirim and Simsek, 2016).

The researchers employ a sequence of procedures to study and understand metaphors. The analogies were gathered from the data acquired through written contributions from students and graduates and were organized into a thorough list. Concise statements that lack metaphors, explanations, or elaborations are purposely excluded, and any comments made are not within the scope of the research. For example, basic assertions such as "communities bring me joy" are not encompassed in the context. Out of the 627 responses received, 327 were considered suitable for inclusion in the review.

In the second phase, the metaphorical expressions created by students and graduates were thoroughly evaluated, and only the ones considered valid were selected. The aim of this study is to classify the valid metaphors (the metaphor and its justification) according to their similarities after identifying the sample metaphors. There were a total of 327 metaphors, which were classified into eight separate categories.

Validity and Reliability

In order to validate the reliability of the results, the obtained data underwent independent analysis by the two researchers participating in the study. Afterwards, the researchers gathered and began to compare

their own analyses side by side. An additional expert opinion was sought to determine the accuracy of the categories defined in the study in reflecting the underlying metaphors. The expert in the relevant field was asked to create metaphors that fit into the right category. Later, a comparison was conducted between the categories of the domain specialist and the researchers. In order to ensure the reliability of the study, the researchers utilized the framework established by Miles and Huberman (1994).

Reliability can be quantified by computing the ratio of consistent decisions to the total number of decisions, both consistent and inconsistent. The research's reliability was assessed to be 94% based on the result of this calculation.

FINDINGS AND INTERPRETATION

This section offers the findings about the online community's perceptions of students and alumni associated with Anadolu University's online student communities. A total of 327 metaphors were discovered in the data obtained from the participants, as shown in table 2. The metaphors were subsequently classified into seven unique conceptual categories, taking into account their shared qualities (table 3).

Metaphors used for Online Community

Table 2. Participants' metaphors about online communities

Metaphor series	Metaphor name	f	Metaphor series	Metaphor name	f
1	To each other*	27	98	Beautiful	1
2	Family	25	99	Ring	1
3	Tree	10	100	Imagination	1
4	Sun	7	101	School open to all	1
5	Life	7	102	Excitement	1
6	Social network	5	103	Hogwarts	1
7	Class	5	104	Organization	1
8	World	5	105	Serenity	1
9	Light	4	106	Ideal groups	1
10	Education	4	107	Ideology	1
11	Book	4	108	Communication	1
12	School	4	109	Science	1
13	Entertainment	4	110	Pearl	1
14	Forest	3	111	Human body	1
15	Rainbow	3	112	Building	1
16	Ocean	3	113	Internet	1
17	Virtual environment	3	114	Job search site	1
18	Conversation	3	115	Cafe	1
19	Moon	3	116	Coffee	1
20	Star	3	117	Crowded dinner table	1
21	Hobby	2	118	Heart rhythm	1
22	Party	2	119	Canteen	1
23	Social media	2	120	Snow drift	1
24	Social platform	2	121	Complex structure	1
25	Friends group	2	122	Complex puzzle	1
26	Friend environment	2	123	Categorised group	1

27	Ant	2	124	Spoiled soup	1
28	Pomegranate	2	125	Exploration	1
29	Virtual world	2	126	Personal developments centres	1
30	Useful	2	127	Mass	1
31	Culture	2	128	Classical music concert	1
32	Library	2	129	Keyboard	1
33	Game	2	130	Conference	1
34	Meeting at a common point	2	131	Copy	1
35	Leaf	2	132	Sheep	1
36	Beehive	2	133	Bridge	1
37	Sea	2	134	Village	1
38	Computer	2	135	Club	1
39	Improvement	2	136	Institution	1
40	Sky	2	137	Undergraduate course	1
41	Friendship, School friendship	2	138	Funfair	1
42	Happiness	2	139	Seasons	1
43	Activity	1	140	Magnet	1
44	Flame	1	141	Candle	1
45	Kindergarten	1	142	Pain relief	1
46	Encyclopaedia	1	143	Discussion	1
47	Apartment meeting	1	144	Music box	1
48	Car spare shop	1	145	Nouron	1
49	Bee	1	146	Dive in	1
50	Friendship website	1	147	School canteen	1
51	Soldier	1	148	indispensable	1
52	Socialization	1	149	Common area	1
53	Love	1	150	Environment	1
54	People on the same boat	1	151	Homework	1
55	Honey	1	152	Afternoon tea on the lake shore	1
56	Sports lesson	1	153	Student	1
57	Composition	1	154	Learning	1
58	Information tool	1	155	Instructor	1
59	Having knowledge	1	156	Formal student club	1
60	Community knowledge	1	157	Story book	1
61	The cosmos of knowledge and culture	1	158	Special classroom	1
62	Knowledge	1	159	Free fun	1
63	Bouquet of flowers	1	160	Self confidence	1
64	Ball	1	161	Warm cotton pyjamas	1
65	Working together	1	162	Panel	1
66	Leisure time	1	163	Comfortability	1
67	Spend leisure time	1	164	Power	1
68	Part of whole	1	165	Colour	1
69	Geography	1	166	Wind	1
70	Roof	1	167	Intimate friendly atmosphere	1
71	Tea	1	168	Responsibility	1
72	Flower	1	169	A social tool	1
73	Flower garden	1	170	Social group	1

74	Chocolate	1	171	Social life	1
75	Looking for your sock's mate	1	172	Social environment	1
76	Soup	1	173	Intangible communication	1
77	Dart board	1	174	Internship	1
78	Test board	1	175	Non-governmental organization	1
79	Break	1	176	Water	1
80	Nature	1	177	Bra	1
81	Friend Assembly	1	178	Flack	1
82	Education course	1	179	Team	1
83	Red blood cells of education	1	180	Chicken farms	1
84	Elkin	1	181	Facility	1
85	Crew	1	183	Seed	1
86	Electron	1	184	Society	1
87	Adolescence	1	185	Passion	1
88	Equal part	1	186	Horizon	1
89	Interaction	1	187	University club	1
90	Faculty	1	188	University	1
91	Philosophical approach	1	189	Vision	1
92	Exchange of ideas	1	190	Don't fantasise about what you can't do	1
93	Idea workshop	1	191	Artificial communication	1
94	Football	1	192	Youtube	1
95	Immigrants' birds	1	193	Time line	1
96	Shapes in the sky	1	194	Observation	1
97	Day	1			
Total	**231**		**Total**		**96**

**The aforementioned phenomenon demonstrates commonalities by providing both motivation and perspective in a comprehensive manner. The members apply the metaphor "to each other" to develop real links with other online groups.*

Categories and Subcategories Related to Online Community Metaphors

The research participants' accounts of online communities comprise a range of metaphors, which can be classified into categories such as information dissemination and generation, social connections, personal interests, communication and engagement, advantages and personal fulfillment, technology, and tedium. The following tables display the metaphors linked to the aforementioned categories and subcategories.

Table 3. Distribution of participants' categories related to online communities

Category	Metaphor number	%
Knowledge sharing	114	34,8
Social relationship	106	32,4
Hobby	33	10,3
Benefit/Life	26	7,95
Interaction/Communication	29	8,86
Technology	12	3,66
Monotony	7	2,14

Table 4. Examples of Participants' Metaphors about Sharing and Creating Knowledge Learning and Acquiring Knowledge

Category	Subcategory	f	%	Metaphor
Knowledge sharing	Education / Informatization	94	28,7	To each other (12), sun (5), school(4), light (4), moon(3), tree, (2) life (2), ocean (2), education (2), development (2), culture (2), behive, bee, love, learning, observation, discovery, information tool knowledge society, friend environment, knowledge, geography, world, team, undergraduate course, working together, diving sea, nature, friend assembly, education course, red blood cells of education, philosophical approach, idea workshop, exchange of ideas, horizon, immigrants birds, day, imaginations, science, activity, buildings, Internet, personal development centres, non-governmental organization, candle, discussion, pomegranate, indispensible, environment, life, student, university, class, a social tool, social environment, internship, chicken farms, colour, vision, music box leaf, you tube and time line
	Instructional media and material	10	3,05	Book (3), library (2), panel, conference, homework, encyclopaedia, instructor
	Educational institution	10	3,05	Faculty, test board, essay, school open to all, Hogwarts, organization, school canteen, formal student club, special classroom, facility, university executive board
Total		**114**	**34,8**	

Table 4 presents the metaphors employed by the research participants in the information sharing category. After examining the table, it is clear that the participants primarily used metaphors related to information exchange when describing their perceptions of online community. These metaphors accounted for 34.8% of all the metaphors expressed. After examining the subcategories within the field of information exchange, it is clear that the most frequently used metaphors relate to education/information (28.7%), instructional media and material, and educational institution (3.05%). Below are the subcategories and metaphors that have been offered.

In the context of acquiring education and knowledge, a total of 94 metaphors were used to describe the duties and responsibilities of student communities in connection to education, sharing information, and personal development. The participants offered diverse metaphors related to the process of gaining education and information, accompanied by their own justifications.

"It is similar to training courses; you learn information you do not know and you ask questions and get answers"

"It's like construction, it creates the opportunity to build new things"

"It's like a pomegranate because outwardly it's one knowledge and inwardly it's many knowledge"

"It is similar to each other because it is educational"

"It is like light because they will illuminate the future."

"It's like a stream because something new can be learnt every day."

"It's like diving; because under the sea is a whole new world and very different"

"It is like a world because it consists of curious, knowledge-hungry people who do not know each other".

"It is like the red blood cells of education, because it gives colour and life to education"

"It's like an undergraduate course because I can get very different and detailed information in these communities"

The dominant metaphor utilized by the participants in this context is the metaphor of mutual similarity, emphasizing similarities with other online groups. Stock (2021) states that the metaphorical connection between darkness, symbolizing ignorance, and light, symbolizing education, is frequently employed in the field of education. This metaphor is based on deep and extensive worldly experiences and may be used universally to various situations, languages, and cultures. This study utilized metaphors linked to warmth and lighting, such as the sun, light, moon, and candle, and provided a rationale for their application in the context of education. The sun metaphor was frequently used in different conceptual realms as a crucial and dynamic source. The usage of ocean and sea metaphors in the context of education and knowledge relates to subjects that should be actively explored in daily life. In contrast, metaphors such as life and blood cells are used to emphasize the essential role of these communities in the core nature of existence.

The educational institution subcategory comprises 10 metaphors, including faculty, test board, public school, Hogwarts, organization, school canteen, formal student club, private classroom, facility, and university executive board. The participants offered the following terminology to clarify certain metaphors and their underlying justifications. The metaphors used in this category related to school, education, knowledge, learning, and development are tangible metaphors that directly represent the acts and institutions connected to learning.

> *"It is the support of school-like education"*
>
> *"It is similar to school canteens because the most important thing they have in common is being a student"*
>
> *"It turns into a special classroom because we take lessons from experts in their fields and we gain practice along with theory thanks to the meetings"*
>
> *"Student communities are like Hogwarts because they give people what they want to receive, not moulds"*

The subcategory of instructional media and material includes diverse metaphors that enhance the accessibility of information for community members. The metaphors used include book (3), library (2), panel, conference, assignment, encyclopedia, and instructor. The participants expressed the selected metaphors and their corresponding arguments in the following way.

> *"Student communities are like a 1000-page encyclopaedia because they teach people something all the time."*
>
> *"It is like a library, as in every book, you can learn from every person"*
>
> *"It is similar to a conference because it provides a chance to learn from everyone".*
>
> *"Student Communities are similar to panels because, just like panels, the aim is to reach a conclusion".*
>
> *It is not, it is to analyse the subject and the listener can also participate in the same way."*
>
> *"Student communities are similar to instructor because they are informative"*

Table 5. Participants' metaphors related to the category of social relationship

Category	Subcategory	f	%	Metaphors
Social relations	Friendship, family, team	56	17,1	Family (25), ant (2), tree (3), cafe, friendship site, friendly friendly environment, university clubs, group of friends, bridge, friendly environment, friend, leaf, flame, happiness, star, soldier, game, ball, football, institution, snow mass, forest, pomegranate, ring, power, honeycomb, world, equal part, team
	Common interest, purpose	27	8,25	To each other (5), class (4), meeting at a common point (2), common space, coming out of asociality, people in the same boat, honey, cosmos of knowledge and culture, part of the whole, crowded dinner table, categorised group, searching for the match of the sock, excitement, human body, school friendship, social group, roof, soup and passion
	Inclusiveness, openness, diversity	23	7,03	Earth (3), rainbow (3), star (2), tree, kindergarten, composition, bunch of flowers, flower garden, electron, sky, complex structure, complex puzzle, cut soup, classical music concert, magnet, ocean, forest and storybook
Total		**106**	**32,4**	

Table 5 displays the subcategories and metaphors linked to the social relationship category that were discovered in the participants' evaluation of online communities. The notion of social interaction incorporates diverse metaphors, including friendship, family, team (17.1%), common interest, purpose (8.25%), and inclusivity, openness, diversity (7.03%). These analogies are frequently encountered in online communities, where members get together and form relationships or bonds with administrators, teachers, and other participants. The overall occurrence rate of the social relationship category in all responses was determined to be 32.4%. The subsequent metaphors are relevant to the classification and subclassification of social interactions, along with corresponding exemplifications linked to these metaphors.

Friendship, in the context of interpersonal connections, includes a range of entities such as family, teams, and social groupings. The notion of family is depicted 25 times, but the ant and tree analogies are each noticed 2 and 3 times respectively. Additional depictions encompass the coffee shop, social networking platform, and welcoming atmosphere, all of which suggest environments that promote the development of connections. Furthermore, this category encompasses university clubs, friend groups, and bridges, which serve as symbols of the establishment and upkeep of friendships. Additional metaphors, such as leaf, flame, happiness, star, soldier, game, marble, football, institution, snow mass, forest, pomegranate, ring, power, honeycomb, world, equal part, and team, expand the range of representations in the friendship category. The prevalence of positive metaphors in this study can be viewed as a dependable indicator of factors such as satisfaction and motivation among open and distant learners. Within the domain of distance education, difficulties such as feelings of isolation, reduced sense of belonging, and disengagement from the learning environment are considered problems that can be overcome by strengthening the sense of community. According to Holmberg (1989), in his theory on interaction and communication in distant education, a strong and effective conversation between learners and teachers promotes emotional connection to the educational institution. He underscores the crucial significance of human relationships, work fulfillment, and empathy between learners and institutional staff in distant education. Therefore, empathy and a feeling of belonging act as powerful motivators to encourage the learner. Out of all the remarks, the metaphor that is most prominent is that of family. The family metaphor is frequently used to depict the development of feelings like steadfast support, acceptance, and communal sharing in social relationships. The participants presented metaphors related to this domain and explained the reasoning behind their selections as follows:

"Like family, it's unity."

"Like a family, you share everything".

"It is like a family because everyone helps each other"

"It is like a family; because you feel comfortable, happy and learning when you are with them."

"What is shared in the family is gratuitous."

"Everyone is together in the family."

"There is sincerity in the family."

"In the family, you organise and achieve things together."

"Since it is a place where friendships are made, reinforced and socialisation increases, it is similar to cafes."

"Student communities are similar to a sincere, friendly environment because it is a platform where pros and cons are shared".

"It is similar to a bridge because it brings distances and intimacy closer".

Within the specific subcategory characterized by common interests and goals, the participants together produced a grand total of 27 metaphors related to the experience of uniting for a shared purpose, motivated by their engagement in online student communities. The text utilizes various metaphors, such as mutual interaction, educational setting, convergence, shared environment, overcoming isolation, shared journey, sweetness, expansive realm of knowledge and culture, interconnectedness, gathering of individuals, organized grouping, pursuit of compatibility, enthusiasm, human anatomy, companionship within an educational institution, collective association, shelter, nourishing mixture, and intense emotion. The participants presented metaphors related to this particular subcategory and explained the reasoning behind their selections in the following manner:

"Student communities are like a crowded dinner table, because the members enjoy the subjects in the same field together, as if they were enjoying the same meal together at the same table"

"It is similar to passion and excitement. Because it brings together people who are passionate and excited about what they do, what they are interested in"

"It is similar to a roof because they are communities that want to increase our awareness with our common interests"

"Student communities are like a cosmos of knowledge and culture because people with similar interests come together"

"People who get on the same ship have a common time to spend until they reach a similar harbour, that is, until graduation"

Within the context of inclusivity, openness, and diversity, the participants utilized several metaphors to depict online communities as a cohesive entity that brings together individuals with a wide range of characteristics, such as age, gender, geographical location, profession, and educational history. The metaphors included several themes, such as the global rainbow (3), star (2), tree, kindergarten, composition, bouquet of flowers, flower garden, electron, sky, intricate structure, intricate puzzle, fragmented soup, classical music concert, magnet, ocean, forest, and storybook. The participants justified their usage of metaphors, such as rainbow, planet, ocean, forest, and flower garden, by emphasizing the diverse nature of individuals within communities. The participants' statements explaining the reasons for using metaphors such as tale, rainbow, world, and magnet are as follows:

"It is similar to storybooks; everyone has a story"

"Like a song composition, there are people from every note

"It is a rainbow because everyone is different"

"A rainbow because they are platforms where different colours (thoughts) come together"

"Cut soup is not homogeneous"

"Student communities are like the world. Because it brings together many people with different departments at school, different aims and goals in life, different ages, maybe different races and colours, on a common issue.

"Student Communities are like 'magnets' because they are 'communities where students from all walks of life come together under different organisations"

Table 6. Participants' metaphors related to the hobby category

Category	f	%	Metaphors
Hobby	33	10,09	Entertainment (4) hobby (2), party (2) groups of friends, physical education class, to each other, leisure time, leisure time utilisation, knowledge, Friday night, tea, chocolate, dart board, break in the lesson, sky, peace, ideal groups, heart rhythm, book, village, club, amusement park, game, afternoon tea by the lake, free entertainment, warm cotton pyjamas, comfort and happiness, relaxation and happiness, imagining things, you can't
Total	**33**	**10.09**	

Table 6 presents a newly emerged category in the metaphorical interpretations of online communities. According to the data in the table, it is evident that 10.09% of the participants classified online communities using metaphors related to hobbies. The metaphors used to describe student communities as enjoyable and relaxing include terms like entertainment, hobby, party, tea, groups of friends, physical education class, leisure time, leisure time evaluation, Friday night, chocolate, dart board, break in the lesson, sky, peace, ideal groups, heart rhythm, book, village, club, amusement park, game, free entertainment, cotton hot pyjamas, comfort, happiness, and engaging in extraordinary activities. The participants presented metaphors related to this domain and explained their reasoning for choosing them as follows:

"It's like a village because people relax there"

"It is like Friday night, because you feel relieved and happy knowing that the next day is Saturday."

"It's like chocolate, it gives you happiness."

"It's like an amusement park because you don't get bored there, you have fun, you can do all kinds of activities"

"It helps to distract us from entertainment"

"Student communities are like cotton, warm pyjamas; because you are in what you want to be and you are happy."

"A break in the lecture relaxes you."

"It is similar to physical education lessons, even if the weather is bad (problems) there is fun".

"It is like drinking tea by the lake in the afternoon because that is the only way to empty your head."

"Student communities are like a party; because they are fun."

Table 7. Participants' metaphors related to the category of utility and life

Category	f	%	Metaphors
Benefit and life	29	8,86	Tree (4), life (3) to each other (3), useful (2), sun (2), car spare parts store, coffee, painkiller, beehive, crop, society, seed, puberty, season, forest, bra, wind, responsibility, flower and water.
Total	29	8,86	

Table 7 displays the metaphors offered by the participants that are linked to the benefit/life category. According to the results, a large portion of the participants, precisely 8.86%, considered online student communities to be an important part of their life and a valuable means of establishing interpersonal connections. The discourse utilizes a range of metaphors, such as tree (4), life (3), each other (3), useful (2), sun (2), auto spare parts store, coffee, painkiller, beehive, crop, society, seed, adolescence, season, forest, bra, wind, responsibility, flower, and water. The participants offered insights on specific metaphors related to the domain of benefit/life, along with their relevant rationales.

"It is like water because it gives life"

"It's like life because it's like breathing."

"A car is like a spare parts store; because it supplies whoever needs the most."

"It's like a tree because you follow it and eat its fruit when the day comes."

"It's like a painkiller, it relieves some of my pains."

"It's like a beehive because it aims to do useful work"

"Like crops, if you look after them, they ripen and bear fruit"

"It is like a forest because as it breathes, it benefits those around it"

Table 8. Participants' metaphors related to communication/interaction category

Category	Subcategory	f	%	Metaphors
Communication/ interaction	Communication	21	6,42	To each other (3), chat (3), interaction, pearl, confident, keyboard, shapes in the sky, life, job finding site, social life, ideology, beautiful, canteen, apartment meeting, communicating, neuron and social platform
	Virtual Communication	5	1,52	Virtual world (2), abstract communication, virtual environment and artificial communication
Total		**26**	**7,95**	

Table 8 provides a thorough summary of the several subcategories and metaphors in the field of communication/ interaction. The occurrence rate of metaphors depicting the ability of online communities to enable the sharing of ideas, promote connections among members, and encourage efficient communication is 7.95%. The section consists of two separate subcategories, specifically communication and virtual communication.

The participants articulated a range of metaphors to describe communication and interaction, such as mutual engagement (3), online conversation (3), interpersonal exchange, precious gem, assertiveness, input device, celestial formations, existence, employment search platform, societal connections, belief system, aesthetically pleasing, communal dining area, residential gathering, interpersonal connection, neural network, and digital social network. The participants elucidated the rationales underlying these metaphors.

"It is like chatting with someone at the next table while sitting in a cafe because you have a common interest and maybe there are few people to talk to..."

"It is similar to a job site because one of the biggest benefits of student communities is that it increases communication between students, provides networking, and increases personal competences."

"It is similar to a canteen; the interaction is high."

"It is similar to an apartment meeting; we don't know what is going on in the apartment."

"It is similar to a chat because there is interaction."

"Similar to neurons, requires interaction network"

"It's like a social platform because everyone expresses their own opinion while respecting the opinion of others."

The participants articulated many metaphors to convey their objections of virtual communication and the underlying reasons.

"It is similar to abstract communication because it has a dimension that isolates the person or individual and reduces human relations.

Since the communities here are in the virtual world, they are very different from communication with real people and do not contain the same emotions."

"It is similar to cyberspace because communication is not face-to-face"

"It is similar to the virtual environment; because there is no face-to-face communication"

"It is similar to artificial communication, because there is no face-to-face communication."

Table 9. Participants' metaphors related to technology category

Category	f	%	Metaphors
Teknology	12	3,66	Sun (5), computer (2) virtual environment (2) social media (2) and social platform
Total	**12**	**3,66**	

The technology category, which represents 3.66% of the total content, contains numerous statements regarding the operating structure of the community within an online program. These sentences include metaphors such as social network (5), computer (2), virtual environment (2), social media (2), and social platform. The participants expressed specific analogies and offered justifications for their selections.

"It is similar to a computer because it works systematically."

"It is similar to social media because it builds an information network"

Table 10. Participants' metaphors related to the category of monotony / boredom

Category	Sayi	%	Metaphors
Monotony/boredom	7	2,14	To each other (3), copy, mass, sheep, flock
Total	**7**	**2,14**	

Table 10 displays the metaphors employed by the participants in the monotony/boredom category. The expressions with a rate of 2.14% correspond to unfavorable portrayals of online student collectives. These expressions consist of three metaphors: inclusion, duplication, and collective behavior, specifically falling under this particular category. An examination was conducted on the sheep metaphor in relation to the concepts of docility, subordination, and submission. The participants expressed specific metaphors and offered explanations to support them.

"It's like a copy, because each student is unique"

"They are similar to each other because they are almost the same people"

"To the masses, they all have the same mindset and that's a bad thing"

"It's similar because it's monotonous. It doesn't appeal to young people"

DISCUSSIONS AND CONCLUSION

This study aimed to determine participants' perceptions of the Anadolu University Open and Distance Education System Online Student Communities through the use of metaphors as a research instrument. The study revealed that the participants evaluated online communities by taking into account multiple features instead of depending on a single concept. Hence, the metaphors used by participants in online student communities were categorized into seven main kinds. After examining the proportional distribution of metaphors, it was noted that the category with the greatest number of metaphors was information sharing and information creation, making up 34.8% of the overall total. Following that, the previously specified categories were noted.

After examining the participants' statements about metaphors linked to online student communities and their motivations, it became clear that the participants had positive attitudes towards gaining information, building social connections, communicating and interacting with other students and alumni, and deriving personal enjoyment and benefits from these communities.

The researchers discovered that the participants evaluated student communities as an environment that promotes both the interchange and creation of knowledge. The use of metaphoric expressions such as learning, observation, discovery, information acquisition, lesson assimilation, cultural immersion, educational pursuit, conceptual exploration, intellectual expansion, personal growth, student engagement, university involvement, and class participation collectively suggest that the individuals involved view these communities as opportunities for informal educational experiences. The subcategory related to the acquisition of knowledge and information displayed the highest occurrence of metaphors, representing 28.74% of the overall total. These findings are consistent with prior research indicating that virtual communities can enable a range of activities, including information seeking, sharing, and provision, as well as socializing and engaging in other forms of contact (Burnett, 2000). Research has confirmed that the main reason why people engage in online communities is to exchange information (Wasko and Faraj, 2000). These communities provide individuals with the chance to casually generate and distribute information, as well as connect with like-minded individuals (Chen and Hung, 2010; Chunngam, Sumalee and Murphy, 2014). Participants greatly appreciate these groups and consider them to be a significant reservoir of knowledge. Communities offer opportunities to interact with experts, utilize the knowledge and experiences of others, gain new ideas, methods, and technology, and receive support (Tausczik and Huang, 2020).

Within the scope of social interactions, this study found that metaphors emphasizing unity and coherence, such as friendship, familial bonds, and collaboration, ranked second in terms of importance. SosyalleiThe issue of socialization in distance education settings is often seen as a disadvantage compared to traditional in-person education. However, it can be argued that online communities play a vital role in meeting the need for a supportive social environment among open and distance learners. Online communities are digital environments enabled by information technology. These virtual places function as platforms where individuals seek emotional support, a feeling of belonging, and motivational encouragement (Furlong, 1989; Hiltz and Wellman, 1997; Korenman and Wyatt, 1996; Smith, 1999; Sproull and Faraj, 1997).

Social presence is a concept employed to enhance communication in online groups and mitigate feelings of loneliness among individuals. Social presence, as now defined, pertains to an individual's ability to interact with a community, engage in meaningful communication within a reliable setting, and form interpersonal connections by expressing their distinct personalities (Garrison, 2009, p. 352). The use of the family metaphor might be seen as a sign of the trust placed in these groups.

Inclusion, as a subtype of social interactions, refers to the ability to include and incorporate all persons in a community, hence reducing exclusionary practices. Hence, it signifies the integration of all individuals into diverse systems, decision-making processes, and activities (Talmage and Knopf 2017). Inclusiveness is commonly recognized as a quantifiable characteristic of participation. Inclusive participation is the intentional endeavor to involve pertinent groups or interests, while considering individual characteristics such as gender, age, color, and sexuality (Barnes, Newman, Knops, & Sullivan, 2003; Michels & De Graaf, 2010). This categorization includes metaphors that share resemblances with the structural attributes of open and distance learning. Open and distance learning has been shown to greatly benefit inclusion, especially in poor countries, by reducing several barriers to higher education such as gender, age, socio-economic status, and geographical distance (Yasmin, 2013).

The notion of openness is intricately linked to the pedagogical framework. Encompassing the reduction of constraints in the learning process, enabling learners to exercise autonomy in making choices about their own learning (Rumble, 1997). Openness promotes increased availability, fairness, and cooperation in the field of education. Furthermore, it promotes socioeconomic fairness and removes barriers to education (Bozkurt et al., 2023). Online communities enable the convergence of persons with varied backgrounds, encompassing differences in religion, ethnicity, experience, perspectives, identities, color, class, and gender, who come together to discuss and exchange ideas on a common topic. Facilitating the integration of community members into online groups is of utmost importance, necessitating the active promotion of inclusion and diversity. The Anadolu University Online Student Communities prioritized diversity, as demonstrated through the utilization of diverse metaphors to illustrate this theme. The metaphors encompassed allusions to various elements such as the world, rainbow, star, tree, kindergarten, composition, bouquet of flowers, flower garden, electron, sky, complex structure, complex puzzle, cut soup, classical music concert, magnet, ocean, forest, and storybook. The analysis of metaphors and phrases in terms of their underlying justifications emphasized the importance of embracing diverse perspectives, encouraging inclusiveness, and cultivating a sense of unity throughout communities.

The survey participants utilized metaphors such as leisure time, chocolate, hamlet, and quiet to depict student communities within the realm of entertainment and hobbies. The metaphors presented here are consistent with prior studies conducted by Wasko and Faraj (2000) and Ishii (2008), which discovered that individuals view online communities as providers of entertainment and enjoyment.

The Uses and Gratifications Approach aims to comprehend the underlying reasons that drive individuals' use of media. According to the hypothesis put out by Katz, Blumler, and Gurevitch (1974), people intentionally and deliberately use the media to meet specific desires and achieve specified goals. As per Giddens (cited in Cizmeci, 2015), people use mass media for various reasons such as acquiring information and knowledge, forming a connection with media personalities, participating in social interactions, developing a sense of community, finding relief from daily pressures, and seeking amusement. Bruckman and Jensen (2002) state that people participate in communities, both online and offline, because they believe they will gain personal advantages from the experience. Studies on new media have revealed that individuals utilize these tools for various purposes, such as establishing social connections, enhancing personal status, engaging in online commerce, benefiting from the convenience of communication technologies, and gaining economic advantages (Kaye, 1998; Papacharissi and Rubin, 2000; Song, LaRose, Eastin, and Lin, 2004). In Sungwook Do-Hyung and Han's (2014) study, it was shown that individuals who join a virtual community carefully assess the advantages and disadvantages at every step of the decision-making process inside the community. Moreover, the research suggests that if these individuals do not perceive any benefits from their involvement in a specific community, they are inclined to hunt for alternative virtual communities. The study explored metaphors related to the notions of life and benefit, including prominent metaphors such as life, tree, seed, sun, and beehive. The focus was centered on the advantages obtained via communal interactions.

Online communities are communities that are aided by technology, where electronic communication is the main way people interact (Dennis, Pootheri and Natarajan, 1998; Hiltz and Wellman, 1997). The Internet, together with its related technologies, enables the smooth incorporation of individuals into diverse societies. Online communities utilize many technological improvements, such as communication systems, video capabilities, photographic tools, audio functionality, webcams, and other related features. Preece, Krichmar, and Abras (2003) state that the development of standardized frameworks for these technologies has enabled the growth and progress of the associated protocols (Plant, 2004). Among the different metaphors used to understand the concept of community, only 3.66% of these metaphors were identified to specifically explain the operational dynamics of online communities, especially those supported through electronic communication platforms.

The investigation unveiled numerous metaphors that are linked to adverse perceptions. These metaphors relate to the comparison between in-person interaction and online communication, the disruptions in community operation, and the view of the program as unengaging. The participants emphasized that the communities fail to achieve their expected goals, using metaphors such as each other, copy, mass, sheep, flock, cyberspace, abstract communication, virtual environment, artificial communication, looking for the match of your sock, and test board. Building upon the findings of Garton and Wellman (1995), who argue

that communication in virtual environments is impersonal, lacks social subtleties, and is primarily focused on completing tasks rather than face-to-face interactions, metaphors that highlight the importance of in-person communication in interpersonal relationships are viewed negatively.

The following suggestions are recommended:

This study investigates the users' impression of the Online Student Communities that were introduced in the Anadolu University Open Education System during the 2016-2017 academic year. The purpose of establishing these communities is to facilitate social engagement and encourage a wide range of interests among students, similar to the student clubs offered to students in traditional departments. Evaluating the viewpoints and opinions of participants is important when it comes to building and reorganizing community-related spaces, as well as dealing with and solving connected problems. System administrators should carefully examine the elements associated with negative metaphors and explore different approaches and topics, such as conducting interviews, to comprehensively evaluate metaphors and their underlying causes.

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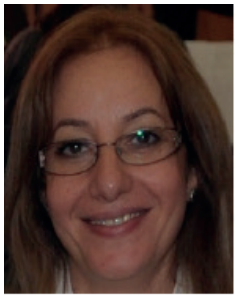

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DIGITAL LEARNING SUPPORT ELEMENTS IN THE ONLINE TEACHING OF GERMAN AS A FOREIGN LANGUAGE

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ABSTRACT

In recent years, pedagogical design and practice have undergone a forced transformation that has brought many innovative methods and tools to the implementation process. The transition to online education has demanded new infrastructural solutions that have temporarily replaced traditional classroom practices. Most teachers seem to have adapted well to these new challenges. Learning support platforms and online teaching elements had to be harnessed by teachers who, in many cases, acquired this knowledge on their own, in awareness of their importance. Our study examines the need for digital learning support elements in primary schools of the German national minority in Hungary. Our research tools comprised an online questionnaire survey conducted in 2022. The goal of our study was to identify the problems that teachers faced in the transition to online teaching during the period of distance learning introduced due to the COVID pandemic in 2020 and since; the forms of support teachers received nationwide; and the measure of success in their work as language teachers. We also looked at the factors that influenced the digital elements being used. Finally, we examined whether teachers are still willing to use online learning support tools when returning to face-to-face teaching.

Keywords: Online teaching, distance education, primary school, German language, ICT, Hungary.

INTRODUCTION

In our literature review, we looked for research projects and findings that would be of interest to our own study. Although different target groups (teachers, students, parents) were interviewed, we limited ourselves to those in which the focus is on teachers. All the studies were conducted in European countries (Italy, Croatia, Germany), including one neighboring country (Austria), but in order to receive a more comprehensive view, we added a country that happens to be geographically and culturally distant from Hungary (India).

Hassan et al. (2020) explored the challenges faced by Indian teachers in an online survey. In their article "A Critical Review by Teachers on the Online Teaching-Learning during the COVID-19", Hassan et al. conclude that in India, teachers were not prepared for the online transition (Hassan et al., 2020, p. 21)

The slight majority of teachers, 55%, agreed that they lacked sufficient computer knowledge and skills to deliver online lectures or create e-content, and only 45% considered themselves competent enough to deliver online lessons or create e-content (Hassan et al., 2020). The authors also made recommendations, namely they considered it important to include content for online/digital education in teacher training (Hassan et al, 2020, p. 25).

A study conducted in Italy by Ferri et al. (2020), entitled "Online Learning and Emergency Remote Teaching: Opportunities and Challenges in Emergency Situations", aimed at analysing the opportunities and challenges, technical/technological, pedagogical and social issues presented by emergency remote teaching due to COVID. One of the main difficulties faced by teachers was their lack of digital skills/competences and the confusing variety of online platforms they had to navigate through and familiarise themselves with (Ferri et al., 2020, p. 1). They underline that the technical conditions (internet connection, electronic devices) were not equally accessible to all teachers and students, leading to inequalities of opportunity, for example when several children in a family were supposed to participate in online education at the same time, or the different urban and rural locations (Ferri et al., 2020).

Teachers' methods also had to change and become innovative if they wanted to keep students' attention, active participation, and motivation in the online space. In many countries, distance learning was particularly problematic at lower secondary level, as this age group had no experience in digital/remote learning. In relation to technical problems, Ferri et al. point out that in Italy, for example, many children in 2020 could only follow lessons on their mobile phones because they did not have laptops or computers. In Italy, training courses were organised for teachers to familiarise themselves with innovative learning and teaching methods (Ferri et al, 2020, p. 13).

Ivancan interviewed Croatian language teachers in primary education for her MA dissertation (Ivancan, 2022, p. 21). She states that Croatian teachers were also completely unprepared for online teaching because of the lack of digital competences (Ivancan, 2022, p. 25). The teachers tried to fill this gap by researching different platforms and digital tools, seeking advice from colleagues, continuing their education via internet tutorials or participating in online courses (Ivancan, 2022, p. 26).

In Germany, Austria and Switzerland, the School Barometer in March/April 2020 drew an initial picture of the mood among 7100 respondents (school administrators, teachers, pupils, parents, representatives of school administrations) (Huber et al., 2020). Regarding the digital competence of teachers, it was found that there were great differences in the competences of teachers in dealing with digital media. Teachers perceived the use of digital media as a challenge and demanded a stronger engagement with digital media in the context of initial and in-service training. Porsch & Porsch (cited in JanBen et al., 2022, p. 246) also point to the low importance of digital media for learning in primary schools, which presented this target group or the teachers teaching them with greater challenges during the pandemic.

A smaller qualitative study (n=30) in Austria is relevant for our research because of its research setting (primary school) and the fact that it conducted sample interviews with school administrators, teachers, and parents and also included the children's perspective. Regarding teachers, it is stated that the school closures posed a particular challenge because one of the most important elements in early education – daily personal exchange with pupils – was lost (Kampf-Winetzhammer, 2020, p. 5). The authors also point out that the actual use of digital media for learning purposes in primary education was extremely limited before COVID (Kampf-Winetzhammer, 2020, p. 8). Teachers felt that the shift to distance learning forced them to engage with new digital media. This, in turn, proved difficult due to the lack of time in regular teaching hours (Kampf-Winetzhammer, 2020, p. 14).

PURPOSE OF THE STUDY

The rapid transition to online education in 2020 due to the COVID-19 pandemic and the related difficulties have been investigated by several researchers/studies worldwide – from the perspective of children, teachers/educators, and parents. The Hungarian Government ordered the transition to digital distance learning in public education on 13 March, 2020. In the primary school sector, this affected around 700,000 pupils throughout the country (https://www.parlament.hu/documents/10181/4464848/Infojegyzet_ 2020_10_

oktatas_COVID-19.pdf). As in many other countries, the sudden switch to online education in Hungary was unexpected and caught the vast majority of teachers unprepared. Early on, small and medium-sized studies in Hungary examined the switch to digital teaching from several perspectives; Thekes (2021), for example, conducted a survey of school leaders just two weeks after the switch to digital teaching. One year later, Herman et al. (2022) collected data through a telephone survey among primary and secondary school pupils and their parents, asking about their experiences with online teaching in the wake of the school lockdowns. Our study explores the transition to distance learning from the perspective of foreign language learning and teaching. In our questionnaire survey, we interviewed teachers who teach foreign languages in Hungarian primary schools. This paper presents the results concerning the teaching of German in national minority schools.

In our research, we would like to verify the following hypotheses:

1. The greatest difficulty in distance education in nationality schools of the German minority in Hungary was the use of technical tools and digital platforms.
2. The use of a variety of learning support applications depends on the teaching experience, the type of locality, and the grade level at which the teacher teaches.
3. The level of support clearly determines the use of a variety of learning support applications.
4. Those who have experienced online education as an improvement will continue to prefer to use online elements after returning to face-to-face education.

METHOD AND MEASUREMENT TOOL

To achieve the research objective, we chose the questionnaire survey method for data collection. The questionnaire could be completed online during the spring and summer of 2022. We also disseminated the link to the questionnaire on our social media platforms, and national pedagogical organisations helped us to reach as many respondents as possible. As English is the most popular foreign language in Hungary, most of the responses were related to the teaching of English. 67 teachers of German filled in the questionnaire, most of them teaching in German nationality schools, among children aged 6-10 years. The responses were processed using a SPSS 26 data processing software. The results were presented in graphs and charts.

The development process of the questionnaire is shown below:

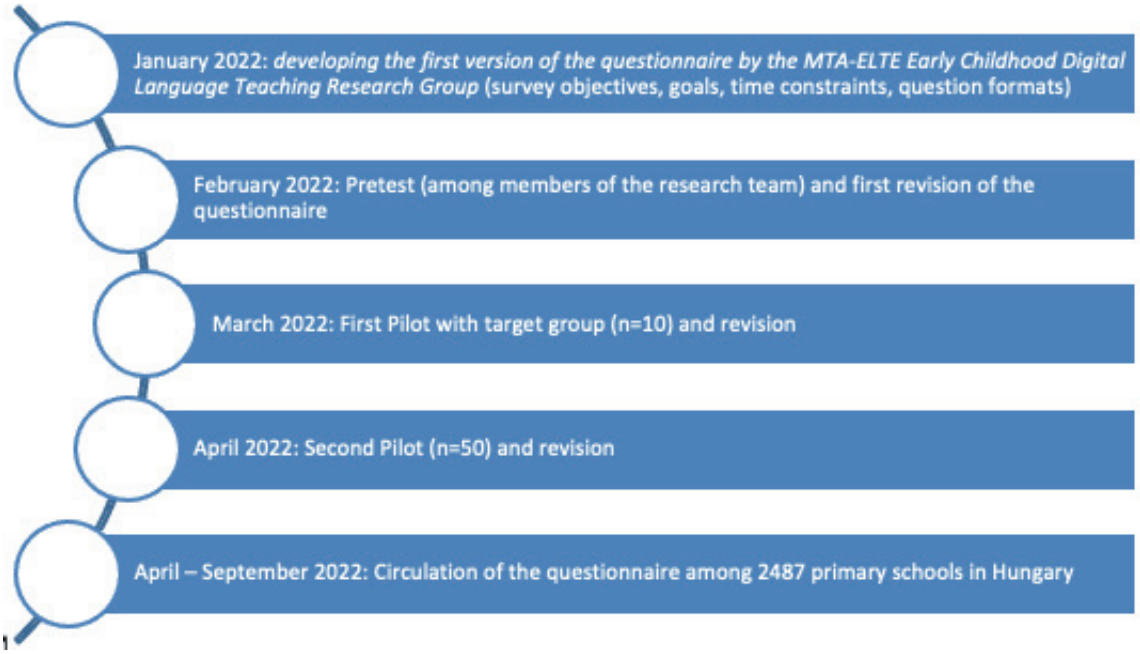

Figure 1. The development process of the questionnaire

The questionnaire was structured as shown in the following:

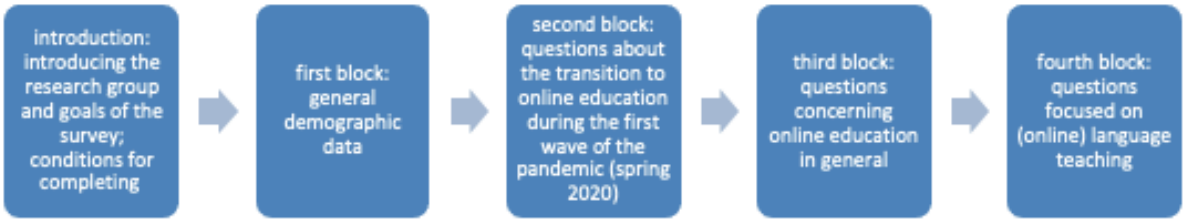

Figure 2. The structure of the questionnaire

Data Collection and Analysis

The quantitative study used an online questionnaire as an instrument to collect data. This approach was the most suitable method to obtain a large amount of data on a national level. We knew that schools are far too often contacted for questionnaire surveys, which reduces teachers' willingness to fill in questionnaires. Nevertheless, 705 completed questionnaires were returned. The collected quantitative data was then graphically presented in the form of diagrams and charts to visualize our data properly. We performed a Sperman correlation analysis to examine the correlations.

Ethics and Participants

The ethics approval of the research was granted under the number KE 2022/005, issued on 31 March, 2022 by the Research Ethics Committee of the ELTE Faculty of Primary and Pre-school Education: "On behalf of the Research Ethics Committee of ELTE TOK, we declare the application for research ethics permission submitted by Dr. Peter Medgyes, head of the research group, and Dr. Valeria Arva, project supervisor, on the topic of Digital Early Childhood Language Teaching to be appropriate, and therefore we grant research ethics permission. The research ethics principles of the ELTE TOK are fully met on the basis of the documents submitted."

As was mentioned above, for our study we only analysed the responses returned by teachers of German nationality schools; out of a total of 67 German nationality teachers who completed the questionnaire, 72% were minority German primary teachers and 28% secondary school teachers. This proportion is one-tenth of the total number of respondents, which clearly indicates that German nationality language and culture is in minority in Hungary (Figure 3).

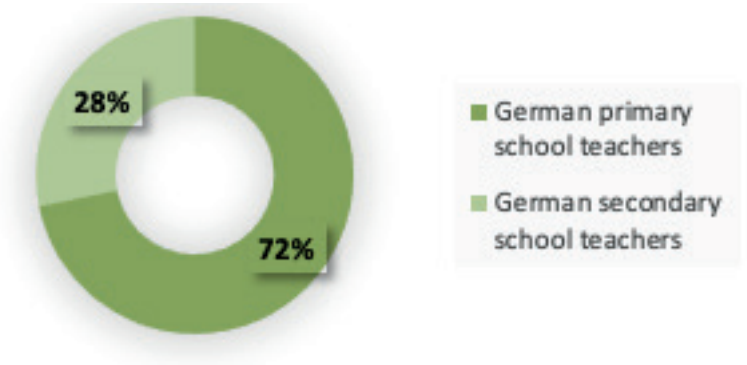

Figure 3. Number of German nationality teachers and teacher respondents

The majority of the respondents teach at lower secondary level, with 34 in lower secondary only, eight respondents in grades 5 and 6, seven teachers in the first six grades and 18 in all grades of primary school (Figure 4).

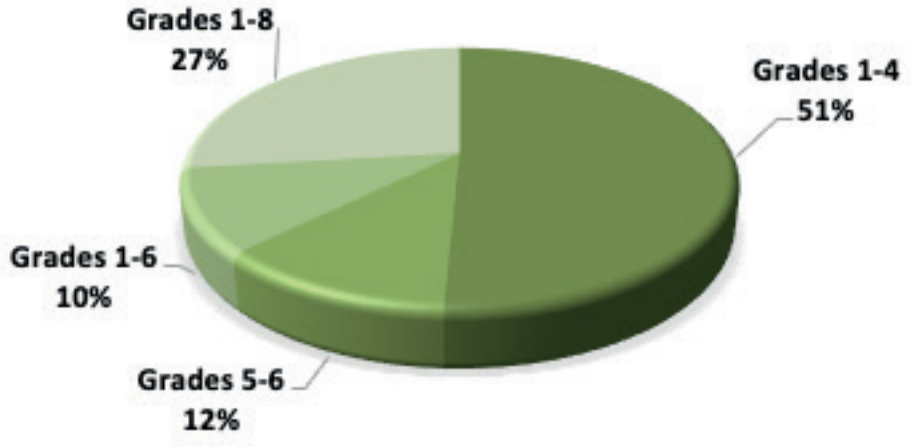

Figure 4. Distribution of responding teachers by year of teaching

The majority (43 respondents) teach in a minority language teaching primary school; 16 teach in a national minority bilingual (Hungarian-German) institution where German is a minority language, while only 3 teach in a regular bilingual institution (Hungarian-German) where German is a second language (Figure 5).

Figure 5. Types of schools where the majority of respondents teach

FINDINGS

The majority of German teachers were reluctant to switch to online teaching because they did not feel prepared for this transformation (Figures 6 and 7). The less prepared they felt for online education, the more they feared the transition to online education (r= 0.254*; p= 0.038).

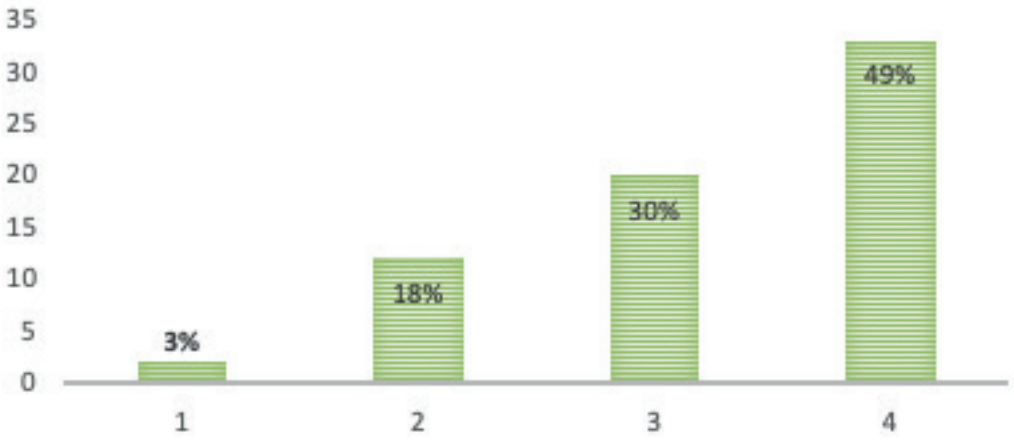

Figure 6. The problem of transition to online education
(Scaled from 1 to 4, 1 = not at all, 4 = very much)

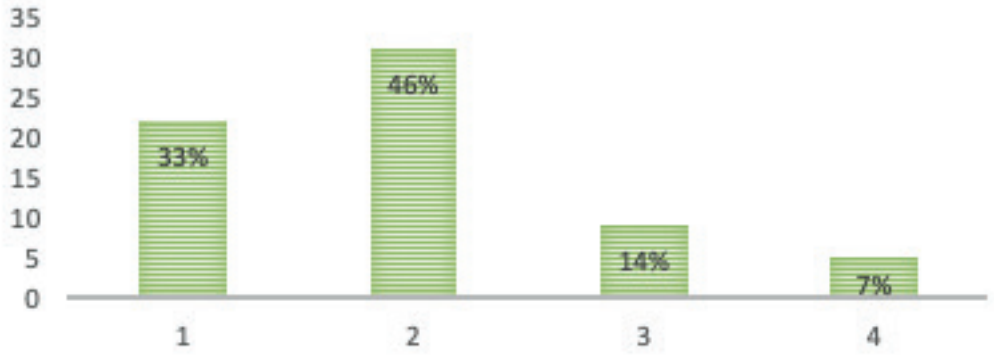

Figure 7. The problem of online education readiness
(Scaled from 1 to 4, 1 = not at all, 4 = very much)

As the emergency required immediate action, many teachers (58) searched for training opportunities online and/or tried to catch up and learn the basics of online education through self-taught training or with the help of friends (37 people). Few teachers could rely on support expended by their own institution (Figure 8).

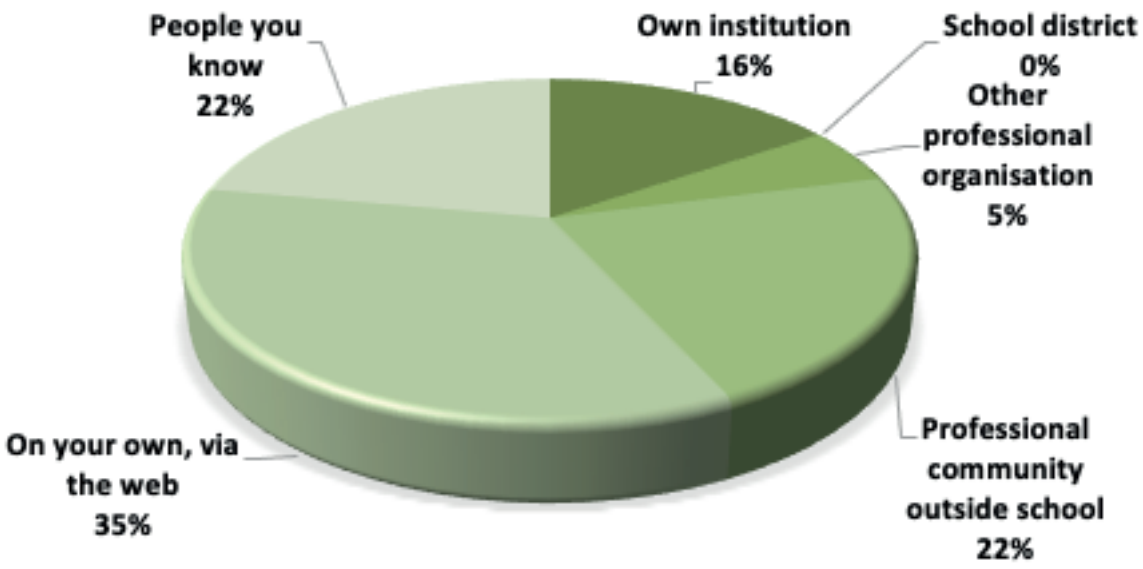

Figure 8. Possibility to ask for help during online education

Overall, the German nationality teachers in Hungary who filled in the questionnaire rated the success of their language teaching work during the online instruction as moderately good (Figure 7). 1 in Figure 9 means 'not at all' while 4 means 'completely'.

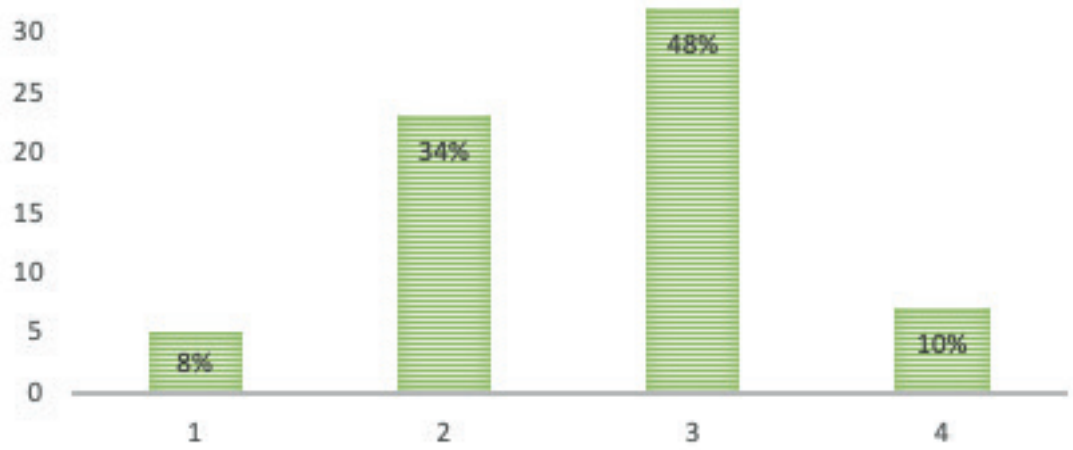

Figure 9. Perception of the success of language teaching in online education

The majority of teaching tools were available and caused fewer problems during the transition to online teaching, but the teaching methodology was less available for online teaching (Figure 10).

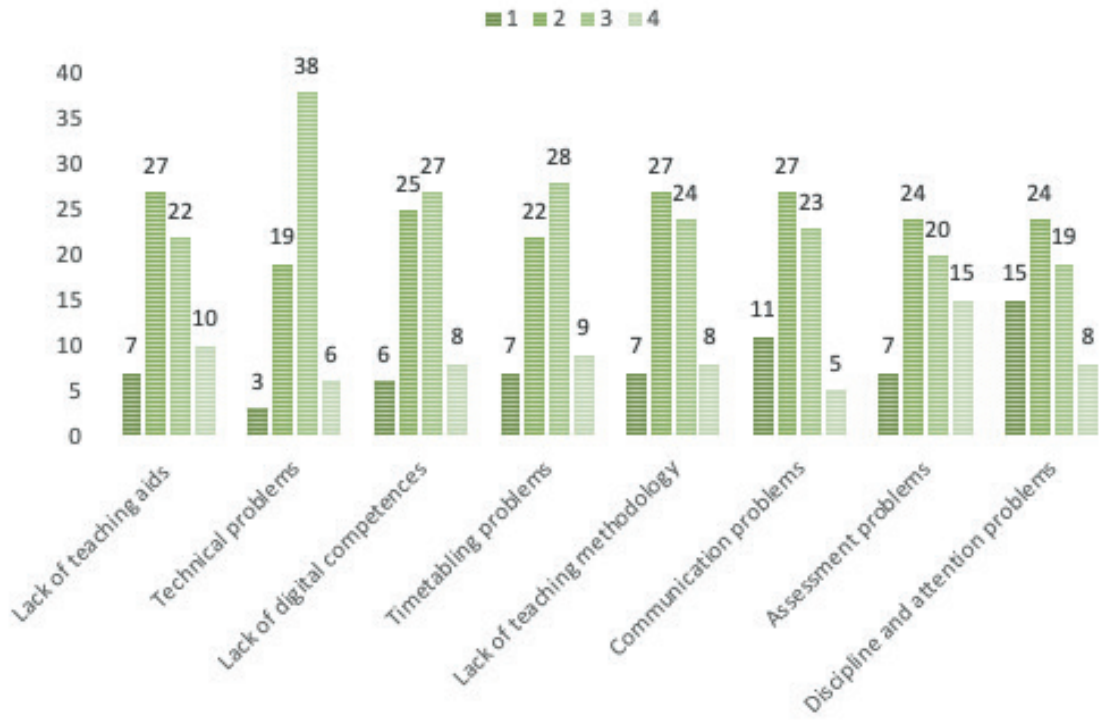

Figure 10. The problems with online education (N)
(1 = not at all, 2 = rarely, 3 = often and 4 = regularly)

Problems with lesson organisation were significantly related to communication (r= 0.355**; p= 0.003), attention and discipline (r= 0.344**; p= 0.005). Discipline problems made it more difficult to maintain attention and to organize and adhere to lessons. Technology did not cause insurmountable difficulties, but it was still a significant problem for the majority and showed the clearest correlation with lower levels of digital competence (r= 0.443**; p= 0.000).

Table 1. Correlations between class organization, communication, attention, technical problems and lack of digital competences

	Spearman's rho	1)	2)	3)	4)	5)
Timetabling problems	Correlation Coefficient					
	Sig. (2-tailed)					
Communication problems	Correlation Coefficient	,355**				
	Sig. (2-tailed)	,003				
Discipline and attention problems	Correlation Coefficient	,344**	,540**			
	Sig. (2-tailed)	,005	,000			
Technical problems	Correlation Coefficient	,402**	,367**	,554**		
	Sig. (2-tailed)	,001	,002	,000		
Lack of digital competences	Correlation Coefficient	,364**	,495**	,493**	,443**	
	Sig. (2-tailed)	,003	,000	,000	,000	

The ANOVA table of the linear regression in our research clearly shows that the predictor variable has a small but significant effect on the outcome variable (F= 4.638; p= 0.035). The fact that teachers continue to use online elements when returning to face-to-face teaching in later years is explained by the development experienced during online teaching in only 6% of the cases. The coefficients table provides a good illustration

of the negative Beta slope, and the t-test (Beta= -0.258; t= -2.154; p= 0.035) also shows that, although the digital competence of the teacher has improved, the use of online platforms will not be favoured in the classroom when returning to face-to-face teaching.

DISCUSSION

Reviewing the relevant international literature it emerges – which is consistent with the data we have found – that the vast majority of teachers were caught completely unaware and mostly unprepared for the closure of schools and the forced digital switch to distance learning. They were therefore fearful and frustrated by the situation they had to face. Because the changeover happened so quickly, teachers had little time to prepare for distance and online education. Our data shows that language teachers were largely self-sufficient, without much methodological support given by their schools. Despite this, the majority of German language teachers in our survey rated the success of distance learning as moderate.

Hasan et al. conclude in their research that Indian teachers were also unprepared for the transition to online education (Hassan et al., 2020, p. 21). European research studies reached similar results as well. A Europe-wide survey on distance learning by the School Education Gateway from April to May 2020, with nearly 5000 participants (including 86% teachers and school leaders), focused the survey – similar to our study – on experiences, negative and positive challenges, technology and the future of digital elements in teaching. The results of the survey are similar to our findings. For example, 67% of the respondents claimed that online teaching during the pandemic had been their first experience with online teaching. 25% had some previous experience and only 6% had extensive experience with online education (https://www.schooleducationgateway.eu/en/pub/viewpoints/surveys/survey-on-online-teaching.htm).

The main problem teachers in Hungary faced at the time of the closures had to do with technology. Many respondents reported that the lack of appropriate teaching methodology for teaching German online was also a problem, in addition to the lack of digital competences, especially with regard to teaching at primary level. Here, children were clearly dependent on parents for help. Organising lessons was also reported as a major difficulty. This proved to be a much more difficult task in the online space than in face-to-face classroom teaching. Furthermore, many respondents found it a challenge to develop communication skills, nor could they cope with the task of assessment in the online space. Discipline problems made it more difficult to maintain the attention of the children.

Ivancan interviewed 209 Croatian language teachers (German and English) in primary education for her thesis (Ivancan, 2022, p. 21), a target group that received comparatively little attention in studies on foreign language teaching during the pandemic and is therefore of particular interest for our study. Her results are similar to ours in several respects. For example, she states that Croatian teachers were also completely unprepared for online teaching (Ivancan, 2022, p. 25). She suspects that the reasons for this uncertainty lie in the lack of digital competences for online teaching in initial and in-service training. The teachers surveyed tried to fill this knowledge gap in other ways by researching different platforms and digital tools on their own (94%), seeking advice from colleagues and acquaintances (66%), continuing their education via internet tutorials (59%) or participating in online continuing education courses (51%) (Ivancan, 2022, p. 26). A difference to our study can be found in terms of satisfaction with the support of the schools, where 49% of the respondents claimed to be mostly satisfied while only 14% being dissatisfied (Ivancan, 2022, p. 27). Our preliminary hypotheses were largely confirmed. The biggest difficulties in distance education were the use of technical tools and digital platforms. Those who perceived online education as an improvement have retained the use of online elements when returning to face-to-face education.

The Europe-wide survey on distance learning by the School Education Gateway from April to May 2020 reached partially similar results: The most frequently cited challenge the respondents mentioned was access to technology (computers, software, stable internet connection, etc.). This was true for both students (mentioned by 49%) and teachers (34%). Increased workload and stress when working from home was cited by 43%, with 18% of teachers finding time management and organisation a challenge. Digital literacy was cited as a challenge for both students (24%) and teachers (24%). The most frequently cited challenge in terms of learning content and assessment was redesigning activities and content for online/distance learning (28%), closely followed by creating relevant content (27%) and assessing student progress (25%) (https://

www.schooleducationgateway.eu/en/pub/viewpoints/surveys/survey-on-online-teaching.htm).

In terms of the future use of digital elements in the classroom, 44% of respondents felt that school reality would change to include more online teaching. 17% indicated that schools would change a lot: online teaching would become an integral part of school practice. On the other hand, 39% said that very little could be expected. 32% agreed that schools would return to their original practice with minor changes whereas 7% assumed that schools would return to their original practice unchanged. Factors perceived as positive by the respondents were innovation, freedom to try new things in the classroom, flexibility, and a wide range of digital tools. Similar results were found in the ELTE-TOK survey. In terms of support or assistance, respondents felt that more educational resources would help them meet the challenges, together with clear guidelines from the Ministry of Education targeting professional development, e.g. in the form of fast-track courses for online teaching and opportunities for teachers to share resources, ideas, and difficulties (https://www.schooleducationgateway.eu/en/pub/viewpoints/surveys/survey-on-online-teaching.htm). Similar results to the ELTE-TOK survey are also shown by the results regarding the positive impact of distance/online teaching: respondents believe that these results may give some early indications to policy makers and school leaders that distance/online teaching and learning, although challenging, can have lasting positive effects and open up interesting opportunities for innovation and new ways of working, especially if supported by adequate and timely professional development.

An unexpected finding is that the use of learning support applications does not seem to depend on whether one lives in a town or a village, nor on how experienced or young the teacher is. However, it does depend to a small extent on the grade level being taught. It was also found that those who received more technical and methodological support were more likely to befriend online platforms and applications. A surprising result is that, when returning to face-to-face teaching, the majority of teachers continue to use online elements regardless of whether their digital competence improved during online teaching. On the other hand, it could well be expected that in primary school the use of digital learning support elements will not be the preferred method of teaching for the time being.

IMPLICATIONS AND RECOMMENDATIONS

In our research, we show how teachers of foreign languages in primary schools reacted to the forced and rapid digital changeover in 2020, and how distance learning was implemented in the teaching of German as a minority/foreign language. We highlight the problems teachers had to overcome and where and from whom they received help. We also aimed to discover how successful German teachers in Hungary felt online teaching to be, and whether they have retained online/digital elements upon returning to face-to-face teaching.

Our research results show the importance of training, support, methodological assistance, and technical equipment for language teachers in the field of national minority education and foreign language teaching. In our view, the teaching of digital competences should play an important role in (language) teacher training, an added value in education, as children are in the habit of using their own devices, such as mobile phones. This technology can therefore increase motivation in language teaching, a problem area in public education in Hungary. In addition to the motivating effect of digital elements, teaching without these tools is inconceivable in the future, even in primary schools. The microcosm of the school and learning environment and the macrocosm of the world are changing at an ever-faster pace and learners need to develop skills to deal with these changes: "The rapid spread of COVID-19 has demonstrated the importance of building resilience to face various threats, from pandemic disease to extremist violence to climate insecurity, and even, yes, rapid technological change. The pandemic is also an opportunity to remind ourselves of the skills students need in this unpredictable world such as informed decision making, creative problem solving, and perhaps above all, adaptability. To ensure those skills remain a priority for all students, resilience must be built into our educational systems as well." (World Economic Forum Webpage: https://www.weforum.org/agenda/2020/03/3-ways-coronavirus-is-reshaping-education-and-what-changes-might-be-here-to-stay/)

Furthermore, the need for teacher professional development (TDP) in a rapidly changing world, especially in terms of digitalization, must be a clear goal in the training of educators. One instrument which provides a general reference frame to support the development of educator-specific digital competences, can be SELFIE

(Self-reflection on Effective Learning by Fostering the use of Innovative Educational Technologies), a tool provided by *The European Framework for Digitally-Competent Educational Organisations* (DigCompOrg, https://joint-research-centre.ec.europa.eu/digcompedu_en).

In the next phase of the research, comparative analyses will be carried out, comparing English and German teaching along the same competences: Do they have a similar view of the problem areas? Would English language teachers returning to face-to-face teaching use these online platforms more frequently than their colleagues teaching German? Did English language teachers use more digital learning support formats than German teachers? Do English teachers use different platforms or more platforms than German teachers?

Authors' Note: The present research was conducted by the MTA-ELTE TOK research group on childhood language teaching supported by digital tools. It discusses the consequences and lessons learned from the educational situation triggered by the COVID-19 pandemic in the field of foreign language teaching in childhood.

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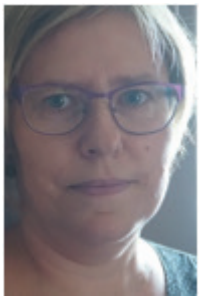

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NONLINEAR LEARNING PATH: A SYSTEMATIC REVIEW

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ABSTRACT

Students benefit from a nonlinear learning path, also known as a nonsequential learning path, because it allows them to control the pace and sequence of their learning. However, the dynamics of a nonlinear learning path, particularly within an open learning environment like MOOCs, remain underexplored. The current study aims to map out various nonlinear learning paths and explore the potential for personalisation within these environments. Guided by the PRISMA 2020 Statement, we conducted a comprehensive review of 3,418 articles from three databases, focusing on 30 that were relevant to nonlinear learning paths in open learning environments. We discovered that a nonlinear learning path in MOOCs involves path selection, cyclical paths, or skipped paths, all influenced by the design of the MOOC learning materials. In classrooms utilizing an open learning environment, a nonlinear learning path is facilitated by activities such as face-to-face or online discussions, self-study materials, student-created content, project mentoring or coaching, peer feedback, and co-learning activities. Additionally, personalisation, tailored by educators or technology, is key to preventing students from becoming disoriented within these open learning environments. Our findings highlight the importance of promoting nonlinear learning paths in both classrooms and MOOCs, developing learning path recommender systems, and creating supportive MOOC learning materials. Future research should explore students' perceptions of nonlinear learning paths within an open learning environment, particularly focusing on the integration and impact of MOOC learning materials.

Keywords: MOOC learning materials, MOOC personalisation, nonsequential learning path, open learning environment, personalized learning path.

INTRODUCTION

The market value of e-learning is expected to reach $645 billion by 2030, continuing its rapid expansion (Straits Research, 2022). The number of users is also predicted to reach 0.90 billion by 2027 (Statista, 2023). The growth in this sector is driven by the rise of online learning and a trend towards personalised learning experiences (Statista, 2023; Straits Research, 2022). Personalisation has evolved from a choice to a necessity. Factors such as technology, diverse socioeconomic backgrounds, and individual knowledge and preferences are pivotal in driving this shift towards personalisation (Huang, Spector, & Yang, 2019).

Building personalised learning heavily relies on the interaction between the learner and the content (Powell & Leary, 2021). Such learner–content interaction is described as how a student gets intellectual information from the course materials (Moore & Kearsley, 2011). Although it is essential, learner–content interaction is infrequently explored compared to the learner–instructor, and learner–learner interaction (Xiao, 2017; Zimmerman, 2012). To date, learner–content interaction has been studied based on the interaction categories and duration of engagement (Majumdar, Flanagan, & Ogata, 2021), motivation and access activity (Le et al., 2022), textbook or e-book features (Day & Pienta, 2019), measurement tools (Powell & Leary, 2021), and learning path (Premlatha & Geetha, 2015). The term '*learning path*' itself refers to the sequence of learning materials (Rahayu, Ferdiana, & Kusumawardani, 2023).

Viewing the learning path as an information flow, from start to finish, highlights the importance of the learner-content interaction. This perspective results in two types of learning paths: linear and nonlinear. The linear path involves studying topics sequentially (topic 1, then topic 2, and so on). In contrast, nonlinear learning allows students to choose the order of topics, facilitating a nonsequential approach to learning (Robberecht, 2007).

Nonlinearity in learning does not eliminate the need for structured materials, as a lack of structure means no learning (Rootzen, 2015). However, the growth of nonlinear learning, driven by the demands for personalisation and advanced learning materials, has revealed a significant research gap in understanding how to effectively structure learning materials using a nonlinear approach. For example, the heutagogy educational method illustrates nonlinear learning by designating two-thirds of its learning contents as 'non-negotiable,' (Hase, 2011), but the understanding of its application is under-studied. The gap is further deepened by the critical need for scaffolding -achieved through tools (Mamun, Lawrie, & Wright, 2020) or expert guidance- in personalising learning. This study aims to address these gaps by exploring nonlinear learning paths and personalisation, providing educators with practical insights for classroom use.

Nonlinear learning relies on Open Learning Environments (OLEs) to function effectively, whether in traditional classroom settings or online platforms. These environments empower students to determine what they consider important in their learning (Land & Oliver, 2012) and to navigate their own learning paths. The following are the research questions (RQs):

RQ1: How do OLEs support nonlinear learning paths?

RQ2: To what extent do OLEs enable personalised nonlinear learning paths?

The remaining sections of this paper continue as follows: Section 2 presents a theoretical background of the learning path, nonlinear learning path characteristics, and its benefits and drawbacks. Section 3 describes the research methodology using the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) 2020 Statement. Section 4 presents the findings linked to the research questions, followed by Section 5, which discusses implications, the research agenda, and limitations. The final section of this paper is the conclusion and recommendation for educators.

LITERATURE REVIEW

Linear and Nonlinear Learning Paths

A learning path is a sequence of learning materials. The term '*learning path*' is also used to refer to the curriculum sequences (Iglesias, Martinez, Aler, & Fernandez, 2004; Weber, 2012), content sequences (Ros & Lizenberg, 2006), study paths (Ros & Lizenberg, 2006), and instructional sequences (Pepin & Kock, 2021).

The path can be classified from two different viewpoints. According to the *task sequence approach*, the content sequence can be divided into hierarchical, procedural, topical, spiral, and a combined sequencing approach (Cock & Meier, 2012). Hierarchical sequencing divides skills into high and low levels with subcomponent-component dependence. It means that lower-level skills must be taught before higher-level ones. Procedural sequencing promotes learning using a step-by-step approach, where each step represents a separate concept. The topical approach ensures that topics are taught at the appropriate level before progressing, while spiral sequencing involves teaching topics in recurring cycles.

Based on the *information flow*, the learning path could be classified as linear and nonlinear. A linear path is synonymous with the process of reading a printed book which begins with the first chapter, then the second one, the third one, and so forth. Educators usually use a linear approach by providing the same set of learning materials in a predetermined flow for all students in the classroom. In other words, novice, intermediate, and advanced students all start at the same point and proceed through the learning materials on the same path (Robberecht, 2007). This regularity brings many benefits for constructing comprehensive knowledge, particularly for hierarchical and procedural contents. However, linear path has drawbacks as it fails to consider each student's background, preferences, interests, and learning speed. It also does not consider that some students already know certain knowledge.

The nonlinear approach is comparable to how a person navigates a forest using a Global Positioning System (GPS) (Correa, 2017). It is also like a student randomly selecting any page in a printed textbook and then moving directly to any other page (Robberecht, 2007). However, printed books lack the ability to provide additional context for each page, hindering comprehensive learning through random reading. In contrast, online materials use hyperlink technology to facilitate connections among materials, thereby enhancing the construction of comprehensive knowledge.

Nonlinear learning integrates nonsequential access to learning materials with the use of *hyperlinks*—or simply links. Links allow users to click their way from page to page (W3Schools, n.d.). Clickable things such as text, images, and buttons are found anywhere on the internet. Without links, each piece of content will stand alone. In online learning, links also serve to enhance thinking processes and create connections and context among learning materials. These links facilitate various actions such as navigating, browsing, searching, connecting, collecting, annotating, and editing (Peters, 2002).

Learning in nonlinear paths also offers more flexibility and improves multitasking ability. This approach takes advantage of *neuroplasticity*, which is our brain's capability to adapt through growth and reorganisation. When faced with a lot of information, our brains can adjust to handling information from different sources at the same time. As a result, neuroplasticity allows us to adapt to *"simultaneous exposure to information from various sources, and this skill evolves into an enhanced capacity of nonlinear learning"* (Lucin & Mahmutefendic, 2013). In other words, learning in a nonlinear path matches our natural way of thinking, which is not straightforward but interconnected. This allows us to better understand, and link any pieces of information (Feldman, 2001).

Educators and Technology Roles in Nonlinear Learning

The implementation of nonlinear learning requires a variety of enabler roles. Educators are crucial as they design the learning structure for specific subject areas. Their roles extend beyond instruction to include empowering students (empowerer), guiding their exploration (scout), providing support (scaffolder), and assessing students' progress (assessor) (Bishop et al., 2020).

Technology can complement, substitute for, or augment several educators' roles. In the current study, we adopt the *classification of OLE tools* as processing tools, manipulation tools, and communication tools (Hannafin, Land, & Oliver, 1999; Land & Oliver, 2012). Technology, serving as processing tools, collects and processes data on learning processes and outcomes. As manipulation tools, technology helps select or assists students in choosing their learning paths. Communication tools are used to provide various learning modes and media either synchronously or asynchronously.

Personalisation is essential to mitigate disorientation in nonlinear learning and assist students in achieving students' autonomy. Based on the interaction type, personalisation can be *adaptable* or *adaptive*. Adaptable

personalisation tailor's recommendations based on student's input, while adaptive approaches use inferences data drawn from student-content interactions (Van Velsen, Van Der Geest, Klaassen, & Steehouder, 2008). Examples of adaptability are guided tours or metacognitive maps (Correa, 2017), whereas adaptive personalisation could use a recommender system informed by the emotional feedback from a social network (Khaled, Ouchani, & Chohra, 2019).

In summary, personalisation can be conducted by both educators and technology (Shemshack & Spector, 2020). Educators tailor learning paths using scaffolding techniques, and technology acts as a recommender system. Figure 1 depicts the relationship between the learning paths, nonlinear learning, and personalised learning.

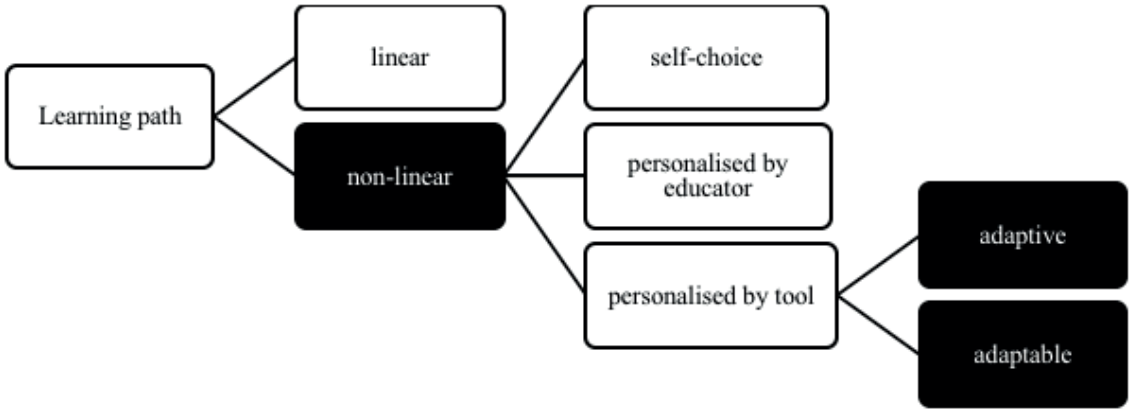

Figure 1. Relationship among learning paths, nonlinear learning, and adaptable personalised learning

RESEARCH METHOD

There are several methodologies for conducting or reporting systematic reviews, such as Methodological Expectations of Cochrane Intervention Reviews (MECIR) (Higgins et al., 2022), Methodological Expectations of Campbell Collaboration Intervention Reviews (MECCIR) (The Campbell Collaboration, 2014) and Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA). One component of the PRISMA is the PRISMA 2020 Statement, which serves as the latest guideline for reporting systematic reviews. The current systematic review was reported according to the PRISMA 2020 Statement, which suggests five steps for reporting by identifying new studies via databases: (1) literature search, (2) abstract screening, (3) article retrieval, (4) eligibility assessment, and (5) data extraction (Page et al., 2021).

The current systematic review process starts with a thorough search of various databases to find relevant studies. Next, we carefully examine the abstracts of these studies to determine if they meet the inclusion and exclusion criteria. Then, we retrieve the full papers that passed the initial screening. Subsequently, articles are assessed to ensure they meet the criteria for eligibility. Finally, we conduct data extraction, where we record key information and findings from each paper.

Literature Search

This study conducts a broad automated search from the ERIC, Emerald Insight, and Scopus databases. More precisely, we searched using the keyword *'learn* AND open AND (path OR sequence OR curricul*) AND (student OR learner)'*. This initial search retrieved 3,418 records (i.e., titles and abstracts). To find matching topics, we identified studies from English-language journals within the areas of: Education, E-learning, Psychology, Social Sciences, Computer Science and Engineering. As a result, we have 1,204 abstract records to be screened.

Abstract Screening

Inclusion criteria are applied during abstract screening. This means that records must be from open learning environments, primary studies, and must discuss the learning path. Most records were excluded since they did not study the learning path. Our remaining records were 87 abstracts.

Article Retrieval

Full text retrieval was performed after the abstract screening. Fifteen records could not be obtained because we did not have any access to them. Thus, we have 72 articles left.

Eligibility Assessment

Full texts were assessed for eligibility using several exclusion criteria as below:

- Reports that describe a model or perspective (e.g., those containing opinions, explanations of the benefits of distance learning, descriptions of models, modelling based on quantitative surveys, assignments using available resources, and concept recommendations).
- Reports related to macro (n=2) or meso curriculum (n=8).
- Reports that did not delve into technical details (e.g., those lacking detailed information on personalising curriculum, lacking an explicit sequence of Open Educational Resources, or focused on educators only).
- Reports related to curriculum development (e.g., those that are case study descriptions, guided exercises, explore prerequisite relationships among resources, or focus on curriculum design without personalisation).
- Reports on quantitative studies (e.g., surveys on motivation and experiences, application reviews).
- Reports discussing task design, specifically how educators design collaborative tasks.

Finally, 30 papers were eligible for extraction. The details of the article selection are presented in Figure 2.

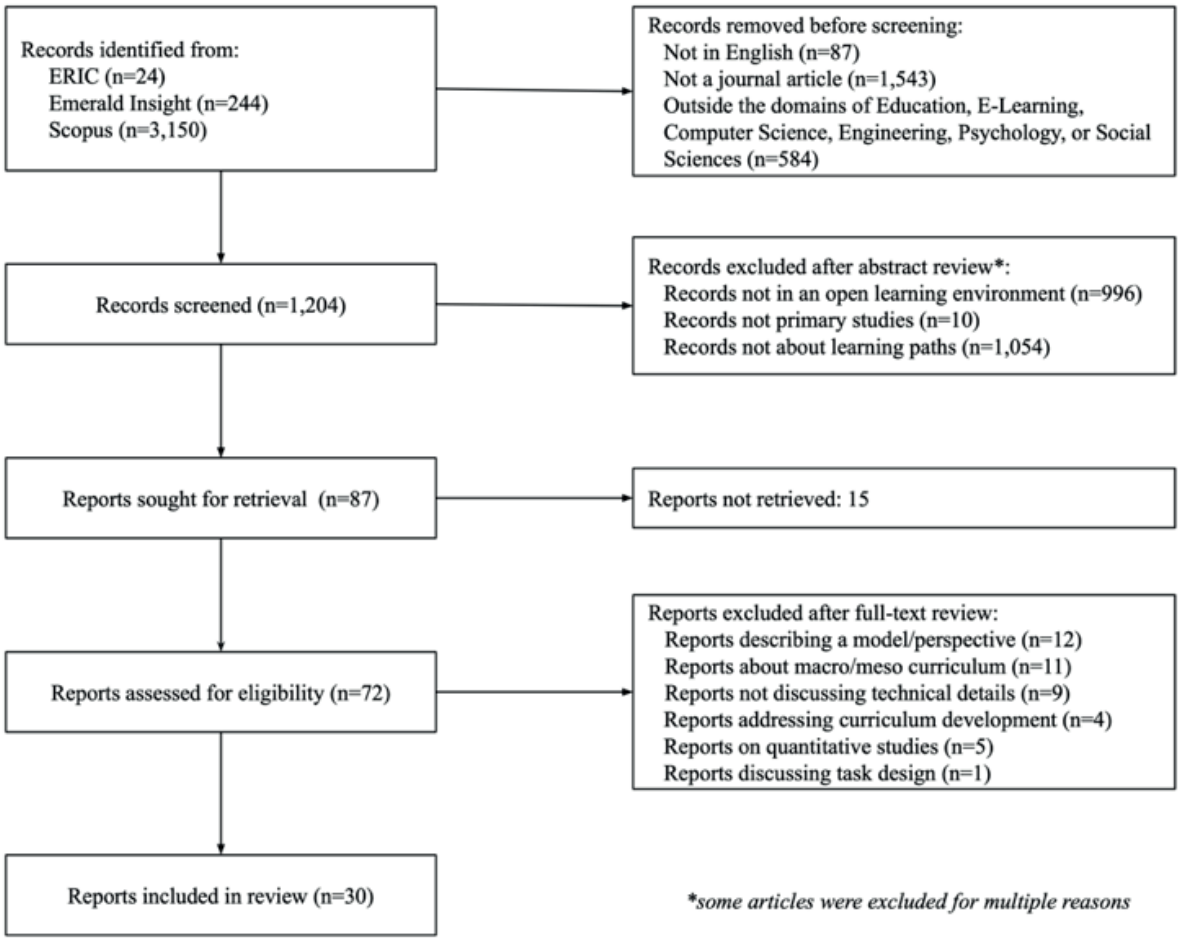

Figure 2. PRISMA flow diagram of the review of nonlinear learning

Data Extraction

All articles that passed the selection phase were extracted in four groups of data:

1. *Course:* This includes the learning platform (e.g., MOOC, classroom setting, simulation study), subject course, department, education level (primary school, secondary school, higher education, professional), course duration, and information about the students (cohort and number of students).
2. *Learning Path Characteristics:* This covers the task sequence approach (hierarchical, procedural, topical, spiral, combination) and curriculum level (nano/individual, micro/classroom). Based on the scope, there are five *curriculum levels*: nano (individual), micro (classroom), meso (educational institution program), macro (national), and supra (international policy) (Leyendecker, 2012). Given the study's focus on learning sequences directly taught to students, we discuss only the nano and micro curriculum levels.
3. *Open Learning Characteristics:* These include the instructional method (e.g., project- or problem-based contexts (Land & Oliver, 2012)), type of open-ended learning (open-ended learning goal, open-ended means, or both (Hannafin et al., 1999)), learning activity, and contexts for projects or problems (i.e., externally imposed (problems that are explicitly specified), externally induced (problem contexts are presented and students generates problems), or individually generated (students generate both the context and problems) (Hannafin et al., 1999).
4. *Personalisation:* This category encompasses the learning technology used, personalisation method, type (i.e., adaptable, adaptive), and enabler role (educator, technology).

Data Analysis

The 30 reviewed studies came from 27 different journals. Most of these studies focused on higher education, as shown in Figure 3. This is likely because colleges and universities have unique needs and pedagogical methods. For example, in subjects like algebra, higher education focuses more on problem-solving and critical writing, while high school often focuses on memorizing methods (Venezia & Jaeger, 2013).

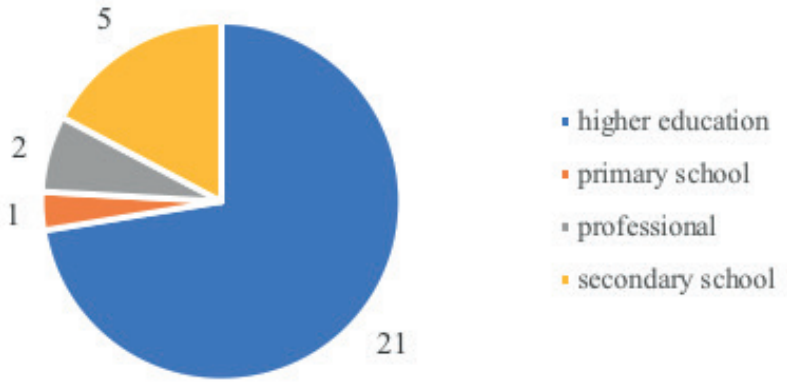

Figure 3. Overview of the educational level of reviewed studies

By comparing the course format, the majority used classroom settings (83,3%, n=25), while only 4 studies use Massive Open Online Courses (MOOCs), and 1 study used simulated environments. Moreover, we found that three-quarters of the studies used a micro-level curriculum, while the remainder used a nano-level curriculum. For example, the educators applied the Geotech Centre's Geospatial Technology Competency Model to enhance the students' geospatial science and analysis skills. In the study, the educators used a micro-level curriculum by providing the environment and activities for learning, e.g., socio-environmental science investigations activities and a map of the sampling area as learning material (Hammond et al., 2018).

All studies, except one which used simulated students, discussed real case studies. There was a variety of subjects, and the medical/pharmacy and engineering subjects in higher education were the two most popular. By categorizing contexts for projects or problems, we found that the reviewed papers are evenly distributed (Table 1).

Table 1. Contexts of problems or projects

Enabling context	Case studies
Externally imposed	A specified problem is assigned, and the students then find solutions to it (Guiter, Sapia, Wright, Hutchins, & Arayssi, 2021; Johnson, Murphy, & Griffiths, 2019; Miller & Sehgal, 2016), choose preferred experiments (Farley, Fringer, & Wainman, 2020; Hietanen & Ruismaki, 2016; M. J. Zhang, Newton, Grove, Pritzker, & Ioannidis, 2020), adjust virtual solutions (Applebaum, Vitale, Gerard, & Linn, 2017), or work on real solutions (Chaudhury, 2021; Flores, 2018; Pepin & Kock, 2021; Verbic, Keerthisinghe, & Chapman, 2017).
Externally induced	An ill-structured problem is presented, then students search for the preferred problem, then propose a solution (Hammond et al., 2018), and work on solutions (Hero & Lindfors, 2019; Hulls & Rennick, 2020; Kowalski, Hoops, & Johnson, 2016; Nikolic, Castronovo, & Leicht, 2021; Rodriguez, Perez, Nunez, Banos, & Carrio, 2019).
Individually generated	Students choose projects according to their preference (Lim, Chua, Yuen, & Hilmy, 2019; Mita & Kawahara, 2017; Van Woezik, Reuzel, & Koksma, 2019), students' needs (Mullen et al., 2017), patients' needs (Pavon, Pinheiro, & Buhr, 2018), students' desired career (Burnham, 2020); students' daily life (Aflatoony, Wakkary, & Neustaedter, 2017) and contemporary sustainability topics (Dharmasasmita, Puntha, & Molthan-Hill, 2017).

FINDINGS

RQ1: How do OLEs Support Nonlinear Learning Path?

Nonlinear learning paths are most effective in open learning environments. Although they are often associated with technology and Massive Open Online Courses (MOOCs), classroom learning can also be nonlinear. This section gives a detailed look at nonlinear learning in both MOOCs and classrooms settings.

Nonlinear in MOOCs

MOOCs, as digital platforms, allow for easy, non-sequential access to content. The four reviewed studies explain how nonlinear learning works as follows:

> *"There are new users, experienced users, and advanced users…. students will take multiple versions of this course over the length of their careers rather than work through all the material as a single course" (Mullen et al., 2017).*
>
> *"Pre-recorded micro-lessons exposed students to key concepts. Students can review confusing concepts and break them into more understandable portions and proceed at their own pace" (Wu, Ma, & Yu, 2021).*
>
> *"… learners do not have to follow the designed sequence of the course activities as they have the autonomy to pursue their own sequence of learning activities, such as when to watch a video lecture, and which course activity … Moreover, learners are free to skip any of the course activities" (Wong, Khalil, Baars, de Koning, & Paas, 2019).*
>
> *"… automatically tell students the most important concepts of the upcoming chapter, which can be helpful …. Based on such guidance, they can have a vision of the course, or check whether they have achieved these concepts before they take an assignment"* (M. Zhang, Zhu, Wang, & Chen, 2019).

One study supports nonlinear learning based on path selection according to user needs and capabilities (Mullen et al., 2017). Therefore, the learning path for new users is different from the one for experienced or advanced users. The other three studies enable nonlinear learning by offering (i) freedom to skip course activities, (ii) opportunities to review confusing concepts, and (iii) content recommendations based on learning performance (Figure 4). As shown in Figure 4, learning might begin with 'A' content, but students can navigate through the material in any order they choose. This flexibility is a key feature of nonlinear learning paths.

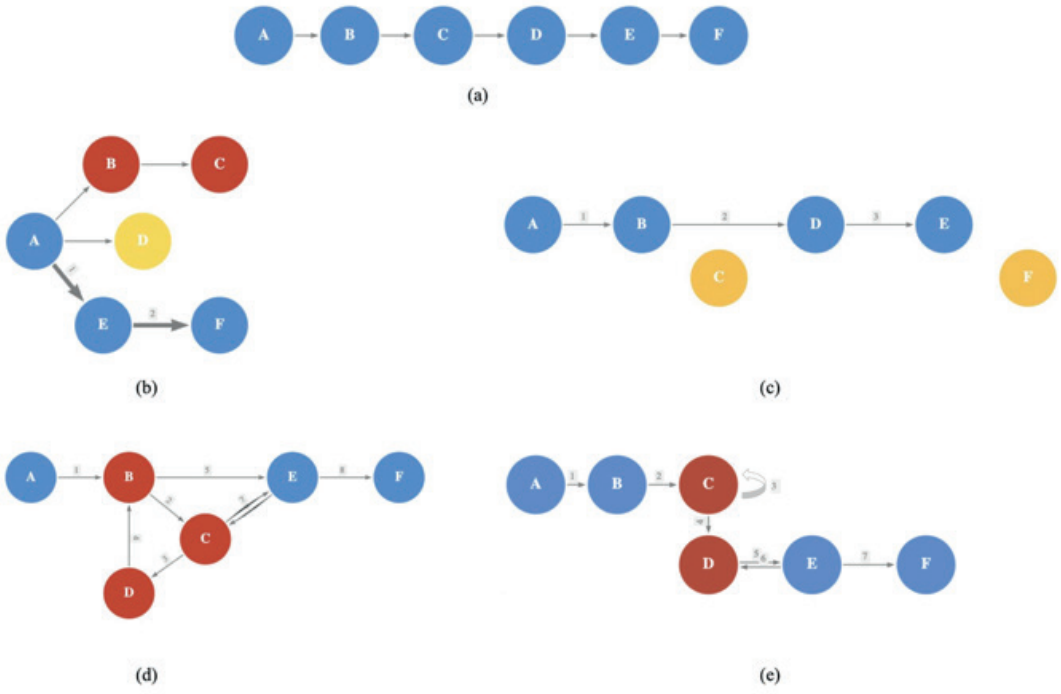

Figure 4. The different learning paths: (a) a linear path, (b) a nonlinear path by selecting 'A-E-F' path, (c) a nonlinear approach by skipping 'C' and 'F', (d) a nonlinear path with a cyclic 'B-C-D' path, and (e) a nonlinear path by re-learning 'C' and 'D'.

Nonlinear Learning in a Technology-Supported Classroom

Open learning environments can be implemented in classrooms through project-based and problem-based learning, as these approaches support individuals in leading their own learning. Therefore, students should recognise what is already known and perform a self-assessment of what needs to be known (Hannafin et al., 1999; Land & Oliver, 2012). Students develop and reconstruct their understanding, for instance, during the artefact creation phase of project-based learning. Such processes imply that "*learning does not occur in linear and discrete steps*" (Krajcik & Blumenfeld, 2006).

Several nonlinear classroom activities are described in the reviewed literature, i.e.:

1. *Face-to-face or online discussions:* Face-to-face and Zoom discussions (Guiter et al., 2021) are synchronous, while written discussion forums on specific websites (e.g., (Chaudhury, 2021; Dharmasasmita et al., 2017)) are asynchronous.

   Discussions, a popular learning activity, can take place within both formal and informal learning groups. Formal groups aim to solve specific problems or complete projects within a given timeframe (Udvari-Solner, 2012). In such groups, discussion is a means of exchanging and understanding ideas from different perspectives. Team meetings and weekly progress reports are examples (Nikolic et al., 2021). Discussion also benefits from a variety of social interactions. Students may interact with educators, project teams, friends, helpdesks, families, specialists, and broader community. Therefore, learning through discussion is not linear but often *iterative* or *cyclical*: it is focused on the common project goal, 'diverging' when working in the group, and 'converging' with the help of the tutor providing focused advice (Pepin & Kock, 2021).

   Discussions in informal learning groups are characterised by (a) the students' seeking answers to what needs to be known, (b) reflection on difficulties to deepen or improve understanding, and (c) feedback from peers or facilitators as a response or guidance (Ellis, Calvo, Levy, & Tan, 2004). The examples include students asking educator in an unstructured discussion form (Van Woezik et al., 2019) or sharing knowledge in groups and classroom-wide discussions (Johnson et al., 2019). Another example is when students can discuss solutions to programming difficulties, which then are modelled by the educator using a computer (Hulls & Rennick, 2020). Discussions in informal learning groups involve perceiving, thinking, and even acting, which are not linear sequences, but rather *circular*, *recurrent* processes (Peters, 2002).
2. *Self-study materials* supplied by the educator. These settings expected students to learn the materials on their own. The self-learning process varied; for instance, there were no teaching or tutoring sessions, but students could ask the educator about the material during weekly sessions without a predefined agenda (Van Woezik et al., 2019). In other research, students were permitted to skip the educator-created content (Hietanen & Ruismaki, 2016), freely access tutorial, and simulation content (e.g., (Applebaum et al., 2017; Nikolic et al., 2021)), and freely view virtual pathology slides (Guiter et al., 2021). Another study used semantic web technology that expose the learning material maps as a network structure (Wu et al., 2021).
3. *Student-created contents,* which students find and learn on their own. Such contents are generally used in experiential learning, problem-based learning, project-based learning, and challenge-based learning. This approach to learning is nonlinear. For instance, a study reported resident doctors overseeing patients who are being discharged. The residents not only monitor the patient in the hospital but also during follow-up visits at home. In this case, the educator does not provide materials; instead, the residents learn through practical experience, such as coaching patients, compiling medication records, and identifying discrepancies in medication (Pavon et al., 2018).
4. *Project mentoring or coaching* for project artefact completion and improvement. This current study adopts a definition where the "*mentor takes on the role of a guide and sage with the characteristics of a helper, teacher, and adviser, while the coach provides individualised professional guidance established with a conversation about methods and performance*" (Carr, Holmes, & Flynn, 2017). As a learning activity, students get mentoring or coaching projects from experienced people, e.g., educators (individuals or teams), teaching assistants (Farley et al., 2020), parents, grandparents, local experts, and distant experts (Flores, 2018).

Mentoring and coaching involves complex engagement and dialogue, more than the Initiate-Response-Evaluation pattern. The student activity goes beyond answering, so a student can expand a response and a teammate can add another answer. Making project artefacts also takes time, as it involves a process of constructing and reconstructing students' understanding. Students also should connect and synthesise ideas. Hence, students have some learner agency (Gardner, 2019). Giving learners autonomy and agency clearly demands a 'paradigm shift' to following more connectivism or nonlinear learning (Bali, el Ahwal, Hashad, Fahmy, & Hussein, 2021).

5. *Peer feedback/interviews/mentoring:* Peer feedback helps to develop abilities, such as critical thinking, listening to and acting on feedback, and sensitively assessing and providing feedback on others' work. A student constructs a more complex understanding by communicating what they know. Hence, peer feedback improves learning because students actively articulate evolving subject matter understandings (Liu & Carless, 2006), which implies nonlinear thinking. There are explicit peer roles found in the reviewed studies, such as:

   > *"Peer-mentoring situations in which one group with a better initial design can advise the other pair on how to increase distance" (Applebaum et al., 2017)*
   >
   > *"…an interview activity which aims to help students find realistic problems by interviewing one another" (Aflatoony et al., 2017)*
   >
   > *"Ability to cooperate allowed the fulfilment of one's own goals within the group work or learning by listening to and observing others" (Hietanen & Ruismaki, 2016)*
   >
   > *"…look out for any constructive feedback from the learner's peers that may have brought resolution to the mistakes…" (Lim et al., 2019)*

6. *Co-learning:* Co-learning describe educator-learner relationships as reciprocal to work and to create shared meaning. The strong collaboration creates an environment where "*people learn through their interaction and participation with one another in fluid relationships*" (Booth, 2014). It also integrates research and teaching where students and educators act as co-learners (Rodriguez et al., 2019). Another term for co-learner is co-experimenter (Pepin & Kock, 2021) and co-developer (Lim et al., 2019).

RQ2: To What Extent do OLEs Enable Personalised Nonlinear Learning Paths?

Nonlinear learning encourages students to choose their own learning path. This proactive behaviour is assumed to be easier for Western culture, which values individualism, personal autonomy, and freedom of choice (Gazi, 2014). However, a transition from directed learning to open-ended learning settings in both East and West requires time and effort. Reluctance is an example of a problem that may occur. For instance, just one-sixth of students enrolled in a course on a campus in the Netherlands opt for self-directed learning, while the remaining students prefer the regular format (Van Woezik et al., 2019). We also found some learning barriers in the reviewed papers, i.e., misunderstanding of project or problem scope, campus policy, educator roles reposition, teamwork issues, technology concerns and students' negative emotions.

Many of the reviewed studies showed learning support from educators; however, they did not specifically address learning path personalisation. The following are the OLE educator scaffolds:

1. *Course design*: educators act as co-learners (Flores, 2018), replicate the process of real-world projects (M. J. Zhang et al., 2020), allow for minor errors (Farley et al., 2020), remind students of targets and deadlines (Flores, 2018; Hero & Lindfors, 2019; Nikolic et al., 2021), monitor student progress on projects (Aflatoony et al., 2017; Nikolic et al., 2021; M. J. Zhang et al., 2020), and provide self-assessment or self-reflection to assess understanding (Wong et al., 2019).
2. *Consultation*: educators assist students with consultation and provide feedback on proposed designs, strategies, processes, and materials (Aflatoony et al., 2017; Farley et al., 2020; Hero & Lindfors, 2019; Kowalski et al., 2016; Nikolic et al., 2021; M. J. Zhang et al., 2020), and discuss alternative suggestions (Hero & Lindfors, 2019; Miller & Sehgal, 2016).

3. *Additional activities* or training (Hero & Lindfors, 2019; Rodriguez et al., 2019).
4. *Technology*: educators facilitate the use of digital pedagogical tools (Dharmasasmita et al., 2017).
5. *Motivation*: educators encourage students to participate in critical thinking (Dharmasasmita et al., 2017; Flores, 2018; Nikolic et al., 2021).

Numerous papers reviewed utilise technology-supported learning (refer to Table 2). Following Hannafin et al.'s classification of OLE tools, we discovered that manipulation tools facilitate nonlinear learning in various ways. Regarding personalisation (Rahayu, Ferdiana, & Kusumawardani, 2022), most of the reviewed manipulation tools still lacked features for recommending learning paths. However, we identified a simulation study used adaptive personalisation to recommend materials based on users' performance (M. Zhang et al., 2019). Meanwhile, adaptable personalisation let students choose their own paths based on their needs and capabilities (Mullen et al., 2017).

Table 2. Use of OLE tools

OLE tool category	Learning technology
Processing tools	Temperature data collection using GPS-enabled iPad (Hammond et al., 2018); open access digital microscopy slides (Guiter et al., 2021); Prezi presentation (Dharmasasmita et al., 2017); Google search engine (Van Woezik et al., 2019); browser to display the learning materials (Mullen et al., 2017; Wong et al., 2019; M. Zhang et al., 2019); linked data-based knowledge navigation system (Wu et al., 2021)
Manipulation tools	Application development environment (Hero & Lindfors, 2019); building information modelling tool (Nikolic et al., 2021); logo designer (Rodriguez et al., 2019); Canva, Piktochart, and Vengage design tool (Chaudhury, 2021); ArcGIS.com suite as geospatial tool (Hammond et al., 2018); Google Sites (Miller & Sehgal, 2016); LEGO NXT/EV3 robot (Hulls & Rennick, 2020); open hardware (Mita & Kawahara, 2017); open-source immersive virtual environment (Lim et al., 2019); Web-based Inquiry Science Environment as virtual model support (Applebaum et al., 2017); learning path recommender system (Mullen et al., 2017; M. Zhang et al., 2019)
Communication tools	Email (Chaudhury, 2021); online quiz (Dharmasasmita et al., 2017); discussion forum (Wong et al., 2019)

DISCUSSIONS

Implications

Nonlinear learning allows students to choose and determine their own learning path. We propose some practical implications to implement it more effectively. *First*, the nonlinear learning path can be a self-choice, but educators can also implement it in the classroom and the MOOCs. Educators can facilitate nonlinear learning in the classroom through discussions and mentoring/coaching projects. In MOOCs, technology can aid with the learning path recommenders.

The recommender system is one of the artificial intelligence technologies that can be used in e-learning. The learning materials are the most frequently recommended items in the e-learning domain, followed by learning paths and feedback (Rahayu et al., 2022). Learning path recommender systems function variedly. Based on the approach, the learning path recommender system might be in the form of *course generation (CG)* or *course sequence* (CS). The CG develops and recommends whole paths to students in one recommendation, and grading occurs upon the pathway completion. In contrast, CS generates and recommends paths to students based on their progress and allows for assessment during learning (Nabizadeh, Leal, Rafsanjani, & Shah, 2020). Thus, the CS approach supports nonlinear learning by allowing students to make choices either at the start or during their learning.

Depending on the number of users, the learning path recommender system can be set up either at individual (*individual sequencing*) or group (*social sequencing*) levels (Rahayu et al., 2023). Individual sequencing provides the optimal path for each student to use during learning, whereas social sequencing suggests an ideal collective path for the entire group. Both strategies allow nonlinear learning, but individual sequencing is better suited for individual students.

Second, as technology advances, the demand for nonlinear learning will grow substantially. Learning materials and project types are related to this need. For example, both blended learning and flipped learning models encourage the use of nonlinear digital materials. Moreover, projects can often transition into digital formats, whether in blended environments or fully online courses.

Third, nonlinear support is beneficial for students, but only for those with strong learner agency. However, nurturing learner agency is time-consuming and challenging. Previous studies have explored various strategies to support this, including methods like ungrading, self-grading, creating content by learners, allowing students to choose their own learning path (Bali et al., 2021), enhancing information literacy skills, focusing more on students' experiences and emotions (O'Brien & Reale, 2021), and meeting psychological needs (Kaplan, Bar-Tov, Glassner, & Back, 2021).

Fourth, the current review indicates that the success of open-ended projects does not depend solely in the hands of students. Developing a project or artefact often encounters challenges along the way. The challenges can be attributable to the lack of hard skills (such as insufficient understanding of the project's scope or technology issues) or lack of soft skills (e.g., writing, teamwork, time management, emotional management). Thus, students need motivational or competence-based external help, such as design, communication, training, and technology support.

Research Agenda

The current study suggests directions for future research on nonlinear learning. *First*, it emphasizes the need for qualitative research to understand how students engage in nonlinear learning. Most existing research focuses on how to enhance course design from the educators' perspective or on curriculum resources and tools (Flores, 2018; Pepin & Kock, 2021). Course plans, student self-reflections, and daily logbooks can be used as source documents.

Second, learner–content interaction often assesses interaction data, such as learner engagement (Powell & Leary, 2021), behavioural effort (Al Mamun, Lawrie, & Wright, 2022), and learning activities (Le et al., 2022). Therefore, there is a need to study the learning path patterns concerning access to materials via the MOOCs platform. Such patterns can be used to improve the learning materials and navigation over time.

Finally, nonlinear learning allows combining the educator-supplied resources with the student internet search. Materials provided by the educators are no longer the only source of information. Students can find supporting information and enriched material as the internet grows (Ismail, Balkhouche, & Harous, 2020). Future studies could pair information sources and follow-up actions to effectively help educators and students.

Limitations

This research represents the first attempt to study the learner-content interaction from the perspective of learning path. The challenge lies in the vast scope of nonlinear learning and the unlimited materials access available to students. The patterns of nonlinear learning interactions may differ across scientific disciplines (like science, engineering, humanities) and cultures, especially in terms of learner agency (Blaschke, Bozkurt, & Cormier, 2021). Along with that, there is no sufficient information from the students' point of view about how they interact with the content. Hence, we could not generalise practical inferences about the personalisation needs. More interesting patterns are expected from further research.

Furthermore, this review includes only English peer-reviewed journal publications. Future research can also include conference papers, including those in other languages.

CONCLUSION

The learning path is critical to learning. Moreover, nonlinear learning paths not only offer greater flexibility but also add complexity compared to linear learning paths. The current study examines how nonlinear learning paths are being adopted in the open learning environments. We reported 30 journal articles using the PRISMA 2020 Statement. Below is a summary of the findings:

1. Nonlinear learning, as a form of student-centred learning, aligns with the natural human ability to think non-linearly. With the expansion of the internet, nonlinear learning involves jumping non-sequentially between different pieces of information using *hyperlinks* -or links- among learning materials.
2. Naturally, nonlinear learning applies effectively *both in the classroom and on the MOOCs platform*. Examples of nonlinear-supported activities in classroom are face-to-face or online discussions, self-study materials, student-created contents, project mentoring or coaching, peer feedback/interviews/mentoring, and co-learning activities. Using MOOC platforms, nonlinear learning allows students to choose from multiple learning paths, engage in cyclical learning path, or skip around between sections.
3. Nonlinear students may find themselves disorients by incoherent learning materials. Personalisation is key to prevent such disorientation. However, the personalisation of nonlinear learning path has not been extensively explored. Technology offers a solution through adaptable or adaptive recommender systems that suggest specific learning paths to students.

Recommendations for Educators

Our research shows that nonlinear learning aligns well with how people naturally think and is practical for educational use. Therefore, we propose two recommendations for educators to help students learn better through nonlinear approaches. *First*, use a variety of nonlinear activities both in classroom settings and online platforms. Supports that have been given in person and in real-time, such as discussions and mentoring, also needs to change through technology. For example, social media can be used to keep students motivated, collaborative technology can help with group work and synchronous communication tools can be used for customer meetings or professional consultation (Cochrane & Antonczak, 2014; Mac Callum, Day, Skelton, Lengyl, & Verhaart, 2015). Moreover, online peer monitoring and peer assessment can be utilised to monitor and evaluate projects (Cochrane & Antonczak, 2013; Gogus, 2012). Educators (Rehman, Elshareif, & Khan, 2023) and other professionals, such as instructional designers, instructional project managers, media specialists, technology coordinators, system administrators, developers or programmers, and evaluators, must collaborate to implement these changes (Huang et al., 2019).

Second, make learning more personal with technology. This includes creating learning materials and projects that support nonlinear learning. Furthermore, educators could also use learning path recommender systems that can automatically adjust learning paths based on a student's performance and preferences. This approach can provide a more personalised and effective learning experience, helping to prevent disorientation.

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BIBLIOMETRIC ANALYSIS OF SOCIAL MEDIA STUDIES WITHIN EDUCATIONAL RESEARCH

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ABSTRACT

The digital transformation in higher education can be observed in numerous ways and practices. Recently, post-pandemic digitalization played a significant role in the increase of the educational use of digital technologies such as artificial intelligence, virtual reality, augmented reality, extended reality, and social media. Among these, social media has dominated daily life long before the rest of the technologies. Hence, examining the current situation of social media studies within educational research aids in envisioning the future vision. This study aims to outline the trends in the use of social media platforms by analyzing

them within educational research published between 2017-2023. For this purpose, 473 articles in the Web of Science database were examined regarding the dimensions of publication year, country of publication, author, keyword, article type, the method used, sampling, data collection tools and analysis methods, and social media use. The findings of this study are believed to guide practitioners and researchers in their practice and consideration of social media within educational environments.

Keywords: Social media, social media studies, bibliometric analysis, educational research.

INTRODUCTION

Social media provides a powerful means of communication platform where users can basically share information, chat, and interact. According to We Are Social (2024), the number of active social media users in the world reaches 5.04 billion. As of 2024, the most frequently used social media platforms are listed as Facebook, YouTube and WhatsApp. The survey conducted with individuals aged 16-64 reveals three key reasons for social media use: keeping in touch with friends and family, spending their free time, and reading the news. Moreover, according to the Pew Research Center (2023), numerous 13- to 17-year-old teenagers in the U.S.A. regularly use social media platforms such as YouTube, TikTok and Snapchat. Social media seems to prevail and expand in the daily lives of people all around the world.

Immersive digital transformation including social media has affected education as well as other fields such as health, politics, and sports. Studies on the educational use of social media date back to the "social media classes" created by Howard Rheingold in the 1980s (Blankenship, 2010). Within this context, research has presented both negative and positive results regarding the use of social media in education.

LITERATURE REVIEW

In the broadest sense, online communication and exchange between individuals constitute social media. Poore (2015) points out the unlikelihood of making a single and broad definition of social media due to its wide scope and identifies the qualities that characterize social media as "*participation, collaboration, interaction, communication, community building, sharing, networking, creativity, distribution, flexibility, and customization*". Similarly, Carr and Hayes (2015) define social media as "internet-based channels that allow people to interact opportunistically and self-represent selectively either synchronously or asynchronously while engaging users who develop user-generated content". It is seen that the definition of social media is subject to variations such as the dynamic conditions and contexts, and its users.

The constant relationship between the media and education has progressed with the growing integration of media tools; the use of radio and television in education was followed by the incorporation of computers. All these highlight the relevance and significance of media within educational contexts. A leading motivation to prefer social media use in daily life communication might relate to the unidirectional and one-to-many feature of traditional media; on the other hand, social media can be bidirectional and even versatile (Wilks & Pearce, 2011). Despite the vitality of these platforms, their undesirable effects on people's educational lives cannot be disregarded. For instance, Yilmazsoy, Kahraman, and Kose (2020) investigate the negative aspects of WhatsApp use in education and point out its potential adverse effects on students' academic achievement and reading comprehension levels.

Compared to the traditional learning method, which provides little opportunity for students to manage their learning activities, learning platforms based on social media put the students in control of their learning (Raut-Vishranti & Patil-Prafulla, 2016). According to Poore (2015), social media platforms provide learning and student-centered rather than teacher-centered practices; they allow students to engage actively and creatively in their learning. In this direction, Dabbagh and Kitsantas (2012) state that self-practice opportunities offered by social media environments allow students to self-regulate by acquiring basic and complex knowledge management skills that help manage and advance their learning. This indicates the effectiveness of social media in multiple forms such as personalized-individualized, self-regulated, and self-

directed learning. Correspondingly, Sarsar, Basbay, and Basbay (2015) conclude their research by underlining the role of social media as a learning environment with a potential contribution to enjoyment, satisfaction, professional and personal gains, and achievement.

In addition to social media's use for personalized learning, its communication and interaction aspects contribute to education, since education systems are built on social interaction with recurring interaction between students, teachers, and staff. Vollum (2014) states that social interaction in education increases the learning experience and success for students; social media stands out as a popular way to increase or encourage social interaction. For instance, teachers can interact with their students through platforms such as Facebook or WhatsApp and share the course materials. Students can cooperate to meet their common learning purposes, can exchange their ideas, course-related information, and materials in their social groups; they can even collaborate to complete their homework. According to the study by Babu et al. (2022) students' access to course materials via Telegram, an online messaging application, clearly influenced their self-directed learning skills. Moreover, the analysis of Twitter use in formal education by Kruger-Ross, Waters, and Farwell (2012) demonstrates how teachers can get instant answers from their students on Twitter, and how this boosts the participation level of reluctant students who feel more comfortable engaging anonymously. Intensive use of social networks on Facebook has been reported to affect online social behaviors (Raza, Usman, & Ali, 2022), influence depression, social anxiety, and self-regulation skills (Foroughi, Iranmanesh, Nikbin, & Hyun, 2019), impact students' psychological well-being (Hong, Huang, Lin, & Chiu, 2014), and affect social support and communication (Tang, Chen, Yang, Chung, & Lee, 2016). In academic literature related to Instagram, studies have indicated its effects on mental health (Zhao, Cingel, Xie, & Yu, 2023), its impact on self-presentation skills (Geary, March, & Grieve, 2021), concerns regarding privacy and confidentiality (Abril, Tyson, & Morefield, 2022; Choi & Sung, 2018), and research on social media addiction (Aparicio-Martinez, Ruiz-Rubio, Perea-Moreno, Martinez-Jimenez, Pagliari, Redel-Macias, & Vaquero-Abellan, 2020). Although the literature discusses education-oriented studies in the context of social media, it lacks a thorough analysis of the status of social media in educational studies. An in-depth analysis of studies on social media in the field of education contributes to the literature in identifying and illustrating its broad perspective.

Rationale and Research Questions

Social media along with the other technologies have become widespread in every field of life going beyond acting as a mere socialization tool. Besides, there is an increasing trend to evaluate the influence of social media in educational sciences. Reviewing, examining, and assessing social media studies within educational sciences and presenting the current situation is believed to contribute to further research regarding social media. The evaluation of social media's influence on education is crucial, extending beyond individual interactions to encompass its effects on broader educational policies and practices within society. This research strives to offer a significant repository for researchers, educational institutions, and policymakers, consolidating the latest insights into the utilization of social media within the realm of educational sciences. This study offers researchers the opportunity to quickly understand and evaluate the existing knowledge about the use of social media in education. Moreover, it is anticipated that this study will illuminate forthcoming research endeavors aimed at enhancing the efficacy of social media in educational contexts. This study aims to bibliometrically examine the trends in the use of social media within educational studies published between 2017-2023. For this purpose, answers to the following questions were sought:

In the studies regarding the use of social media in educational research, how are the following items presented:

1. Years,
2. Research method,
3. Social media platforms (Facebook, Twitter, etc.),
4. Subject area,
5. Type of research,
6. Sample size,
7. Level of sampling (K-12, higher education, professional, lifelong learning),

8. Users (Who?/To whom?),
9. Content (What?),
10. Function (Why?),
11. Data analysis methods,
12. Data collection tools,
13. Type of hashtags,
14. Variables,
15. Keywords,
16. Countries,
17. Journal of publication.

METHOD

Research Design

This study examines the articles on social media within educational sciences published between 2017-2023 by bibliometric analysis method. The bibliometric analysis enables a statistical analysis of information such as author, country, citation, keyword, and journal of studies published in a certain field, database, or journal; the bibliometric data provides a general situation of a particular discipline (Al, 2008; Al & Costur, 2007). The researchers determined the inclusion and exclusion criteria for the selection of the articles and chose the database according to the scope of the study. Upon finalizing these steps, inquiries were started in line with the criteria. The results of the inquiry were investigated through content analysis of the articles and the analysis findings were organized. In addition to tables of content analysis, bibliometric visualizations produced from the bibliometric analyzes were included in the presentation of the findings. In the bibliometric visualization of the study, the researchers created the visuals by using the VOSviewer program.

Sampling

In line with the rationale of this research, open-access articles published between the years of 2017 and 2023 on the Web of Science (WoS) database were scanned on January 23, 2024, using the search query: [social media]. "Education Educational Research" was selected from the "Web of Science categories" drop-down menu to filter the query into the framework of studies focused on educational sciences. The reason for using Web of Science (WoS) in the research is that it is the world's oldest and most widely used database in the world. After applying the filter and setting the search keyword, the result produced a list of 2216 studies.

Inclusion/Exclusion Criteria

At the end of the review, the list was refined, and 473 studies were included in this study. Table 1 lists the inclusion and exclusion criteria.

Table 1. Inclusion and Exclusion Criteria for Sampling Selection

Inclusion Criteria	Exclusion Criteria
• With "social media" keyword	• Without "social media" keyword
• Access to the full-texts	• Access only to the abstracts
• Written in English	• Written not in English
• Published between 2017 and 2023	• Unavailable in the Web of Science database
• Under the category of "Education Educational Research"	• Not under the category of "Education Educational Research"

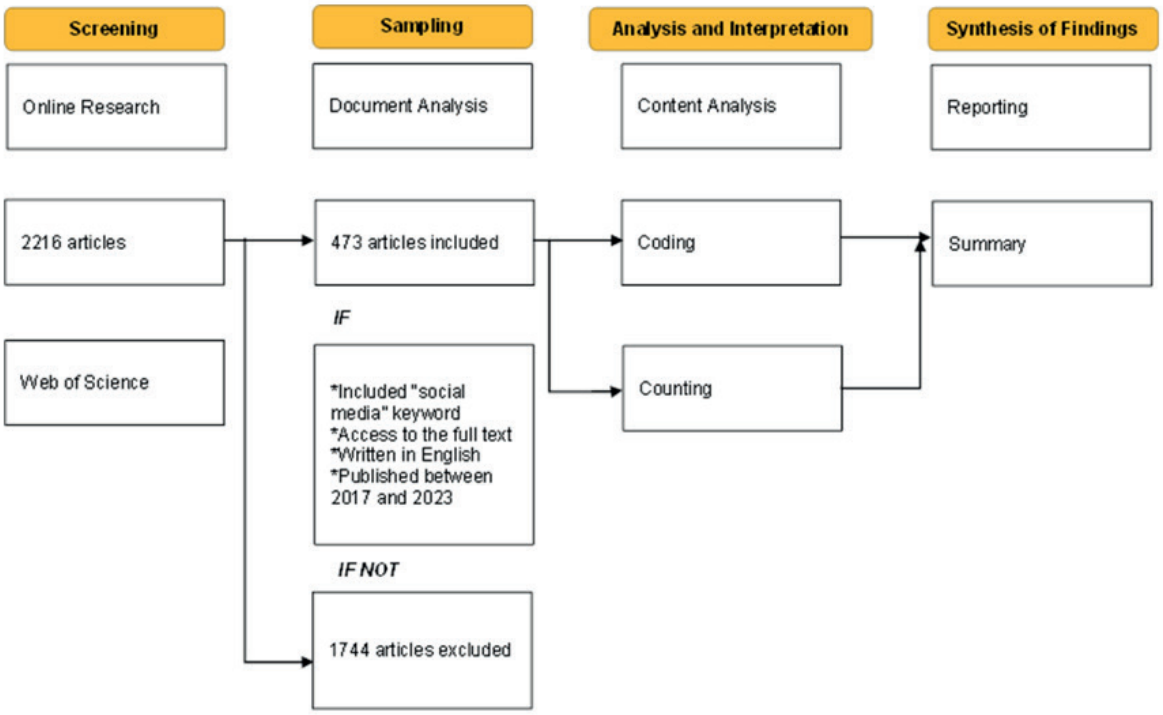

Figure 1. Research Design

The research design includes multiple steps and is displayed in Figure 1. It is adapted from Bozkurt et al. (2017).

Reliability Analysis

To determine the reliability between coders, Fleiss Kappa's reliability coefficient was taken as a basis. Coding was performed by five researchers using the Microsoft Office Excel program. Fleiss Kappa's reliability was assessed based on studies published between 2017 and 2021, as the inclusion of research conducted in 2022 and 2023 occurred later in the study. For coding, 66 articles were chosen and it was ensured that each year was adequately represented in the selection of the articles. The distribution of articles published in different journals was also taken into consideration. Selected 66 articles were examined independently by five researchers and intercoder reliability was calculated using the Fleiss' kappa formula. While Cohen's kappa coefficient is used to calculate the reliability between two encoders, Fleiss' kappa coefficient can be used to calculate the reliability of two or more coders (Fleiss, 1971). As a result of the first coding, the Fleiss kappa coefficient was determined as 0.66. The researchers revisited the steps to establish consensus by discussing the criteria for article classification and criteria for inclusion-exclusion. After reaching a consensus, the Fleiss kappa coefficient was calculated as 0.71. Landis and Koch (1977) state that a fit in the range of 0.61-0.80 is considered a significant fit. Therefore, the reliability between encoders can be accepted at a significant level.

Classification

Twelve classifications were targeted in the study: subject area, article type, article method, data collection tool, sample level, sample size, sample selection method, data analysis method, users ('who'/'to whom'), content ('what'), function ("why"), and social media. While creating these classifications, the researchers reviewed the relevant literature and determined the most suitable classification to match the purpose of this study.

Subject area classification is constructed on the sub-categories developed by the Organisation for Economic Co-operation and Development (OECD, 2015). The type of articles examined was categorized by means of the "Educational Technologies Publication Classification Form" developed by Goktas et al. (2012). No reference was stated in the article method classification; subcategories of quantitative, qualitative, and

mixed were compiled by the researchers. The "Social Media Publication Classification Form" developed by Kadirhan et al. (2016) was adopted to classify the data collection tools. The classification form by Goktas et al. (2012) was applied to a group of the sample levels of the articles examined; social media users from the sub-categories were added to the classification form by Kadirhan et al. (2016). Goktas et al.'s (2012) classification form was applied for the sample size, and the researchers slightly adjusted it by adding the category "more than 1000+" due to the large number of data analyses in social media studies. The form by Kadirhan et al. (2016) was incorporated into the sample selection method, and the form by Goktas et al. (2012) was referred to in the data analysis method.

Social media taxonomy developed by Ouirdi, El Ouirdi, Segers & Henderickx (2014), inspired by Lasswellian coding categories, was employed to classify the articles in terms of users, content, function, and social media. According to this taxonomy, social media tools are organized according to users ('who'/'who'), content ('what'), and functions ("why"). The subcategories of the user category are clustered as micro-meso-macro. The researchers incorporated Instagram and WeChat into the subcategories since they were missing from the list of social media platforms.

In addition to the classification criteria for the literature, the researchers added their sub-criteria. In this direction, the "unspecified" option was inserted into the sub-categories, especially for the articles that did not specify any of the classified sub-categories. At the same time, the "other" option has been included to choose different categories from the predetermined sub-categories.

FINDINGS

This section presents findings related to social media within educational research in terms of their publication year, country, author, keywords, social media platform and hashtag. First, the distribution of the articles according to their year of research was examined to achieve the research objectives. Table 2 lists the articles by year.

Table 2. Analysis of Social Media Studies by Years

Research Year	n
2022	107
2021	98
2023	89
2019	65
2020	50
2018	32
2017	32
Total	473

Table 2 shows fluctuations in the number of studies over the years. This may be related to the additional features of social media technologies growing over the years and the rise in their educational uses. However, a decrease was observed during the emergency distance education period, which started in 2020 with the onset of the COVID-19 pandemic, followed by a significant increase in 2021. This might be due to the integration of social media platforms as a complementary tool to the distance education processes. Furthermore, it is evident that the majority of studies were published in 2022. This could be attributed to the ongoing research on online learning post-pandemic and the increasing prevalence of social media platforms in the education sector.

To meet the objectives of this study, research methods utilized in the social media articles are examined and results are given in Table 3.

Table 3. Analysis of Research Methods Used in the Social Media Studies

Research Method	n
Qualitative	162
Quantitative	120
Mixed (Quantitative-Qualitative)	76
Unspecified	115
Total	473

Table 3 demonstrates the high rate of the qualitative research method (n=162) in educational research on social media which is followed by quantitative research methods (n=120) and quantitative-qualitative mixed research methods (n=76) respectively. The number of studies that did not specify any research methods is found as 115. The qualitative research method is seen as the most preferred research method that might relate to the need for deep and comprehensive analysis of data about social media platforms.

In the next step, the social media platforms in the social media studies were explored and findings on their frequencies are listed in Table 4.

Table 4. Analysis of Social Media Platforms in the Social Media Studies

Social Media Platform	n
Facebook	146
Twitter	110
Instagram	68
YouTube	56
WhatsApp	34
WeChat	15
LinkedIn	10
TikTok	9
Other	90
Unspecified	53
Total	591

Table 4 shows that the most preferred platform is Facebook (n=146) followed by Twitter (n=110) and Instagram (n=68). While YouTube (n=56) and WhatsApp (n=34) follow these platforms, respectively, WeChat (n=15), LinkedIn (n=10), and TikTok (n=9) are realized as less integrated platforms. Ninety studies included other social media platforms and 53 studies did not give any specific information. Next, articles related to social media were surveyed according to their subject areas. Table 5 presents the findings as a comprehensive list.

Table 5. Analysis of Subject Area in the Social Media Studies

Subject Area	n
Social Sciences	
Educational Sciences	276
Media and Communication	11
Economics and Business	3
Political Science	2
Psychological Cognitive Sciences	2
Other Social Sciences	7
Medicine and Health Sciences	
Basic Medical Sciences	10
Clinical Medicine	4
Health Sciences	2
Other Medical Sciences	2
Natural Sciences	
Computer and Information Sciences	4
Mathematics	2
Biological Sciences	1
Physics	1
Humanities and Art	
Languages and Literature	10
Art	4
Other Humanities	4
Engineering and Technology	
Mechanical Engineering	1
Other Engineering	1
Architecture	1
Agriculture and Veterinary Sciences	
Agriculture, Forestry and Fisheries	1
Unspecified	124
Total	473

Data in Table 5 highlights Social Sciences (n=301) as the subject area investigated the most within the social media studies. The subject areas of Medicine and Health Sciences (n=18), Natural Sciences (n=8), Humanities and Arts (n=18), Engineering and Technology (n=3), and Agriculture and Veterinary Sciences (n=1) appear in the list respectively. According to the findings, educational sciences under social sciences stand out as the most prevailing concerning social media studies. This might be due to the selection of studies published in the "Education Educational Research" category in the database. In addition, the exploration of educational use of social media applications ranges from medicine and health education to engineering and agriculture. This shows the interdisciplinary nature of social media within educational studies.

Additionally, Table 6 presents information about the article types in the social media studies.

Table 6. Analysis of Article Types in the Social Media Studies

Article Types	n
Descriptive Study	67
Experimental Study	42
Methodological Study	18
Theoretical Study	17
Case Study	16
Action research	13
Exploratory Study	13
Evaluation Study	7
Literature Review	7
Professional Work	4
Design Based Research	3
Other	30
Unspecified	236
Total	473

According to Table 6, descriptive study (n=67), experimental study (n=42), and methodological study (n=18) are seen as the top three methods administered in social media studies. The number of unspecified methods (n=236) counts more than half of the total number of studies. Despite the stated research methods as qualitative, quantitative, or mixed design in the studies examined, the type of article is not always openly and directly expressed.

Next, the results from the analysis of sample sizes in the social media studies are displayed in Table 7.

Table 7. Analysis of Sample Size in the Social Media Studies

Sample Size	n
101-300	106
31-100	92
301-1000	85
11-30	66
1000+	61
1-10	42
Unspecified	21
Total	473

According to Table 7, the distribution of the studies underlines the sample size of 101-300 (n=106). Sample sizes vary from 31-100 (n=92) to 1000 and above (n=61); while 21 of the studies have not specified any. It is observed that the groups with too few or too many sample sizes are generally less favored. This might be attributed to the educational context of the studies and the laborious nature of accessing meaningful interaction due to the substantial number of users.

The next step of the research covers the sample levels of the articles related to social media. Table 8 demonstrates the results of this analysis.

Table 8. Analysis of Sample Level in the Social Media Studies

Sample Level	n
Undergraduate students	209
Teachers	60
Secondary school students (9-12)	44
Social Media Users	40
Graduate (Masters, Doctorate)	27
Instructors	26
Pre-School/Primary school students (1-8)	25
Parents	11
Youth and Adults	8
Students	5
Administrators	4
Other	36
Unspecified	33
Total	528

Table 8 shows that data were predominantly collected from the participants studying at the undergraduate level (n=209). The remaining sample groups include participants such as teachers (n=60), secondary school students (n=44), social media users (n=40), graduate students (n=27), and instructors (n=26). Overall, half of all studies were composed of undergraduate students as users. Sample group analysis at the K-12 level uncovers fewer studies at the primary education level than at the secondary education level, while there were also studies at the pre-school level. In addition, all involved in educational institutions are considered as participants in the analyzed studies.

Social media studies were then evaluated according to their users (who?/to whom?). Table 9 briefly shows the results about the users.

Table 9. Analysis of Users (Who?/To whom?) in the Social Media Studies

Users (Who?/To whom?)	n
Micro	211
Meso	142
Macro	105
Unspecified	15
Total	473

Table 9 demonstrates the portion of social media users in the studies on social media with predominance at the micro level (n=211) followed by meso (n=142), and macro level (n=105). Furthermore, eleven studies did not specify the users (n=15). This study classifies micro-level user profiles recognized with a class or a small number of groups considered as participants. While the studies carried out with the participants at the faculty or campus have a meso-level user profile, those reaching all the users across the country or in a wider network are defined as the macro-level user profile.

In the next step of this study, the content (what?) of the social media studies is examined and presented in Table 10.

Table 10. Analysis of Content (What?) in the Social Media Studies

Content (What?)	n
Multimedia	144
Text	66
Video	29
Visual	10
Other	4
Unspecified	220
Total	473

Consistent with Table 10, educational content covers multimedia (n=144), text (n=66), video (n=29), and visual (n=10) content in addition to 'other' (n=4) and 'unspecified' (n=220) content. Multimedia integrates two or more types of content such as pictures (photos, graphics, maps), text, audio, and video, and remains indispensable to learning activities (Mayer, 2005). The multimedia content provides interactive support to the student such as reviewing the material, pausing, recording voice, and making graphical visualizations. These features play a role in the selection of social media platforms that offer multimedia such as text, pictures and sound as seen in Facebook user preference.

As a next step, functions (why?) in the social media studies were scanned and the results are shared in Table 11.

Table 11. Analysis of Function (Why?) in the Social Media Studies

Function (Why?)	n
Sharing	127
Multiple causes	116
Networking	22
Data collection	10
Collaboration	8
Other	25
Unspecified	165
Total	473

Table 11 features the function of having multiple causes (n=116), sharing (n=127), networking (n=22), data collection (n=10), and collaboration (n=8), while many of the studies (n=164) did not specify their function. Multiple-cause functions may prevail since social media offers numerous functions that can be adaptable to educational contexts.

Additionally, this study explores the data analysis methods of the articles related to social media; Table 12 lists these methods.

Table 12. Analysis of Data Analysis Methods in the Social Media Studies

Data Analysis Method	n
Qualitative Data Analysis (Content Analysis/Descriptive Analysis/Thematic Analysis/Other)	157
Predictive Analytics (T-test /Structural Equation Modeling/ Regression /Correlation/ Factor Analysis/ANOVA-ANCOVA)	154
Descriptive Statistics (Frequency/Percentage/Chart/ Graphics /Average/Standard Deviation)	150
Non-Parametric Tests	23
Bibliometric Analysis Cluster Analysis/Text Mining/Social Network Analysis	15
Other	19
Unspecified	64
Total	582

Data analysis methods applied in the social media studies listed in Table 12 exhibit a high rate of qualitative data analysis (n=157) followed by methods such as predictive statistics (n=154), descriptive statistics (n=150), and non-parametric tests (n=23). Furthermore, the number of studies that did not indicate the data analysis method totals 64.

The following step of the research design covers data collection tools in social media studies. Table 13 presents the list of these tools.

Table 13. Analysis of Data Analysis Tools in the Social Media Studies

Data Collection Tool	n
Questionnaires	225
Interviews	127
Time and Motion Logs	30
Social Media Tools	25
Scales	24
Observation forms	20
API (Data extraction application)	15
Performance Tests	11
Anecdote Records	5
E-portfolios	1
Other	73
Unspecified	15
Total	571

According to the data in Table 13, the allocation of data collection tools marks the questionnaire (n=225) as the most preferred data collection tool. The second most employed data collection tool is the interviews (n=127) which are commonly seen in qualitative studies. This finding supports the data about the complementary nature of data analysis methods and tools observed in this study. Data collection tools cover time and motion

logs (n=30), social media tools (n=25), scales (n=24), observation forms (n=20), API (n=15), performance tests (n=11), anecdote records (n=5), e-portfolios (n=1), in addition to 'other' (n=73) data collection tools. In 15 studies, no data collection tool was specified.

As one of the final steps, hashtags in social media studies are examined and the log of hashtags is displayed in the following table.

Table 14. Analysis of Hashtags in the Social Media Studies

Categories	Hashtag	n
About COVID-19 Pandemic	COVD19	1
	WuhanVirus	1
	coronavirus	1
	CoronaOutbreak	1
	2019nCoV	1
	COVID-19	1
	CoronovirusPandemic	1
	korona	1
	evdekal	1
	COVID19	1
	HealtyKidsQuarantined	1
About Teaching and Learning	digital teaching	1
	edtech	1
	highered	1
	elearning	1
	booktok	1
	bookstagram	1
	Studygram	1
	Studygrammer	1
	remotelearning	1
	remoteteaching	1
	Remoteteaching	1
	wedontdistanceeducation	1
	newteachertribe	1
About Chat	EdChat	2
	MedEdChat	1
	chat	1
	CdnELTchat	1
	NGSSchat	1
	pechat	1
	Other	41
	Unspecified	423
	Total	442

Table 14 shows that the hashtags are presented under three main categories according to their scope. These are those related to the Covid-19 pandemic (n=11), teaching and learning (n=13), and chat (n=7). Those not included in these themes are in the other category (n=41). Additionally, it was observed that hashtags were not used in 423 studies.

In the tabulated data set, Table 15 displays the results of the examination of social media studies according to the various variables.

Table 15. Analysis of Variables in the Social Media Studies

Variable	n
Perception	28
Social media use	28
Student participation	16
Gender/Age	15
Academic Performance	14
Interaction	13
Motivation	13
Attitude	12
Experience	10
Social media platform	5
Satisfaction	5
Other	111
Unspecified	314
Total	584

Table 15 shows a diverse list of variables including perception (n=28), social media use (n=28), student participation (n=16), gender/age (n=15), interaction (n=13), and motivation (n=13). The number of studies without any specified variable remains high (n=313) which can be associated with the level of researchers' competence or their command to indirectly present the variables to remove the potential obstacles during the data collection phase. It is seen that affective characteristics such as self-efficacy perception, self-esteem, awareness, anxiety, and interest, as well as social support features of social media such as support and cooperation, and risky aspects such as addiction, are also examined in educational research. However, these are categorized as 'other' and are less frequently studied.

The findings of this study are also presented in the form of visualization. This figure visualizes the keywords listed in social media studies within the educational context. The findings about the keywords are presented in Figure 2.

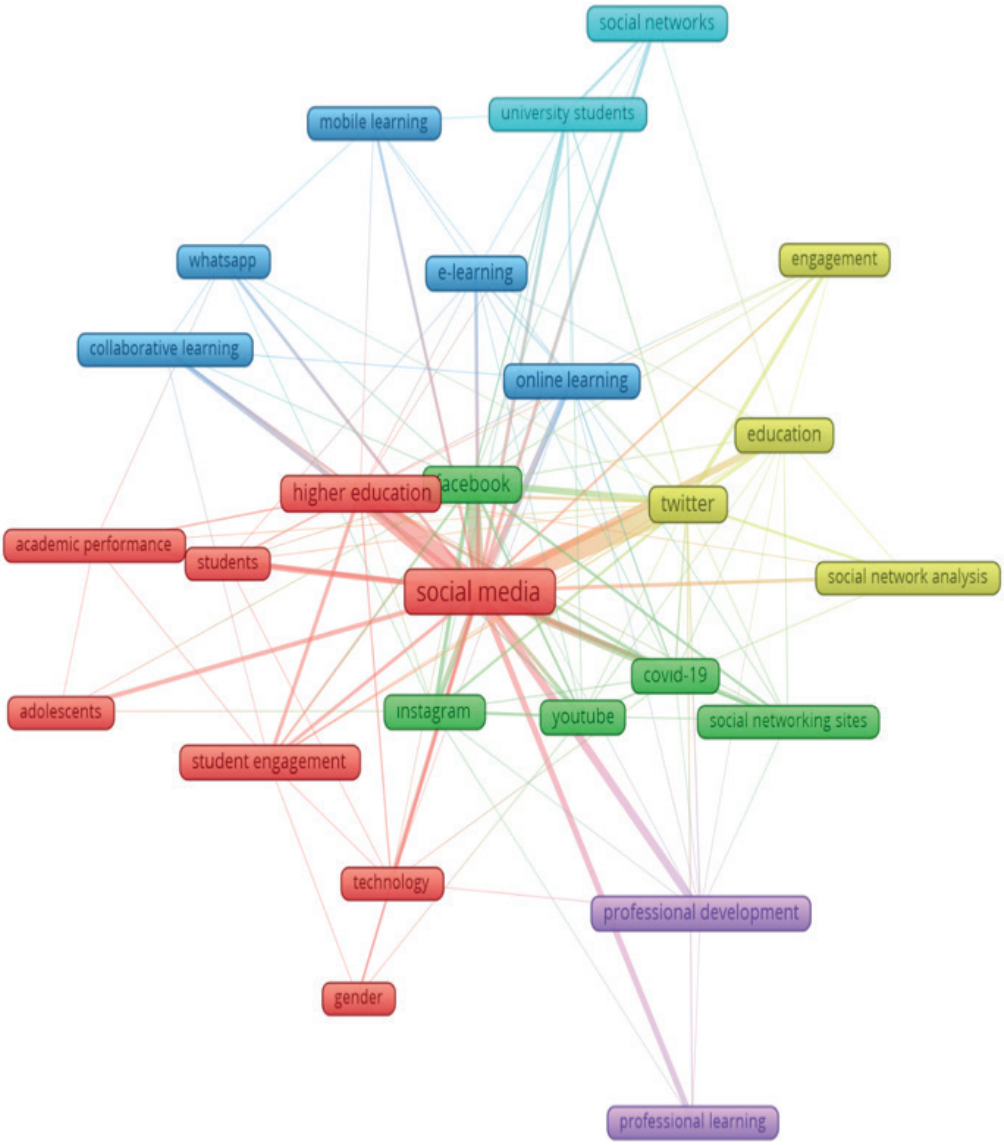

Figure 2. Analysis of Social Media Studies According to the Keywords

Figure 2 shows the most frequently repeated keywords as follows; social media, higher education, Twitter, Facebook, and COVID-19. The significant presence of Twitter and Facebook tools in keywords supports the finding of the most favored social media tools in studies. In addition, the profusion of studies conducted during the COVID-19 global epidemic period may rationalize the exhaustive use of the COVID-19 keyword. The higher education keyword indicates the educational use of social media in higher education; while the keywords professional education, professional development, and teacher professional development confirm the high volume of work about the use of social media in professional and vocational education.

As another point of analysis, social media studies are examined in terms of the countries where they were published. The findings are illustrated in Figure 3.

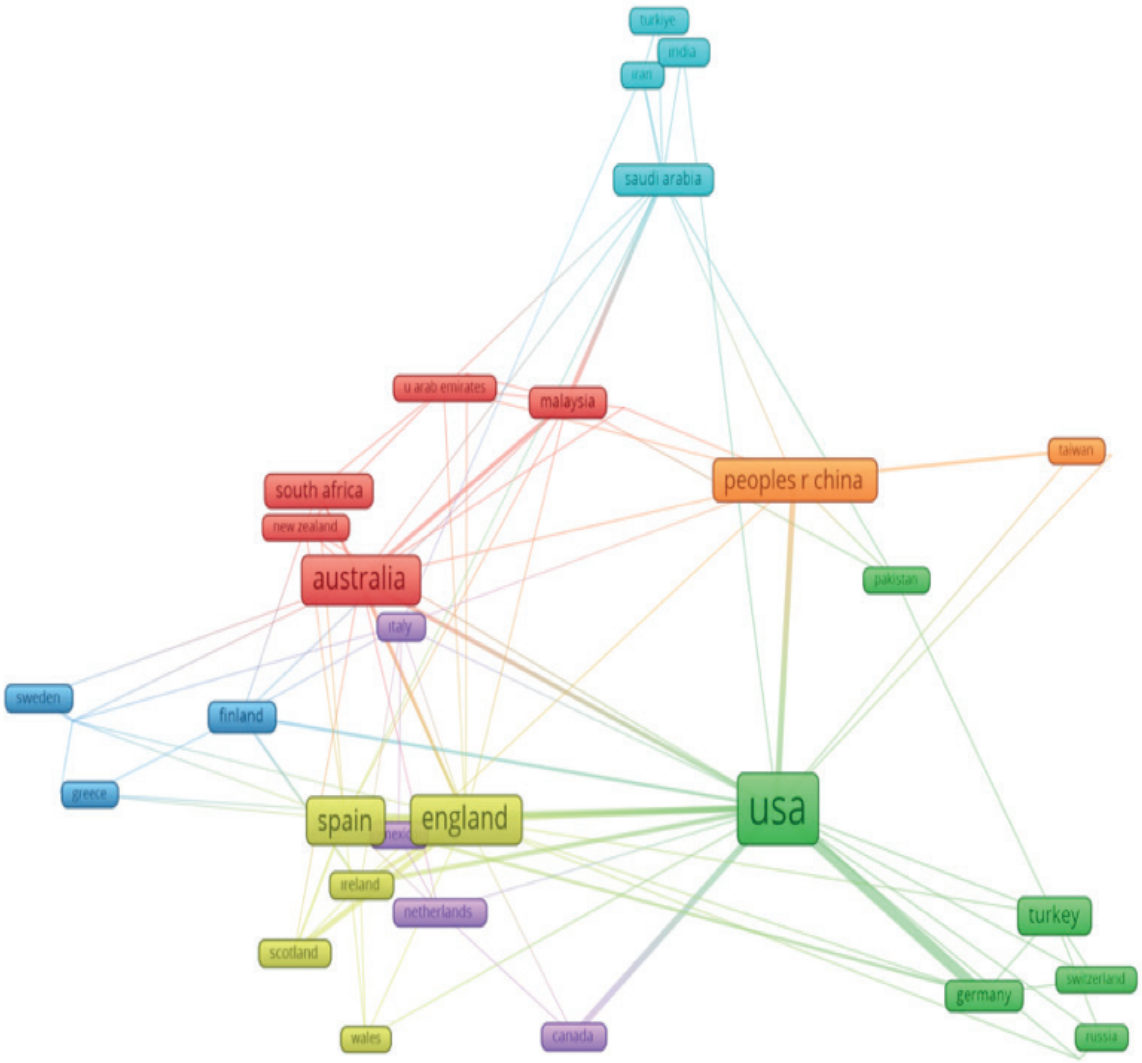

Figure 3. Analysis of the Social Media Studies According to Country of Publication

Figure 3 displays the concentration of studies published in the U.S.A., Australia, Turkiye, South Africa, Germany, and Sweden, respectively.

In the last tabulated data set, Table 16 displays the results of the examination of social media studies according to the journal of publication.

Table 16. Analysis of the Social Media Studies According to the Journal of Publication

Education and Information Technologies	25
International Journal of Emerging Technologies in Learning	24
Education Sciences	18
Frontiers in Education	16
Cogent Education	12
Australasian Journal of Educational Technology	11
Journal of Information Technology Education-Research	11
BMC Medical Education	10

Computers & Education	10
Learning Media and Technology	10
International Journal of Educational Technology in Higher Education	8
International Journal of Instruction	8
Online Learning	8
International Journal of Information and Communication Technology	7
Research in Learning Technology	7
Other	288
Total	473

The data in Table 16 highlight studies published in Education and Information Technologies (n=25) that could be related to the high number of studies using social media in education and education technologies. Moreover, International Journal of Emerging Technologies in Learning (n=24), Education Sciences (n=18), Frontiers in Education (n=16), Cogent Education (n=12), Australasian Journal of Educational Technology (n=11), Journal of Information Technology Education-Research (n=11) journals are seen to focus their publication on social media. Finally, the number of journals included in the scope of the study counts as 190. Journals with six or fewer repetitions are presented under the 'other' category.

DISCUSSIONS AND CONCLUSION

Social media not only functions as a communication network but also serves as a platform in many areas ranging from government institutions to media organizations, from educational environments to academic research. This study investigates academic studies on the use of social media in the field of education grounded on the framework of bibliometric analysis. In the study, full texts of 473 articles on the use of social media in educational research in the Web of Science database between 2017-2023 were investigated by means of the content analysis method. According to the findings, it can be established that studies on social media in educational research between 2017 and 2023 with peak in 2022. Student views on the use of social media in educational processes confirm its recognition over the years (Togay, Akdur, Yetisken, & Bilici, 2013). In this context, the findings from this study are seen as compatible with the literature on social media use.

It is obvious that Facebook and Twitter have millions of visitors every day and according to We are Social's "Digital 2024 Global Overview Report", Facebook, YouTube, WhatsApp, Instagram, and TikTok rank high in the list of social media tools in 2024; while Twitter is placed 12th. In this study, Twitter seems to be a popular platform that might relate to hashtag identification in many social media studies. The widespread use of these platforms can be disclosed as the defining feature of their incorporation into educational environments. Although TikTok is quite popular, it is seen that its frequency is less among the social media tools used in studies. The reason for this can be shown as the increase in TikTok users starting from 2021 (Pew Research Center, 2024).

Social media studies were then evaluated according to their users (who?/to whom?), content (what?), and functions (why?). According to the findings, more than half of all studies are established at the micro level; basically, they were chosen from a narrow area such as class, school, or a family. The study seems to have been conducted with macro-level participants. Considering the wide-reaching accessibility of social networks to users, the number of studies at the macro level appears remarkably low. This could be connected to educational research where users cooperate for a purpose through social media in educational environments. Besides, the popularity of sharing functions is noticeable; these social media platforms allow seamless interaction by exchanging within the network.

As a powerful data collection tool, surveys quickly collect data from large numbers of samples that fit the nature of social media environments where current discussions and situations are consumed rapidly. It is noteworthy to recognize that traditional data collection tools such as questionnaires and surveys are favored in such environments. Online data collection allows gathering data fast and affordable from different

geographical areas and much larger groups compared to other data collection techniques (Wolf, 1988); however, its convenience might cause overuse. Moreover, the result suggests that the sample sizes in the studies maximizing 101-300 support this situation. Time and motion records are defined as reporting tools of what is observed and when it is observed (Fraenkel, Wallen, & Hyun, 2012). Time and motion logs (n=30) are recognized as prevalent in this study. The inclusion and reporting of records in social media environments with these tools may explain the abundance of research findings. Despite this, applications using Application Programming Interface (API) as a data collection tool are scarce. Regarding the considerable size of data in data extraction from social media tools, platforms limit the data capacity that can be requested via API (Thomson, 2016). It is believed that this situation may adversely affect the adoption of APIs in research. All in all, a great deal of diversity is noticed in the context of the data collection tools that can be associated with the current advancements in online data collection tools.

Hashtags, which are one of the ways to interact on social media, are mostly on the themes of the COVID-19 pandemic, teaching and learning, and chat. It is seen that there are hashtags related to COVID-19 due to the fact that the articles examined were studied during the pandemic period and the way of teaching changed. It is also noteworthy that social media communities are used in hashtags related to teaching and learning. Bookstagram is a tag used by users who share the books they read, write short reviews of these books, and make videos about the books. Studygram is a community where students support each other on multiple social media tools. It allows students to come together under a hashtag for purposes such as providing motivation, offering tips for effective studies, sharing study moments, and passion for stationery. This is an indication that students use social media to get support for different aspects of self-education, even without the guidance of a teacher.

Moreover, studies on social media in the field of education are found to concentrate on data from undergraduate students. This supports the findings on sample levels and prominent levels of keywords such as "higher education". It is recommended that future research focus on social media use by adults and parents since the available literature lacks sufficient data on these users.

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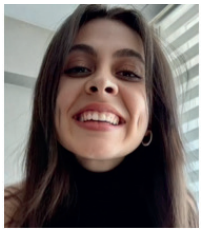

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PAPERLESS ASSIGNMENTS AND CHALLENGES INVOLVED: VOICE OF DISTANCE LEARNERS

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ABSTRACT

The study was planned to explore the challenges faced by distance learners during paperless assignment process. This initiative was introduced a couple of years ago at a distance learning university in Pakistan. Target population comprised on distance learners of M. Phil Education and MBA (col) sessions 2017 to 2019 programs running online through Learning Management System (LMS). Total Population Sampling (TPS) technique was followed and all distance learners of both programs were engaged. It was mixed-method research comprising both structured and open-ended information. The instruments employed were two questionnaires: one on Likert Scale and the other was open-ended. The reliability coefficient was 0.71, and the open-ended questionnaire was validated through six subject experts. The structured questionnaire was sent to all 563 students and in response 132 students filled out the online questionnaire. Quantitative data was analyzed through descriptive statistics while qualitative data was analyzed through NVivo software. The main problems highlighted were study material relevance and late delivery, understanding and processing of paperless assignments, access and skills of ICT, financial constraints, evaluation of paperless assignments, and instructors' feedback. Students suggested that textbooks should be revised and delivered in time, connectivity issues should be resolved, free internet packages should be introduced, LMS training should be conducted, in time feedback in descriptive form by instructors must be provided to the distance learners.

Keywords: Paperless assignments, distance learners, learning management system, problems and challenges.

INTRODUCTION

Multiple challenges emerged during Covid-19 including lack of financial resources, unemployment, scarcity of face-to-face interaction which bound human life and forced them to do more struggle but with less resources. All walks of life were affected with a variety of challenges, especially children had to stay at their houses and their education was restrained at campuses. In this situation the universities started to think about alternative means of education like online open distance learning programs. The open distance learning platforms were not new but already existed which provide opportunity to distance learners to learn at their own pace from anywhere, any time with little resources and physical presence. It includes tutorial sessions, workshops, assignments, quizzes, midterm and final term exams, personal online contacts etc. to facilitate distance learners. In recent times, emerging technologies have opened new avenues of communication and replacing traditional means. Now distance learners and instructors have different options to take online sessions through mobiles, computers, laptops, tablets etc. The constant internet facility with

proper bandwidths required to avail educational experience at online platform in distance education. This sudden change was a huge challenge to arrange all activities at online platform like E-learning, E-workshop, E-Assessment and E-assignment or paperless assignment.

The literature revealed that distance learners have better options of learning in this digital era through paperless classrooms. Such initiatives lead towards open schools with no walls and boundaries, more flexible in nature with increased access especially to marginalized and disadvantaged areas. Moreover, this rapid advancement opens new trends in education like developing a green environment replacing paper-based assignments with paper less assignments (Watfa & Audi 2017). Some digital and electronic tools readily available to prepare paperless assignments without caring for certain space and time (Igwela & Nsirim, 2018, Dhawan, 2020). Distance learners have better access to resources and increase their learning through paperless (soft copy) textbooks, audios, videos and recorded online lectures. In addition to this, open education resources are freely and readily available to get benefit of these. They can save and secure their assignments in soft form at different online stores like google docs and other free web spaces (Wahyuni, Fitriati & Maharani, 2019). It is easy to upload and share their paperless assignments to the instructors through different platforms like Learning Management Systems (LMS) (Aabha & Bani, 2015). The assessment of these paperless assignments is also very simple without paper and pencil (Slowinski, 2000). The instructor's feedback is possible in real time through technology (Baby & Saeed, 2020; Omehia & Nsirim, 2022; Technopedia, 2021). The use of these devices may help to motivate distance learners and enhance their active participation in the learning process (Ferguson, 2017) and restrain intentional delays in the assignment submission (Nordby, Klingsieck, & Svartdal, 2017; Lin, 2016).

The initiative is highly significant for distance learners, but a prompt and emergent paperless strategy is not an easy task to implement, especially through technologies when it changes on every passing day (Thimbleby, 2019). Moreover, the acceptance of these changes is also an issue as the environment refrains and employs its potential to hamper such changes. The quality and accuracy of work can be reduced due to the pressure associated with completing assignments on a short timeline (Kim & Seo, 2015). The distance learner's circumstances are different as most of them are working, bearing families, variety of engagements, and moreover official demands. Their motivation also fluctuates during the enrolment process due to some situational factors, such as financial problems, family distress, employment status, etc. (Newhouse & Cerniak, 2016). Some distance learners feel that their instructors are inflexible with deadlines and not supportive of the additional responsibilities that are faced by them (Dumais, Rizzuto, Cleary & Dowden, 2013). Lin argues that female learners facing additional barriers due to multiple roles and insufficient social and family support (2016) to complete their studies. The study material provided for reading is outdated and scarcely relevant content is available to meet the demand of assignment questions. Moreover, the delivery of books through correspondence is banned and textbooks are uploaded on the online platform which are hardly accessible due to variety of local contextual problems like; frequently electric short fall, non-availability of internet connectivity or required bandwidth to connect and skills required.

The students' skills are insufficient to work on paperless assignments as it is an emergent initiative with little support, training and transitioning period to meet the challenges. The fixing of a new system had a natural resistance among distance learners who were familiar with course assignment through correspondence. Moreover, the sudden shift and without having experience of such a large-scale implementation also augmented undetected happenings which took days to fix the issue. In addition, the country like Pakistan where socio-economic condition of a common man is poor and hardly affordable to get enroll or continue their education. Now the dream of getting education is dependent on access to online environment which require some gadgets like android mobile, laptop or tablet etc. which is not in the reach of all candidates. Anyhow, if they manage such a facility in one way or the other, even then they are unable to use these devices. They need certain training to become familiar with these devices and understand how to use them. The preparation of assignments in soft form creates many challenges for distance learners is one aspect while they face different issues related to assessment of these assignments. The assessment criteria given for assessment is hardly met by the instructors during online assessment. The feedback required to improve their assignment is not provided to the learners and they were not aware of their mistakes and how to improve their assignments.

The literature on the topic is scarce as prior to these mainly correspondence based assignments in hard form were mainly practiced. The emergent trends of technology transform the whole teaching and learning system and things are changing with unpredicted speed. This prompt change definitely made unexpected change in all fields. Summarizing, distance learners faced common challenges are non-availability of textbooks, problem in searching appropriate material for Paperless assignment (Kai, 2004-07), time management, lengthy assignments which demands plenty of time to respond the assignment questions. Mostly learners considered assignment preparation as a burden owing to same deadline of submission for all subjects registered in a semester. The provision of internet facilities, availability of equipment and skills also create a big challenge. In spite of all these issues this initiative is the need of the today era and there is need to explore these challenges being faced by the distance learners to address them.

The key purpose of distance learning institutes was to increase access to marginalized individuals living in remote areas with little or no access to education. The aim of this study is to identify the nature of problems being faced by the distance learners in their perspectives and level of magnitude to find viable means to address those problems. Moreover, the key challenges highlighted by the distance learners were further explored through interview of the participants. This study was a step forward to identify challenges and underlying reasons of these challenges to ensure quality education to individuals with less resources especially living in less privileged areas. As every individual has equal right to get education without any discrimination of region, creed or age and gender. However, it could be only possible through identifying their problems and underlying reasons which might provide solutions to address those problems on the basis of empirical data. The context of the study was based on distance learners of an Institute of distance learning in situated in the Islamabad Capital Territory which had target to provide education to the students living at remote places and with little facilities. The abovementioned objectives were addressed through following research questions.

RESEARCH QUESTIONS

The following questions were made to target the scope of the study.

1. What challenges were faced by the distance learners;
    i. in identifying material for preparation of paperless assignments?
    ii. in having access to online resources?
    iii. about evaluation of their paperless assignments?
2. What are the underlying reasons for key problems reported by distance learners?

RESEARCH METHODS

Mix method approach was employed to conduct this study as it provides us good inferences and safe to be biased from a single method (Teddlie & Tashakkari, 2009). The explanatory sequential mixed method was based on quantitative data first collected through survey method in the form of google docs. This data provided us a general image of the problem like a piece of a puzzle (Ivankova, Creswell, & Stick, 2006). The data were analyzed and descriptive statistics clearly showed us factors with high magnitude which provided us a base for further probing of these factors to unpack the underlying reasons of high mean scores. The underlying description of these factors was qualitatively needed to unpack the situation which was sought through an open-ended questionnaire. The interpretation of this qualitative data explains the image in detail, like to combine the pieces of a puzzle and shows the complete image (Subedi, 2016).

The data were collected into two phases. The first phase was based on quantitative data followed by qualitative data as shown in figure 1. The design of the study was justified as explanatory sequential mix method (Creswell, 2014).

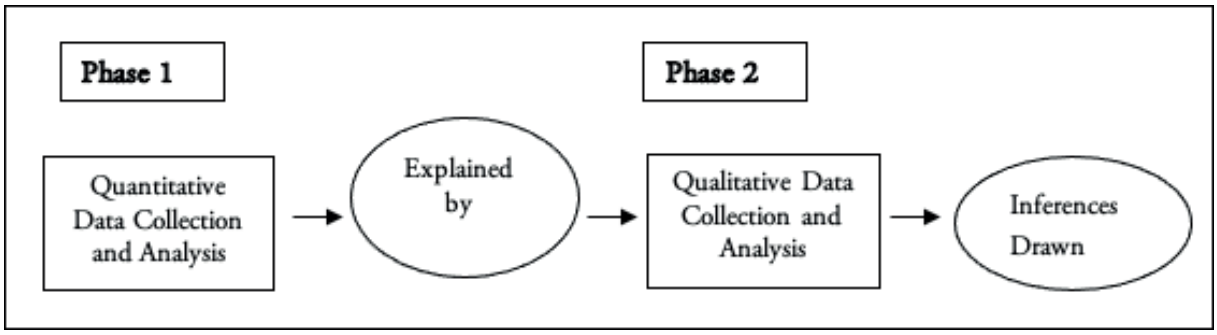

Figure 1. Explanatory Sequential Design (Creswell, 2014)

CONTEXT OF THE STUDY

The study was conducted in an Open Distance Learning University situated in the Islamabad Capital Territory, Pakistan. It was established in 1974 to cater to the educational needs of masses living in remote areas with marginalized opportunities of access. The university was well established and attracted a huge number of students, especially at undergraduate level. The masses living in remote areas, having little access to formal education, working individuals, individuals with little financial opportunities were the main cliental of this university. Mostly students were at their jobs and were continuing education alongside their work. Some were living in remote areas with lack of resources can be stated as disadvantaged segment of the society. In hilly areas and some remote places even, electric supply was not frequently available. Likewise, the internet facility was also not available at some places or with proper bandwidth was not available to run the internet facility without interruption. Some students, especially at postgraduate level, were well established being working individuals in public or private organizations. The university initiated some steps to improve their teaching and learning process including a learning management system (LMS). It was a novel and emergent initiative for distance learners to continue their education.

PARTICIPANTS OF RESEARCH

The students of Master of Philosophy (M. Phil) in Education and Master's in Business Administration (MBA), who were using LMS taken as participant of the study. Both programs were the same level of education. These students were enrolled in the same year (2017) and their session was also completed in the same year (2019). At the time of their enrollment, paperless assignments were introduced for the first time in both programs. However, they have to submit first time paperless assignments rather than handwritten assignments in hard form through correspondence. This initiative created unrest among distance learners due to changes in the assignment preparation, process and evaluation. The students were facing many problems of different nature in the process of paperless assignment and raising their voices at different forums. The researcher was also part of one of these programs and realized the gravity of this issue. The students enrolled at that time genuinely felt this problem and raised their voices on the problem. So, the researcher determines the scope of the study to identify problems faced by the distance learners on paperless assignments irrespective of their discipline of the study or any other perspective. However, the emerging initiative was unique in nature and all programs shifted to LMS were included in the study to get maximum empirical data on the problem. It was decided to find the experience of distance learners on different levels of this new initiative like process, development of paperless assignment and evaluation to probe the underlying reasons of this unrest among distance learners. The assumptions to take these participants were both programs are same in other perspectives like, level of education, year of schooling and experience of paperless assignment initiative. However, there is no question to find comparisons and differences among two groups considering them independent variant groups, but they are assumed similar on the topic under the study.

INSTRUMENTS OF THE STUDY

There were two types of data collection instruments: quantitative and qualitative. The first tool was a structured closed ended questionnaire based on a 3-point Likert Scale. The scoring was like, 3= Agreed; 2=Some extent agreed and 1= Not agreed. This questionnaire was developed on readings related to paperless assignments. The literature highlighted challenges in paperless assignment at three different levels; some problems occurred before the paperless assignment process (preparation of assignments), during the process and after the process (evaluation of paperless assignment) which were faced by the distance learners. The questionnaire was based on 6 main factors followed by 26 subsequent questions. The questionnaire was developed on Google Docs which was easy to conduct and sought experiences of distance learners regarding paperless assignments online. The detail of questionnaire employed with sample statements to have an idea of statements and total number of statements against each factor is given in table 1.

Table 1. Detail of Questionnare Employed for Fiding Challenges of Paperless Assignments

Levels	Factors	Sample Statements	Number of statements
Problems before preparing Paperless assignments	Study material	You receive your study material in time	6
	Vague questions	Questions made unnecessarily ambiguous	4
Problems occur during Paperless assignments	Challenges of ICT	You need training to compose paperless assignment	6
	Financial issues	Internet cost for study is easily payable for you	2
Problems occur After Paperless assignments	Evaluation Problems	You are satisfied with assessment criteria of your assignment	4
	Instructors Feedback	Your instructors give feedback right after assessing your paperless assignment	4

The second tool was based on qualitative data pertaining to 9 open ended questions to get underlying reasons behind high rated factors by the distance learners. It was necessary to explore underlying reasons mentioned by distance learners about the problems related to the process of paperless assignments. The blank space was provided below each question to distance learners for giving their responses to open-ended questions. These were open and extended responses by the distance learners to extract underlying reasons for their challenges faced during the paperless assignments.

The questionnaire was sent through google doc to the distance learners to understand their perception regarding paperless initiative taken by the university for the first time. This nature of the problem is dealt with through employing such a method in most of the researches as highlighted in the literature (Keith & Sue, 2009; Akhter & Ali, 2016; Jumani, Malik & Akram, 2018; Musingafi, Mapuranga Chiwanza & Zebron, 2015; Datt, & Singh, 2021; Ahmed, Salah, & Rana, 2020; & Cubukcu, & Akturk, 2020).

RELIABILITY AND VALIDATION

The questionnaire was piloted on the distance learners of same programs, but they were not included as participants of the study. The reliability test was run to ensure consistency among different items of the questionnaire to measure underlying traits correctly. The reliability coefficient was found to be 0.71 which is an acceptable value (Cortina, 1993).

The open-ended questionnaire was validated by the six subject experts. The face validity and content validity were ensured through expert judgment. Some questions were modified in the light of their suggestions. Finally, the Content Validity Index (CVI) was calculated based on experts' responses. The CVI was calculated as .956 which was acceptable as per literature (Polit & Beck, 2006).

DATA COLLECTION PROCEDURE

The personal information of participants was requested in black and white from the university authorities. After getting access to the data, the IDs of participants of both programs; MBA Commonwealth of Learning (COL) and M.Phil. Education were collected. A request was sent through Google Docs to the 563 participants of the study to fill out the questionnaire. A web link of the questionnaire was sent to all participants while 132 students returned filled questionnaires back to the researchers which was 23% response rate of the total participants of the study.

After the analysis of quantitative data, the qualitative open-ended questionnaire was developed and shared with those participants only who had already filled the quantitative tool. The tool was shared through Google Docs again to the participants. The response rate was better as 33 % of distance learners filled this open-ended questionnaire perhaps, they were interested to share their experiences which observed during the process of paperless assignment.

RESULTS

The sequential explanatory study was initially based on quantitative data followed by qualitative data. The nature of the study demands that quantitative data might be analyzed first and then qualitative data to get answers to the questions of the study.

Analysis of Quantitative Data

The analysis of the quantitative data presented in the following section indicates the total number of participants, mean and standard deviation.

Table 2. Challenges faced by distance learners related to study material

S#	Statements	N	Mean	SD
1.	You receive study material on time for paperless assignment preparation	132	2.36	.77
2.	Problem in reading of study material due to rough publishing	132	2.23	.83
3.	Receive clear guidelines with study guide for developing assignment	132	2.36	.81
4.	Receive schedule of assignment submission to submit them on time	132	2.55	.69
5.	Assignments should be sent to the students before workshops	132	2.87	.44
6.	The time given to complete Paperless assignment is enough	132	2.67	.61

Table 2 shows challenges related to study material faced by distance learners. Some students report that study material is received a bit late (X=2.36, SD=.77) which creates problems in developing paperless assignments. The delay in study material ultimately causes delay in their assignment preparation. However, they cannot complete their paperless assignment in time. Moreover, they reported that the publishing material of textbooks is not clear to the level (X=2.23, SD=.83) that provides support to the distance learners in reading and prepare their assignments in allocated time. The guideline proforma for helping in developing online assignments were not provided to the distance learners along with textbooks (X=2.36, SD=.81) which create hinderance in submitting assignments online intime. The schedule of assignment submission is shared on time with mean score (X=2.55, SD=.69) which indicates that scheduling is properly conveyed to the distance learners in time. Most of the distance learners (X=2.87, SD=.44) wanted those assignments should be sent to the students before workshops so that the students can discuss and get help from their instructors while attending study workshops. Some students reported that time given for assignment preparation is not enough to complete them (X=2.67, SD=.61). Overall, intime study material delivery to the students, proper publishing with clear writing format and font size, provision of guideline proforma, intime scheduling, assignment dissemination before workshops and appropriate time allocation to complete assignments can provide ease to the distance learners to submit paperless assignment and continue their study program.

Table 3. Challenges faced by distance learners in understanding of assignments

S#	Statements	N	Mean	SD
1.	Contact with instructor to understand questions to solve assignment	132	2.58	.67
2.	Some questions are made unnecessarily ambiguous/confusing	132	2.49	.76
3.	Frequently visit to the library to find study material to solve assignment	132	2.02	.81
4.	Take help from classmates in developing of Paperless assignments	132	2.67	.64

Table 3 shows results regarding challenges faced by distance learners in understanding of questions included in the assignment. Mostly distance learners (X=2.58, SD=.67) contact with the instructors to clarify their understanding about vague questions. It is worth mentioning notion that distance learners have intimacy with their instructors to clarify their misunderstandings in solving the paperless assignments. As many learners (X= 2.49, SD=.76) pointed out that questions posed in the assignments are confusing and demands clarification to understand and solve them. For getting assistance to solve assignments some students visit libraries (X=2.02, SD=.81) but such students are less in number as compared to other sources of getting support for clarification. Most students (X=2.67, SD=.64) share their problems with their classmates and get help in the development of their assignments. Perhaps they feel at ease and comfort to share their issues with fellows and understand their misconceptions accordingly. The use of libraries is least in practice by the distance learners which is alarming for open distance learning but alongside a positive point that student closely develop interaction mutually and discuss their confusions in understanding and development of paperless assignments.

Table 4. Problems faced by distance learners related to ICT

S#	Statements	N	Mean	SD
1.	Have internet facility at your home/office/place of work	132	2.53	.75
2.	Difficult to find relevant study material on the internet	132	2.63	.70
3.	Need training to browse on internet for material searching	132	2.61	.70
4.	Need training to use the Learning Management System (LMS)	132	2.69	.69
5.	Need MS word training to compose Paperless assignment	132	2.67	.68
6.	Facing problems in determining plagiarism of text material	132	2.66	.67

Table 4 shows results related to provision of Information and Communication Technology (ICT) facilities available as per opinion of distance learners. The role of ICT is very common in all walks of life especially in distance education when all teaching and learning processes are shifted to online platforms. In this situation some prerequisites are essential to continue your studies like provision of internet facility at living place or office so that learners can access his/her study portal and can work different tasks accordingly. But some students (X=2.53, SD=.75) do not have facility or partially have facility which create hindrances in their daily tasks especially preparation of paperless assignment and their submission. The availability of study material at the learning platform is reported by distance learners (X=2.63, SD=.70) as difficult to locate or meagerly available. These issues can be solved through training as mostly distance learners are of the view (X=2.61, SD=.70) that trainings should be given for internet browsing, use of Learning Management System (X=2.69, SD=.69) and use of MS word for typing and other basic functions (X=2.67, SD=.68). Moreover, in this era of internet facility and computer technology mostly distance learners get sources available in the form of text, use material in their assignments which is detected later as plagiarism. The distance learners want (X=2.66, SD=.67) access to the Turnitin software to check their assignments level of similarity index before submitting to the instructors at the online platform.

Table 5. Financial issues of distance learners related to Paperless assignment process

S#	Statements	N	Mean	SD
1.	Bearing internet cost for study is easily payable	132	2.11	.86
2.	Paperless assignment process is a cost-effective	132	2.31	.74

Table 5 shows results regarding financial issues, if any, faced by the distance learners during the assignment development process. The provision of facilities like constant supply of internet connection with proper bandwidth is essential for online access to the environment and start their work. But the facility of internet is costly and even not available at some locations of the country especially in remote areas. The learners are not satisfied as they have to pay a large amount of money to purchase wireless internet device or in some cases internet connection of some private company on high rates. In both cases they spend money and mostly learners (X=2.11, SD=.86) are not satisfied but scared of these payments. Paperless assignments are normally considered cost effective by the university administration but in the opinion of distance learners these are not alike for some students as reported (X=2.31, SD=.74) in the survey of this study.

Table 6. Problems faced by distance learners regarding evaluation of Paperless assignment

S#	Statements	N	Mean	SD
1.	Instructors provide guidelines to deal with the issue of plagiarism	132	2.05	.88
2.	You are satisfied with marking/assessment criteria at your university	132	2.54	.73
3.	Instructors return marked assignment to the distance learners in time	132	2.61	.66

Table 6 shows assessment of paperless assignment and magnitude of distance learners' challenges in this regard. The distance learners (X=2.05, SD=.88) are partially satisfied with the guidelines provided by the instructors to avoid plagiarism as they face this issue very commonly. The assessment process is also under criticism in academic circles especially in the light of distance learners (X=2.54, SD=.73). Some students report (X=2.56, SD=.66) that they did not receive instructor marked assignments in time to judge their mistakes and improve their learning.

Table 7. Problems faced by students regarding instructors' feedback

S#	Statements	N	Mean	SD
1.	Instructors provide feedback soon after assessment of Paperless assignment	132	2.35	.81
2.	Instructors feedback is constructive to the distance learners	132	2.25	.77
3.	Distance learners get feedback to improve Paperless assignment very late	132	2.83	.45
4.	Instructors take students feedback after the end of the workshop	132	2.70	.55

Table 7 shows distance learners' opinion about their challenges regarding instructor's feedback. Perhaps the learners meagerly get suitable feedback in descriptive form to improve their assignments which is the purpose of this activity. Some learners (X=2.35, SD=.81) do not receive marked assignments in time which create problems and develop uncertainty in the minds of distance learners. The constructive feedback provided to the distance learners is helpful for them at large. They can identify their mistakes, improve their readings, and can prepare assignments with more devotion and effort. Some students (M=2.25, SD=.77) are not satisfied with the feedback provided to them. In most of the cases, instructors provide feedback at the end (X=2.83, SD=.45) when all assignments are already submitted and no chance to get improvement in the development of assignment on the basis of feedback which is unfortunate. Distance learners receive instructors' attention during the workshops and their feedback is also sought (X=2.70, SD=.55) for the improvement of this activity.

Analysis of Qualitative Data

The analysis of qualitative data was made through NVivo-11 software. The results against emerging themes naming; factors, sub-factors and respondent relevant excerpts are given in table 8.

Table 8. Nature of problems faced by distance learners during paperless assignment process

Factors	Sub-factors	Extracts from the learners' responses
Problems in Study Material and composing of assignment	Access and relevance	Books mostly delayed and did not arrive in time
		Books need password to access on the online platform
		Material is mostly irrelevant and outdated
		Books do not pertain content related to the assignment questions
		Need to simplify and link the study material with the course scope
	Issue of online connectivity	Network connectivity issues frequently create problems
		Remote systems do not accept the assignment often
		Link provided to submit assignment is not mostly opened
		Sometime connection dropped with LMS
	Issues of Composing	Typing is another issue for lengthy questions
		Composing is difficult, time consuming and expensive
		Typing is difficult part of paperless assignment
Problems related to ICT	Training required	Need MS Office training to make Paperless assignment
		Composing skills to make assignment needs training
		LMS is a little confusing so need training
	LMS related Issues	Window appearance of online system should be more user friendly
		Sometimes we were not sure that our assignment was uploaded or not
		Discussion board is major issue for distance learners
	Issues in Searching and reporting text	Data searching takes lot of time to find relevant information
		Access to many of research articles is not available which are relevant
		We are not receiving even plagiarism report after checking of assignment
	Cost of internet	Internet packages are going expensive day by day
		Many places where internet facility is not available
		Long travel to get access to internet for opening portal in specified areas
Support and Feedback	Issues in communication	Some tutors don't pick the call of distance learners often
		Tutors answer on the phone sometime not helpful for distance learners
	Understanding of assignment questions	Some questions given in the assignments are vague to understand
		Sometimes we don't find relevant material to respond in the books
	Issue of Time management	Typing text and other work on computer take too much time
		Only grading without remarks is not enough to understand their mistakes
		Descriptive feedback is necessary for distance learners but not provided
	Lack of Facilities	Sometimes electricity shortfall creates problems in remote areas
		Not availability of internet facility in some areas of mountains
		Digital facilities are lacking for distance learners
	Problems in Tutors Feedback	Instructors feedback is vital, but scarcely offered
		Some instructors don't provide tangible feedback for their understanding
		Lack of motivation at different stages of learning

Distance learners highlighted some important points regarding their experience during developing paperless assignments and challenges involved. Students' responses were sought against key factors where quantitative data was meaningful. The information provided by the distance learners was merged at different relevant places. Some of the respondents highlighted more than one issue in their descriptive response while some of them did not respond against some statements and only typed "Nil" in the given field or left it as empty.

Problems of Study Material

There are range of problems related to study material mainly merged into two sub-themes access and relevance of text material. The respondents pointed out that study material is outdated, extra extended books while it should be based on relevant and concise material. Mostly books are misprinted and when scanned and uploaded at the portal it is very difficult to even read the text. There should be some colorful illustrations of important points to make it reader friendly. These all make textbooks boring and distance learners often avoid accessing these books. But in cases books are even not uploaded and distance learners could not purchase books from the open market as books are costly or even not available in the open market. The distance learners are mostly frustrated in such situations and quit their program of study. Moreover, the connectivity of the internet is another a big challenge. The learners living in remote areas often do not have access to the online portal and start their work. Sometime the link is down and LMS is not working. In addition to this, there is an electricity shortfall due to some reasons and electricity cannot be restored for long hours. Anyhow, the system is meagerly supportive to open and distance learners to continue their program of studies in a condition which is not user friendly and soothing to provide conducive environment. Distance learners previously prepared their assignments in black and white form and believed a big challenge to develop in soft form. They considered typing assignments as an extra burden on distance learners due to time consuming and more expenses involved activity.

Problems of ICT

Distance learners pointed out some areas where they face problems like MS word office, composing skills, and uploading skills which should be addressed on preference through imparting relevant trainings. Searching for the relevant study material online is also often difficult for most of them and they need training for online searching and in use of LMS. The appearance of its window should be user-friendly. The platform should provide a conducive environment to distance learners. The assignments are minutely related to the textbooks designed for that course and students must search relevant text online which meagerly available, if available, not free access to that material. The online retrieved information when selected by the distance learners to include in the assignment showed similarity index beyond limit which create problems for the learners. There is a need to provide guidance and support for self-write up to the learners so that they can get insight and develop their skills of writing assignments without plagiarism. Many students cannot afford internet charges and they have no free internet facility to continue their study. Mostly students don't know how to type the text or have very slow typing speed which took too much time to compose the Paperless assignments. This initiative is significant, but students should provide training in formatting and referencing as per APA format. The chat feature among student tutors should be available at nighttime also.

Support and Feedback

Distance learners pointed out many issues related to communication with the instructors. They often make calls at the time of need which are scarcely attended, or the information given is not relevant to the query. In such cases learners get frustrated due to the non-availability of material for reading and developing their assignment. The instructors should share some relevant links of books for learners' readings free of cost. Some journals should be freely accessible to the students for reading and other websites to enhance their access for reading. The instructors should provide links of free e-libraries with their distance learners, provision of free international books and membership of different learning forums should be freely available to distance learners. Moreover, frequent load shedding restraint distance learners especially who belong to rural areas of Pakistan to develop their paperless assignment intime. Internet availability issue, low income of learners to

purchase device and monthly bills. In some areas the bandwidth required for smooth running of internet is scarcely available and learners face slow internet speed which create hinderance in the way of developing paperless assignments. As a result, mostly distance learners are unable to submit their assignments within the allocated time.

Evaluation of Paperless Assignment

Distance learners often declare failure in Paperless assignment, and they have to take up their course again. This increased unrest among distance learners and they could not get a way to overcome this situation. They feel fee submission again as a burden for them, they are of the view that instructors should help and support to enhance their learning and compensate in their assignment through extra support and should save their time and money. The instructors only put marks on their assignments which meant nothing to understand and impossible to incorporate at the learner's level. When the learners could not understand his mistakes, he was never able to improve it by overcoming his shortfalls. There should be more motivation from the instructor side through identifying their mistakes, providing guidelines and supporting material for their improvement. There is no marking criteria shared with the learners, no tangible feedback is provided to them. The quality of evaluating Paperless assignment is very low, marking criteria was hidden from students, lack of transparent marking, lack of motivation towards student's work, marks are allocated without defined criteria which is often mislead to the assessment made. There are no rubrics designed for marking, guidelines about marking are not shared with the learners, instructors do not point out the mistakes with justifiable remarks for the learners. Learner to learner marking criteria varies, results are often delayed which creates unrest among distance learners.

There are many students who could not qualify their Paperless assignments, and they have to get admission as a fresh candidate in that subject. Distance learners are of the view that paperless assignments are the part of formative assessment, and it should be marked timely, and guidance should be provided to the distance learners promptly so that they can improve their learning in the light of suggestions made by the instructors.

The detail of all challenges faced by distance learners along with their magnitude in percentage is given in figure 1.3. It reflects the complete range of challenges being faced by distance learners during the process of paperless assignments. The data based on descriptive illustrations were coded in the NVivo software and merged against different themes generated from the data. These are mainly independent themes but some are overlapping.

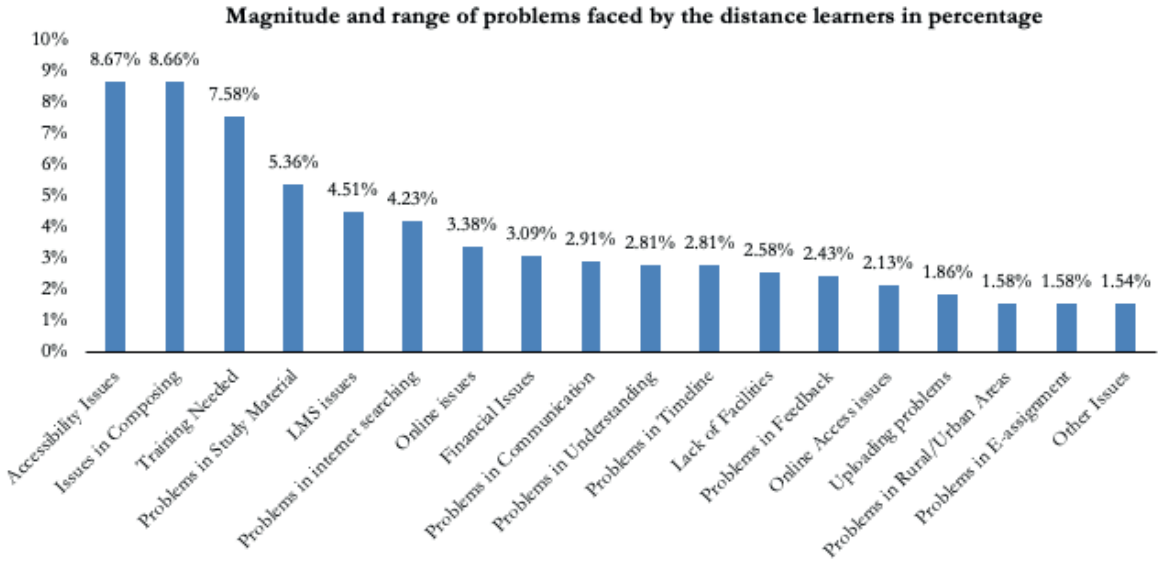

Figure 2. Problems reported by the distance learners during paperless assignment process

Figure 2 shows the percentage of different problems occurrence in the whole process of paperless assignment. The major issue emerged accessibility with 8.67% magnitude as learners often face problems in connecting with the university server and sometime, they cannot upload their paperless assignment due to the slow internet connection. Majoring of learner's face difficulty in developing Paperless assignment with 8.66% of magnitude as stated by the distance learners. They face problems in typing extended assignments due to lack of typing speed and composing skills. These skills are basic requirements to develop a paperless assignment. Online searching and taking different supportive content from different resources demands computerized skills as large value 7.58% of respondents demands training of different computer related online skills. It includes training in using Learning Management System, MS Word and composing skills to develop paperless assignments.

Further different problems are highlighted like, problems related to study material (5.36), issues related to learning management systems (4.51%), problems of distance learners in online searching (4.23%), online issues (3.38%), financial issues (3.09%), problems in communication with instructor (2.91%), problems in understanding of questions including in the assignment (2.81%), problems in meeting timelines for assignment (2.81%) as it is time consuming job, lack of facilities to the distance learners (2.58%), problems in provision of feedback (2.43%) online access issues (2.13%) at LMS and e-books etc., problems in uploading assignments (1.86%), problems in remote areas (1.58%), problems in paper less assignment (1.58%) and some other miscellaneous problems (1.54%) like irrelevant questions in the assignment, high expectations of instructors from the learners are mainly reported by the distance learners.

DISCUSSION

Paperless assignments are an important source of interaction between learners and instructors which lack in previously available correspondence-based mode of assignments (Akhter & Ali, 2016). In addition to this, the initiative is also significant in respect to protecting our environment and being part of the global green program (Yousufi, 2023). Mostly universities are using Learning Management System (LMS), Modular Object-oriented (Moodle) or Blackboard to complete the process of paperless assignment in distance learning programs especially after COVID 19 (Aabha & Bani 2015; Ahmed, Salah & Rana 2020). Students prepare their assignments with the help of different devices like computers, laptops and mobiles and submit through Learning Management System (LMS). The instructors have access to online submitted assignments, evaluate these assignments, and put their comments/feedback which are visible to the learners within no time. This is a smart process to complete assignments and get feedback from the instructors without unnecessary delays in corresponding assignments. Theoretically, it is a very smart, quick and cost-effective way of access and delivery but practically the user's experience is contrary to this or raises some practicable implications for practitioners (Haleem, Javaid, Qadri & Suman, 2022).

This initiative increased access to distance learners (Paul, & Jefferson, 2019) but emergent change resulted in the form of some critical challenges also. The provision of hardware equipment to distance learners is a big challenge (Musingafi, Mapuranga Chiwanza & Zebron, 2015), in addition to this lack of necessary skills required to use that equipment (Haleem, Javaid, Qadri & Suman, 2022). The provision of these all was meaningless if there was an electric shortfall or non-availability of internet facility/connectivity with appropriate bandwidth required for smooth working/running of internet. These all proved an extra financial burden on distance learners which led to a demand for financial support for equipment and internet service to join this platform. These extra expenses are proving as a barrier to get access to education for distance learners. There are some findings related to the quality of whole process like preparation of paperless assignments and their online submission, assessment mechanism and feedback effectiveness. These are challenging for distance learners as highlighted in the result section on self-reported questionnaire by them.

Distance learners face problems in finding answers to the questions given in the paperless assignments. Their foremost source to respond to questions are textbooks which scarcely pertain such information to prepare assignments covering demand of the instructors. Perhaps the level of questions posed in the assignments and text available in the textbooks are mismatched or not aligned. The books are outdated, and the content was not upgraded (Janet, Lesley & Ben, 2009). Moreover, the second source of problem was online searching to find literature to answer the questions, but distance learners were not proficient in searching techniques to find relevant material online. The findings highlighted that learners need training in browsing material

online (Pretorius, Podorova, Ford, Chowdhury, Bames & Viete, 2020). The instructors should provide extra help through specifying some web links, free digital libraries, audios and videos, free online journals, and variety of online readings to assist distance learners. Some questions in assignments demand a higher level of thinking which requires extensive readings to understand the question and respond accordingly. This is only possible by sharing relevant and latest readings with the learners at an online learning platform by the instructors which are meagerly provided (Jumani, Malik & Akram, 2018).

Some distance learners did not have typing skills and could not compose extended answers of assignments and have to pay huge amounts to the composers for this purpose. Ultimately, they felt a problem in making Paperless assignments due to depending on others to complete their tasks which create disturbance for them. The majority of students do not have personal computers/laptops to work on preparing assignments and they travel long to get access to this facility on payment. As a result of these all, the literature highlighted those paperless assignments are cost effective method but in this study the results are contrary (Barrot, Llenares & Rosario, 2021; Haleem, Javaid, Qadri & Suman, 2022). Some distance learners are not satisfied with the marking of paperless assignments as only scores in the form of numbers are provided by the instructors which had no meaning and guidance for learners to identify their mistakes. Feedback in descriptive form can guide learners about their weaknesses and they can make changes or learn for future improvements. Clear rubrics should be made for assessment which make students more strategic while searching their material and preparing of Paperless assignment (Pretorius, et al., 2020). Instructors detailed feedback is important for distance learners to enhance their motivation, boost their learning and enthusiasm towards learning (Barkley, 2010).

CONCLUSIONS AND SUGGESTIONS

The key challenge faced by distance learners at first stage, before starting the paperless assignments were study material issues, outdated and non-readable material, lack of communication between distance learners and instructors, lack of required facilities, financial constraints to manage equipment and online connectivity. At second stage, some problems emerged during the process of paperless assignment like; problems in searching study material online, problems related to work on LMS, composing of paperless assignment, assessment related issues, especially instructors' non-productive feedback are main challenges of distance learners' online submission problems, lack of e-skills, internet issues, server connectivity issues etc. Lastly, some problems occur after the paperless assignment completion like; issues related to marking criteria of paperless assignment, plagiarism issues, non-productive feedback and network issues etc.

The challenges of Paperless assignments process are opening of new opportunities of learning for distance learners. It could be a significant source of learning through formative assessment of distance learners. Actually, this initiative is a tangible source of learning with new opportunities like enhancing computer skills, students online searching abilities, embedded motivation to manage timeline and time management for their students, improves students composing skills, and develop the habit of hardworking. This is a rigorous process which engages students in learning which is multi-faceted. During the developing process of paperless assignments students searched material online and download material and learn online searching techniques and abilities. They enhance their searching abilities from time to time. This hardworking routine developed confidence among distance learners, and they started to trust their abilities.

Some guidelines are provided/suggested for improvement of paperless assignment initiative:

1. Distance learners should provide free online access to different open educational resources to enhance their readability and equip them with better learning opportunities.
2. Necessary basic trainings should be provided to distance learners to get through at LMS followed by some video's recordings on different steps and processes of paperless assignments.
3. Free or cheap internet packages should be introduced for distance learners or establish facilities of such provisions at different centers of the university located in the whole country.
4. A platform for communication between learners and instructors should be provided so that learners can contact their instructors when and where they need any help.
5. The feedback should be clear and in descriptive form so that distance learners can identify their gaps in the assignments, incorporate their mistakes and can improve their learning.

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A BIBLIOMETRIC ANALYSIS OF RESEARCH ON DROPOUT IN OPEN AND DISTANCE LEARNING

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ABSTRACT

The purpose of this study is to examine research on school dropout in open and distance education in the Web of Science (WoS) database using bibliometric analysis and to reveal trends in this area. In line with this goal, a total of 1,615 studies published between 1980 and 2022 were identified in the Web of Science (WoS) indexes. Descriptive and evaluative bibliometric methods were employed in the analysis of these publications, and the results were visualized using VOSviewer software. According to the research findings, studies on school dropout in open and distance education intensified in 2019. The analysis revealed that E.T. Pascarella is the most cited author, and F.D. Pereira has the highest co-authorship network. An examination based on institutions showed that the Universitat Autònoma de Barcelona has the highest number of publications, while the University of Michigan ranks first in terms of citation numbers. Furthermore, in terms of publication productivity and citation numbers, the United States is ranked first, followed by Spain. Looking at the keywords used in articles on the topic, early studies emphasized concepts such as "distance education", "student retention", "attrition", "student success", "social integration", "academic integration", "survival analysis", "education policy", "graduation", and "financial aids". In subsequent years, these were replaced by terms such as "learning analytics", "educational data mining", "systematic review", "engagement", "drop prediction", "decision tree", "student performance", "gamification", "massive open online course-MOOC", and "artificial intelligence". In this context, discussions were conducted within the framework of the literature, and various recommendations were provided based on the obtained findings.

Keywords: Open learning, distance education, e-learning, dropout, bibliometric analysis, VOSviewer.

INTRODUCTION

With origins dating back to the 19th century, open and distance education has become an interdisciplinary field with expanded implementation possibilities in the 21st century (Bozkurt, 2020; Ozkul & Aydin, 2013; Yuzer, 2013). The rapid changes in information and communication technologies have led to various innovative approaches and practices in the field of education, similar to those in fields such as communication, healthcare, transportation and industry. One of these practices is the provision of open and distance education services, which enable individuals of all ages and from any location to receive education without the constraints of time and place. In the current literature, the terms "distance education" (referring to the act of taking courses at a distance), and "open education/teaching" (referring to equal access to educational opportunities delivered at a distance) are often combined to form "open and distance learning". In addition, the terms "distance learning" and "open learning" are often used interchangeably in many contexts. However, the concept of open learning may differ from distance learning in some respects. For example, in open learning, students can often enrol in the courses or programs of their choice without many academic restrictions or prerequisites (Ekren & Kumtepe-Genc, 2018). Addressing the issue from the context of the network society and the concept of learning within the connectivism paradigm, Bozkurt (2014) asserts that the power of networks is increasing with new technologies, and the idea of a network society in distance education is emerging as a new concept. These advances have led to an era where access

to information is more important than the information itself. Siemens (2005) states that methods or tools such as courses, emails, communities, chats, web searches, blog reading and more can be used to implement the principles of a connectivist approach. Building on this, Siemens and Downes ventured into designing a learning environment in line with a connectivist approach, which led to the concept of Massive Open Online Courses (MOOCs) in the field of distance education (Downes, 2012). MOOCs can be described as a new form of existing online learning approaches that are becoming increasingly prevalent in the field of open and distance learning. Wang, Zhao, Wu, & Goh (2023) liken the online learning represented by MOOCs to a digital tsunami in the history of global education. This description underlines the considerable interest in and demand for MOOCs over the past decade.

The increasing global population and rising costs of education are increasing the importance and demand for open and distance education to meet the educational needs of individuals (Behr, Glese, Herve, & Katja, 2020; Muljana & Luo, 2019; T. Yilmaz, 2020; Vieira, Filho, Junior, & Santos, 2023). Despite all these developments, institutions providing open and distance education are faced with challenges such as dropout rates. The effectiveness of educational institutions is often measured practically by the employment opportunities of their graduates and theoretically by their success rates or school dropout rates (Agus, 2019). It has been noted in the literature that the dropout rate in open and distance education institutions is significantly higher than those offering traditional face-to-face education (Lee & Choi, 2011; Radovan, 2019; Yukselturk & Inan, 2006). For example, despite serving as a model for universities worldwide in open and distance learning processes and providing extensive support services to its students, The Open University in the England has a graduation rate of 22%. By comparison, Athabasca University in Canada has a rate of 5.3%, the Open University of the Netherlands 2.5%, Ambedkar University in India 14% and the University of South Africa 6% (Simpson, 2010; Simpson, 2013). Similar to other open and distance universities, the Anadolu University Open Education System in Turkiye faces high dropout and low completion rates. About 40% of students drop out within the first two years, while only 49% of associate degree students and only 25% of bachelor degree students manage to graduate (Latchem et al., 2006).

A high dropout rate within an educational institution may signal that something is wrong or lacking in that institution. The consequences of a student leaving an institution are not only negative for the student but also for the institution itself (Utami et al., 2020). Not only does it indicate that the student has failed to achieve their personal goals, but it also affects the decision of other students to choose that institution. This in turn translates into financial losses for the institution in future years (Levitz et al., 1999). Given the cost of developing and supporting open and distance education courses, identifying the reasons why students leave or choose to continue their studies is of great importance to open and distance education institutions (Lee & Choi, 2011). This study aims to examine, from a broad perspective, the publication trends related to the reasons for dropping out, which is an important issue in open and distance education.

LITERATURE

"Dropout and Persistence Models" in Open and Distance Learning

While there are no field-specific theories or models on "persistence and dropout" in open and distance education, existing theories and models on dropout and persistence in traditional face-to-face education are used (A. Yilmaz, 2020; Agus, 2019; Lee et al., 2013). One of these models is the "Sociological Model of the Dropout Process" developed by Spady (1970), which emphasizes individual factors in dropout. Subsequently, Tinto (1975) proposed the "Student Integration Model" in his study, claiming that in addition to individual factors, organizational factors also play a role in the dropout phenomenon. According to him, dropout can be understood as a longitudinal process of interaction between individual, academic and social systems. This model, applicable to both face-to-face and distance learning, examines learners' pre-entry characteristics in the first stage, commitment issues from both personal and institutional perspectives in the second stage, and academic and social integration in the third stage (McGivney, 2009). As a basis for subsequent research, this model is also widely used in current studies (Guzman et al., 2021; Kilian et al., 2020; Venegas-Muggli, 2020;).

Bean (1983) developed a second model called the "Student Attrition Model". This model emphasizes the impact of environmental factors on students' decisions to persist or withdraw (Cabrera et al., 1992). Later, Bean & Metzner (1985) created "A Conceptual Model of Nontraditional Undergraduate Student Attrition", based on the assumption that nontraditional students have different characteristics from traditional students. This model, based on the work of Spady (1971), Tinto (1975) and Pascarella & Terenzini (1980), outlines three key characteristics of non-traditional students. Firstly, non-traditional students typically do not live on campus and have to commute from outside on a daily basis. Secondly, they are older than traditional students, often over the age of 24, suggesting a greater degree of self-control and maturity. They are also less responsive to social integration than traditional students, meaning that they may not need as much interaction with faculty and peers. Another characteristic of these students is their tendency to work part-time. The most significant difference between non-traditional and traditional students in terms of reasons for dropping out is that non-traditional students are more influenced by environmental factors (such as work, financial circumstances, etc.) than by social integration factors. (Bean & Metzner, 1985).

In this regard, Kember (1989) argues that the concepts within the first tier, namely personal characteristics, should be examined more comprehensively in order to be more appropriate for distance learners. In particular, the student's home environment, family responsibilities and problems, and work situation are highly significant factors in the decision to continue or drop out. Kember (1995) built on the idea that in distance education dropout and persistence are correlated with student achievement. On this basis he developed the "A Model of Student Progress in Open learning". This model, similar to Tinto's (1975) model, includes components such as demographic characteristics, student motivation, academic ability and social factors.

Rovai (2003) noted that while the works of Tinto (1975) and Bean & Metzner (1985) were quite comprehensive in explaining the dropout situations of traditional students, these models fell short in explaining the situations of open and distance education students because they were developed for "on-campus students". According to the authors, the characteristics and needs of open and distance education students are different from those of face-to-face learners. Furthermore, virtual learning environments (the distance education environment) have different characteristics from the campus environment (A. Yilmaz, 2020). Based on this, Rovai (2003) developed the "Composite Persistence Model", which is primarily used and developed to explain the dropout situations of distance education students. In this model, the author synthesized Tinto's and the work of Bean and Metzner in relation to non-traditional students, while incorporating the unique features of the distance education process (Rovai, 2003). Critiquing Rovai's model, Park (2007) argued that the "Composite Persistence Model" needed structural revision and that some variables that were considered insignificant in the research should be removed. Furthermore, according to Park, the external influences in Rovai's model should focus not only on post-entry but also on pre-entry assumptions in terms of their impact on a student's decision to persist or leave (Agus, 2019). Another criticism of Rovai's model by Park is the need for a bidirectional interaction between internal and external factors, rather than a unilateral influence (A. Yilmaz, 2020).

In this context, Park (2007) examined experimental research in the literature related to dropping out of school in open and distance education to enhance the criticized model's effectiveness. Based on the information obtained, Park developed a model named "The Revised Model of Dropouts from Distance Learning in Organizations." This model is a refined and criticism-free version of the "Composite Persistence Model" developed by Rovai (2003) according to Radovan (2019).

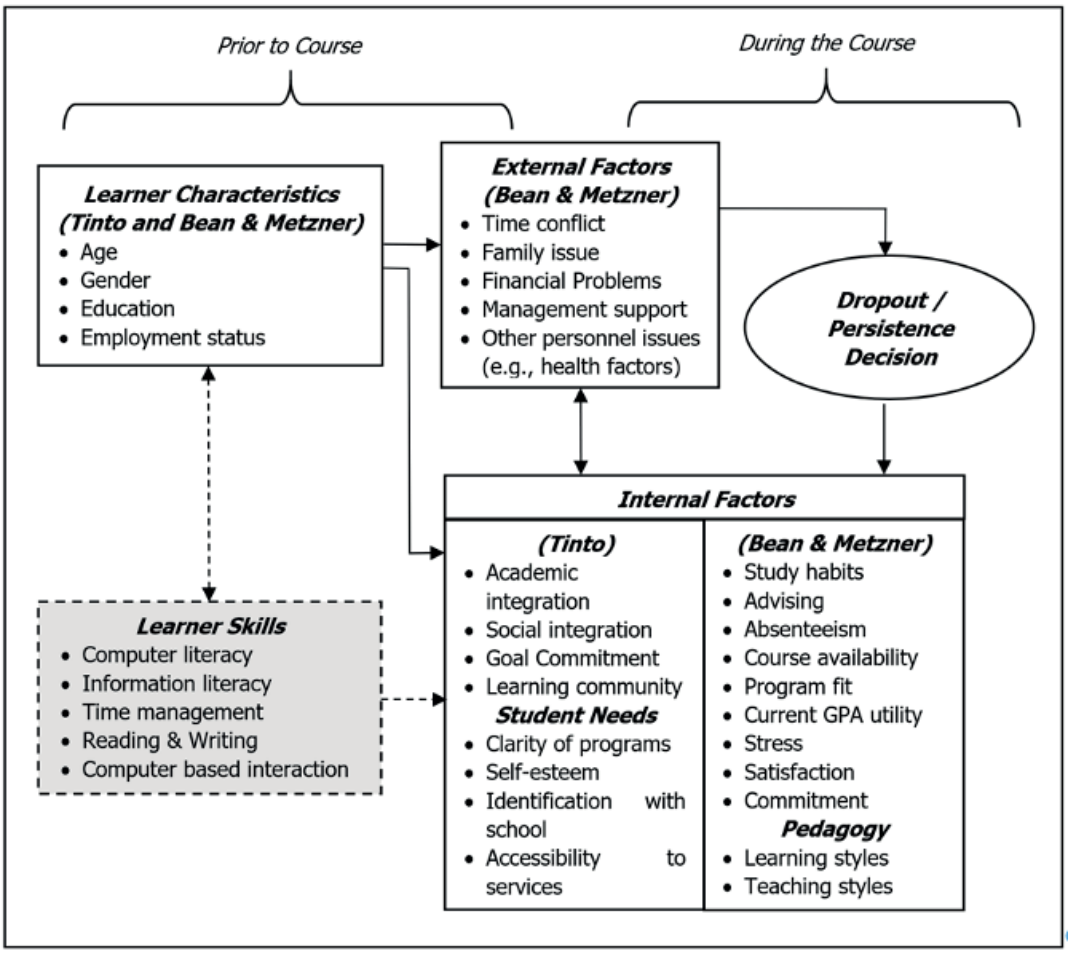

Figure 1. The revised model of dropout from distance learning in organizations (Adapted from Rovai, 2003 & Park, 2007)

As can be seen in Figure 1, the model developed by Park (2007) draws on the models developed by Tinto (1975), Bean & Metzner (1985) and Rovai (2003). Similar to how Rovai (2003) divided the model into two phases; pre-enrolment and post-enrolment, Park (2007) also includes two phases in the model, namely pre-class and post-class. However, while Rovai focuses on external factors only in the post-enrolment phase, Park argues that certain external factors also influence students' decisions before enrolment. Therefore, the author places external factors in the middle of both the pre-enrolment and post-enrolment phases. In this model, the box "student skills" is shown in grey due to the lack of substantial empirical support (A. Yilmaz, 2020). The model also emphasizes the interaction between internal and external factors. Park (2007) describes this interaction as follows: "The tendency of a student who has a high workload, limited time to study, and ineffective communication with instructors to drop out may be higher compared to a student with effective communication skills".

This model, updated by Park in 2007, has been used in several recent studies in the field. One of these studies, conducted by Aldowah et al. (2019), employed a multi-criteria decision-making method to identify the key factors and possible causal relationships responsible for high dropout rates in Massive Open Online Courses (MOOCs). Stephen et al. (2020) conducted a study to investigate the relationships between non-traditional online students and their predictor variables of self-regulation, self-direction, and self-efficacy with the criterion variable of term-to-term persistence, using logistic regression analysis. Gunduz and Karaman (2020) discuss the challenges encountered by students in open and distance learning, including difficulties in paying tuition fees, mismatches with online education formats, the need for printed books, and technical issues encountered in exams. Zuhairi et al. (2020) investigate strategies related to the effectiveness of student support services, a significant factor in school dropout. Yilmaz-Bagriacik & Karatas (2022) investigated the reasons for student dropout from the perspectives of students, domain experts, teachers, administrators, and support staff.

Dropout in Open and Distance Learning

In recent years, the field of distance education has rapidly developed. Despite its high popularity, the number of students dropping out is much higher than in traditional face-to-face education (A. Yilmaz, 2020; Esgice, 2015). Although it may seem like a reasonable decision for a distance learning student to drop out of education, it is important to note that one of the primary objectives of institutions providing distance education is to reduce dropout rates. To achieve this goal, it is crucial for distance education institutions to comprehend the reasons why students leave school, so that necessary precautions can be taken (Lee & Choi, 2011). In recent years, there has been a notable rise in scientific publications regarding dropout rates in distance education. This increase has been further emphasized by the COVID-19 pandemic and rapid technological transformation, highlighting the need for bibliometric analysis of research in this field.

Bibliometrics is both a field of study and a research method that quantitatively determines the distribution of knowledge produced based on various factors (Yilmaz, 2019). The first study in the field of bibliometric analysis is generally considered to be the examination of the "Journal of American Chemical Society" in 1927 (White, 1985). While bibliometric analysis studies were rare until the 1990s, an increased interest has been observed since the 2000s (Kirdar & Benli, 2020). Bibliometrics provides quantitative insights into the productivity of countries, authors, universities and journals, weak and strong research areas, gaps in the literature, collaborative networks, potential opportunities and the widespread impact of outputs in each area (Dirik et al., 2023). Bibliometrics can be divided into two main types: descriptive and evaluative (Nicholas & Ritchie, 1978; Osareh, 1996). Descriptive bibliometrics involves the quantitative study of the distribution of relevant literature by countries, authors, publications, publication years, languages and subjects. Evaluative bibliometrics, on the other hand, involves the analysis of relationships between authors, publications, and countries based on quantitative methods, especially through citations (Hebebci & Ozer, 2023; Yilmaz, 2019). In other words, evaluative bibliometrics focuses on assessing the qualitative aspects of scientific activity and, more importantly, scientific performance (Van Leeuwen, 2004). Bibliometric analysis studies provide researchers in the field with data on both past and current research. This method of analysis has different characteristics from systematic literature reviews.

In the field of literature review, it has been observed that a wide range of scanning methods are used. For example, Pare et al., (2015) conducted a review of scanning studies in information systems journals, resulting in an extensive classification of traditional review, meta-analysis, descriptive review, mixed methods review, critical review, scoping/mapping review, qualitative systematic review, umbrella review, theoretical review, and realist review (Yildiz, 2022). Systematic literature reviews aim to derive findings based on conceptualization. In other words, these studies provide insights into the content and nature of the topic. Bibliometric analysis, on the other hand, is not concerned with information about the content and nature of the subject; it only provides information about the breadth and quantity of the subject.

In reviewing the current literature, it is evident that analytical studies on the reasons for dropout in open and distance learning generally consist of systematic literature reviews or delve into more specific topics. The first systematic literature review on dropout in online learning was conducted by Lee & Choi (2011). This study examined existing empirical research between 1999 and 2008 on dropout in online courses in higher education. The authors identified 69 factors influencing students' dropout decisions and categorized them into three main groups: (a) student factors, (b) course/program factors, and (c) environmental factors. Strategies were then developed to address these dropout factors: (a) understanding each student's challenges and potential, (b) providing quality course activities and well-structured support, and (c) developing strategies to deal with environmental issues and emotional challenges. These strategies were discussed at length. Another literature review conducted by Okur et al., (2019) also found that students may drop out for reasons related to the institution, themselves, and their environment. According to the authors, students who find tuition fees high, are concerned about academic failure, and lack academic or career aspirations are more likely to drop out. The study also concluded that inadequate learning materials and examination conditions have a significant impact on students' decisions.

Another study using the systematic literature review method, which aimed to observe potential reasons for suboptimal completion rates in online learning environments and identify suggested strategies to increase school engagement rates, was conducted by Muljana & Luo (2019). This study developed strategies related

to institutional support, programs difficulty, fostering a sense of belonging, facilitating learning, course design, student behavioral characteristics and demographic variables to increase completion rates. Kara et al. (2019) conducted research on the challenges faced by adult students in online environments. They analyzed articles published in leading journals in the fields of open and distance education, instructional technology, and adult education using a constant comparative analysis method. The research findings indicate that adult students experience challenges related to internal, external, and program-related factors, demonstrating the interrelated nature of these challenges.

Based on the literature review, another study aimed to identify the factors that influence learning engagement in MOOCs. Previous research has shown that learning engagement is a critical factor influencing student achievement and participation rates. However, it's noted that there is a limited number of literature reviews that specifically focus on learning engagement in online courses. Furthermore, the study highlights that both internal and external factors influencing learning engagement have not been fully elucidated and provides solutions to address this gap (Wang et al., 2022).

One of the most recent studies in this area is an evaluation of research trends on dropout in the distance learning literature using data mining and analytical approaches. A study conducted by Elibol & Bozkurt (2023) examines how the term "dropout" is often misinterpreted in different contexts and how inhuman analyses are insufficient to explain the phenomenon, revealing interesting insights. The study also provides promising results for reducing dropout rates in open and distance learning environments. Furthermore, the study emphasizes the need for a precise definition of the term "dropout" in the context of distance learning for future research, the establishment of ethical principles for the use of algorithmic approaches to predicting student dropout, the development of policies and frameworks, and finally the adoption of a human-centered approach to reducing dropout rates.

The review results indicate that there are relatively few bibliometric studies investigating the reasons for dropping out of open and distance education. These studies are limited to a specific educational period (Ertem & Aypay, 2023), distance education method MOOCs (Billsberry & Alony, 2023; Wang et al., 2023), country Spain (Ferrandiz, 2021), rural areas (Guzman et al., 2021), and method/technique data mining and social network analysis (Elibol & Bozkurt, 2023).

Significance of the Research

The demand for open and distance education is increasing, leading to a rise in the number of institutions offering such programs. This trend is driven by a desire to enhance institutional recognition and provide students with a wider range of flexible learning options. The growing number of institutions provides students with more choices, allowing them to select the most qualified option to suit their needs. According to Muljana and Luo (2019), the number of students is one factor that indicates the quality of an institution. According to Muljana and Luo (2019), the number of students is one factor that indicates the quality of an institution. According to Muljana and Luo (2019), the number of students is one factor that indicates the quality of an institution. However, it is also crucial to consider how many students continue their education and how many drop out. In fact, the decision of a single student to drop out can influence the opinions of many others about the institution. Therefore, institutions must take measures to ensure that their current students continue their education. Various findings in foreign literature discuss the measures and factors that influence students' decisions. However, it is important to note that the expectations and preferences of students may vary depending on their cultural background and the institution they attend (Yilmaz, 2020). Therefore, there is a need for studies on the subject of effective coordination (stakeholder management) in open and distance learning. Such studies are limited in the literature and should examine all stakeholders involved. Furthermore, it is important to thoroughly examine environmental factors that may impact the open and distance learning system, such as demographic, economic, political, technological, legal, and cultural structures, as well as library facilities and geographical conditions. The concept of 'dropout' in open and distance education should be clearly and precisely defined, as stated by Elibol & Bozkurt (2023).

Upon examination of the literature, it is evident that there are few studies that comprehensively explore the factors contributing to student dropout rates in higher education open and distance learning. As noted by Selelo & Manamela (2022), the significance of distance education has been further highlighted by the

Covid-19 pandemic and rapid technological advancements, underscoring the need for bibliometric analysis in research. Bibliometric analysis methods can add objectivity to the evaluation of scientific literature. They have the potential to reduce researcher bias in scientific literature reviews by combining the views of many scientists working in the field. Bibliometric methods are expected to complement meta-analysis and qualitative structured literature reviews as a way of analysing and evaluating scientific literature (Zupic and Cater, 2015).

This study differs from other bibliometric analyses on the subject (Billsberry & Alony, 2023; Ertem & Aypay, 2023; Ferrandiz, 2021; Guzman et al., 2021; Wang et al., 2023) by taking a broader perspective on the dropout of open and distance education students, rather than a narrow one. Furthermore, the study's use of both descriptive and evaluative bibliometric techniques to analyse data obtained from Web of Science (WoS) is a notable feature. As noted by Hebebci and Ozer (2023), given the heightened importance of distance education in 2020 and beyond, there is a need for an increase in the quality and quantity of bibliometric studies conducted in this context. Additionally, such studies are crucial for identifying gaps in the literature, contributing to it, and guiding future research. Therefore, this study can make significant contributions to the literature by presenting the current state of the field in general terms.

Objective of the Research

The aim of this study is to analyze and visualize the bibliometric characteristics of publications on the subject of reasons for dropout in open and distance education indexed in the Web of Science (WoS) database between 1980 and 2022. Another aim of the research is to outline the current state of studies on dropout and to provide guidance for future research in this area. In order to identify trends in the field, the following questions are addressed:

With regard to research on reasons for dropout in open and distance education indexed in the WoS database:

- What is the distribution of publications across years and WoS indexes?
- What are the most cited sources, institutions and studies?
- What kind of cooperation exists between institutions and countries?
- What are the relationships between the most cited authors?
- What are the relationships between the most studied topics/concepts?

METHOD

This study employs a descriptive survey model to examine trends in studies on dropout rates in open and distance education. Bibliometric and descriptive analysis methods were used to analyse academic studies on dropout. Bibliometric analysis is a method used to evaluate the development, scientific quality, impact, and sources of studies on any subject. It has recently been frequently used by researchers in different fields (Billsberry & Alony, 2023; Ertem & Aypay, 2023; Hebebci, 2021; Hebebci & Alan, 2021; Hebebci & Ozer, 2023; Kushairi & Ahmi, 2021; Ozturk, 2021; Zupic & Cater, 2015). Although bibliometric analysis studies do not replace literature reviews, they provide a critical complementary factor. They can analyse thousands of studies together, reveal author, word and citation relationships, and use visual mapping at a high level (Hebebci & Ozer, 2023; Talan, 2021; Zupic & Cater, 2015). Furthermore, the bibliometric analysis method can be used to identify trends, gaps, social networks, intellectual structure, and cognitive structure within a particular research field (Borner et al., 2003; Van Eck & Waltman, 2018). Additionally, it aids in evaluating the most influential articles, topics, authors, universities, or journals in a research field (Dede & Ozdemir, 2022).

The study design followed the aforementioned guidelines. Descriptive bibliometric techniques were employed to analyse publications based on year, type, language, and WoS indexes. Evaluative bibliometric techniques included citation analysis (journal, publication, and country), co-authorship analysis (institutions and countries), co-occurrence of keyword analysis by authors, and co-citation analysis by sources.

Data Collection

There are many databases available for data retrieval and bibliometric research. The most important of these databases are WoS (Web of Science), Scopus, Google Scholar, PubMed and MEDLINE (Chen, 2017). The WoS database was used to obtain the datasets for this study. This choice is due to the fact that it contains records of high-quality research publications and is recognized as a reliable source of bibliographic information (Birkle et al., 2020; Falagas et al., 2008; Zupic & Cater, 2015). Comparisons between databases in the literature tend to be aimed at identifying the strengths and weaknesses of each. Fingerman (2006) evaluated WoS and Scopus in terms of their current features and capabilities. The evaluation looked at the databases' coverage and search capabilities. Similarly, another study by Falagas, Pitsouni, Malietzis & Pappas (2008) evaluated the official websites of the databases in terms of content, use, updates, citation quality, search options and product developers. The evaluation highlighted that WoS provides users with more understandable and detailed graphical representations for citation analysis queries (Karasozen et al., 2011). WoS covers more than 211 million records from journals, books, and conference proceedings, and includes more than 13 million records in the sciences, social sciences, arts, and humanities (Clarivate, 2023).

The research-focused search string for data collection included key terms such as "dropout", "drop-out", "school dropout", "dropping out", "open learning", "open education", "distance education", "distance learning", and "higher education". A search sentence was created as TS=(("dropout*" or "drop-out*" or "school dropout*" or "dropping out*" or "open learn*" or "open edu*" or "open learn*" or "distance edu*" or "distance learn*) and ("higher edu*")). Later, following the instructions for "Quick add Keywords" in the detailed search tab of WoS, we arrived at the "Advanced Query" sentence. Table 1 shows the criteria used in the filtering process to obtain documents.

Table 1. Search Strategies

Scientific Database	Web of Science
Searching Date	08.08.2023
Advanced Query	((ALL=(dropout reasons) OR ALL=(drop out) AND ALL=(open learning) AND ALL=(distance learning)) OR (QMTS=("STUDENT DROPOUT")) OR (QMTS=("UNIVERSITY DROPOUT")) OR (QMTS=("DROPOUT")) OR (QMTS=("REASONS FOR DROPOUT"))) AND ((TASCA==("EDUCATION EDUCATIONAL RESEARCH") AND TMSO==("6.11 Education & Educational Research")) NOT (PY==("2023") OR TMSO==("1.112 Palliative Care" OR "1.100 Substance Abuse" OR "1.128 Fertility, Endometriosis & Hysterectomy" OR "1.119 Breast Cancer Scanning" OR "1.228 Virology - Tropical Diseases" OR "1.66 HIV" OR "1.150 Hearing Loss")))
Time Span	1980-2022
Total Number of Documents	1.615
Indexes	SSCI, ESCI, CPCI-SHH, CPCI-S, SCI-EXPANDED, BKCI-SHH, A&HCI, BKCI-S

In terms of disciplines, the majority of studies (n= 461) are in the social sciences. This is followed by 230 documents in computer science, psychology (n= 72), engineering (n= 59), medicine (n= 42), business, management and accounting (n= 34), arts and humanities (n= 33), mathematics (n= 29), decision sciences (n= 21), environmental sciences (n= 14), health professions (n= 13), energy (n= 12), economics, econometrics and finance (n= 12), physics and astronomy (n= 9), materials science (n= 6), multidisciplinary (n= 4), neuroscience (n= 2), earth and planetary sciences (n= 2), chemical engineering (n= 2) and agricultural and biological sciences (n= 1). In addition, the types and numbers of documents included in the searches, number of documents, time range and total number of documents obtained from the search results are shown in Table 1.

Data Analysis

Descriptive and evaluative bibliometric analysis techniques were used in the data analysis process of this study. In other words, descriptive bibliometric techniques were used to analyze publications based on year, type, language and WoS indexes. In terms of evaluative bibliometrics, the study used citation analyses (journal, publication and country), co-authorship analyses (institutions and countries), co-occurrence of keyword analyses carried out by authors and co-citation analyses based on sources.

In this study, Microsoft Office Excel was used to display descriptive results, while VOSviewer software was used to display evaluative results. VOSviewer, developed by Van Eck & Waltman (2018), is equipped with an algorithm known as "visualization of similarities" to visualize the relationships between elements. These elements consist of countries, keywords, journals, authors and other bibliographic information obtained from scientific databases (Prioteasa et al., 2023). VOSviewer uses elements from networks composed of scientific publications, journals, researchers, research institutions, countries, keywords and/or terms to create relationship networks through co-authorship, co-occurrence, citation, bibliographic coupling or co-citation links. These links are also the core analyses of the programs. Bibliographic data from databases such as Dimension, Lens, Scopus, Web of Science and reference management software such as EndNote, RefWorks and RIS can be used to construct a bibliometric map of a specific field (Van Eck & Waltman, 2022; 2023).

FINDINGS

Descriptive Findings

Distribution of Publications by Year

The distribution of the publications in the study by year of publication within the scope of the study is shown in figure 2.

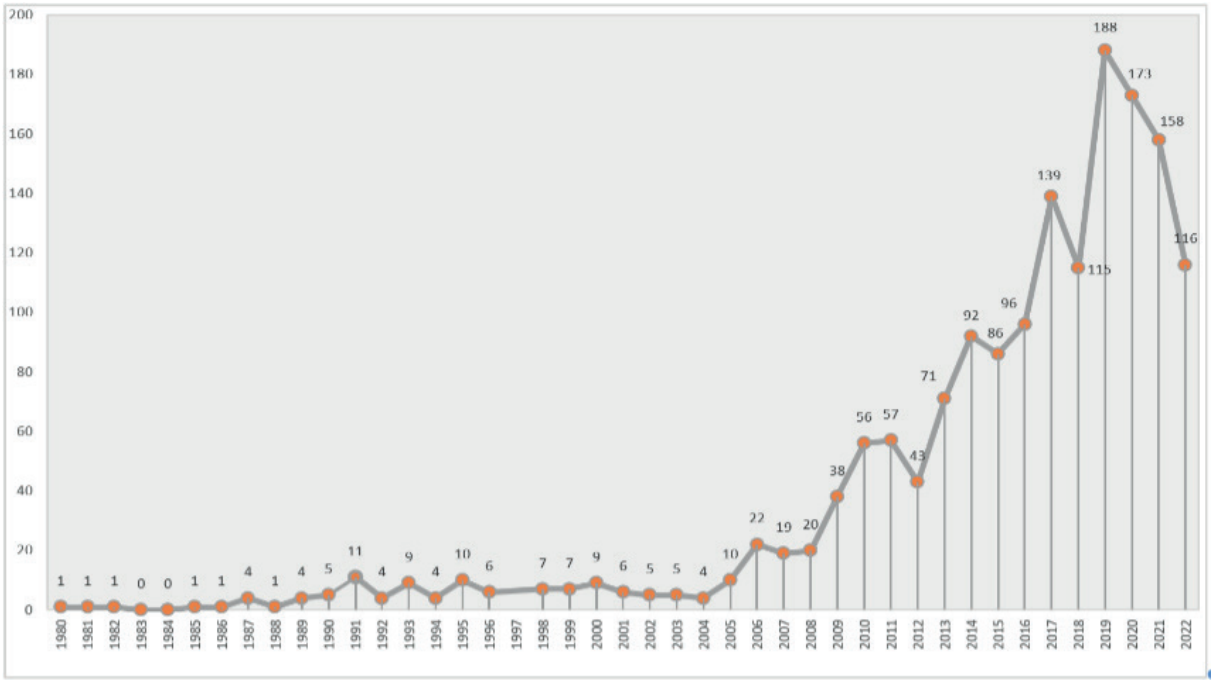

Figure 2. Distribution of Publications by Year

As can be seen in Figure 2, studies on dropout rates in open and distance learning were mainly carried out between 1980 and 2022. The studies show a relative upward trend. The first work on this subject was carried out in 1980 by Pascarella & Terenzini (1980). From 1980 to 2004, a period of linear growth without significant jumps was observed. The first significant increase in the number of publications occurred in 2006, when 22 studies were published. This was followed by 2010 (n= 56), 2014 (n= 92) and 2017 (n= 139). In

2019, the number of publications reached 188 studies. The year 2019 marked the peak in the number of publications. However, a decrease in the number of publications can be observed from 2020 to 2022. The reason for this decrease could be attributed to the COVID-19 pandemic. During this period, the adverse effects of the pandemic led to some journals being unable to publish, while others postponed their issues.

Distribution of Publications by WoS Indexes

The distribution of studies included in the review by WoS indexes is shown in Figure 3.

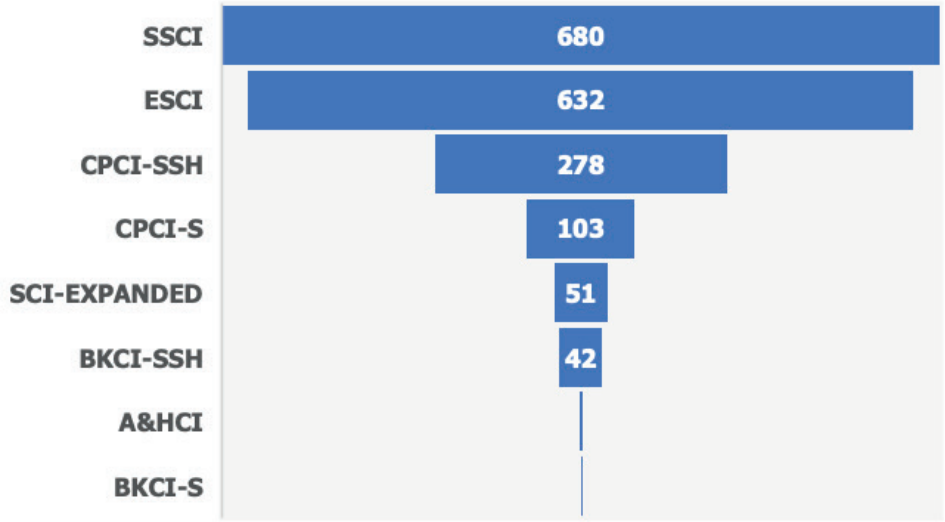

Figure 3. Distribution of Publications by WoS Indexes

According to the WoS indexes, the Social Sciences Citation Index (SSCI) has the highest number of publications with 680 (Figure 3). This is followed by the Emerging Sources Citation Index (ESCI) with 632 publications, the Conference Proceedings Citation Index-Social Sciences (CPCI-SHH) with 278 publications, the Conference Proceedings Citation Index-Science (CPCI-S) with 103 publications, the Science Citation Index Expanded (SCI-EXPANDED) with 51 publications and the Book Citation Index-Social Sciences & Humanities (BKCI-SSH) with 42 publications.

Evaluative Findings

Citation Analyses (Publication, Source and Country)

Citation analysis research has gained considerable attention in recent years. Such studies address issues such as author productivity, use of publications and the ageing of the literature. Citation analysis studies help to identify the most cited researchers, countries and publications in a given field, thus contributing to the development of library collections (Al & Tonta, 2004). These studies use a variety of techniques, the most common of which are "bibliographic coupling" and "co-citation". When two different sources cite the same publication, it's called "bibliographic coupling", and when one source cites two different publications, it's called "co-citation" (Garfield, 1980; Rehn et al., 2014; Tonta & Al, 2008).

Bibliographic coupling means that a series of scientific studies share one or more references, indicating a meaningful relationship between these studies. In other words, the reference lists of scientific studies reveal the academic network in which the author operates (Kessler, 1963; Arslan, 2022). On the other hand, co-citation analysis is an effective tool for identifying key studies in a particular field and understanding the intellectual structure of the research area (Khandelwal et al., 2022). In essence, "bibliographic coupling" and co-citation provide insight into the similarity between publications in terms of topics or other characteristics (such as authority) (Al, 2008). The VOSviewer software allows data on publication and citation counts, as well as total link strength, to be presented in bibliographic coupling analyses based on institutions and countries.

Bibliographic Coupling Analysis for Publications and Most Cited Studies

According to the VOSviewer manual, each link is associated with a positive numerical value that represents its strength. The higher this value, the stronger the link is considered to be (Pauna et al., 2019; Al Husaeni, 2022). In other words, the total link strength attribute expresses the cumulative strength of co-authorship links with other researchers for a given researcher.

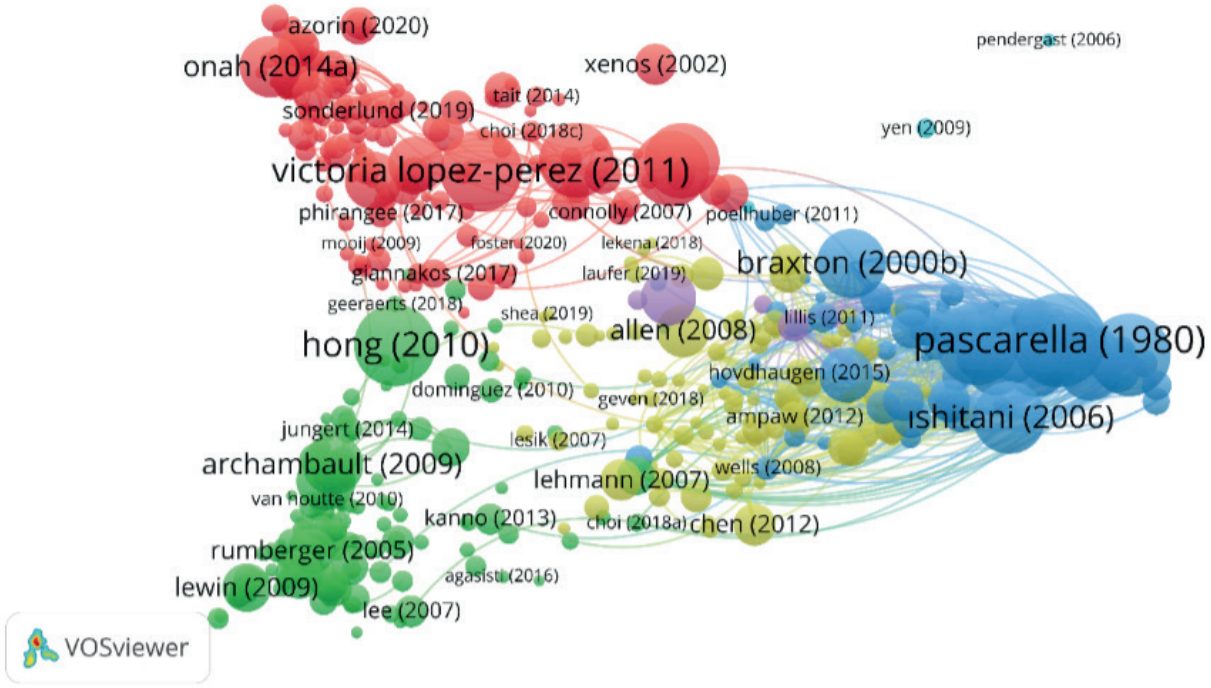

Figure 4. Bibliographic Coupling Links of Documents

Figure 4 shows the bibliographic coupling links between the studies. Based on the analysis carried out with 537 publications meeting the criterion of having at least 10 citations and having links between them, 6 clusters, 22.962 links and a total link strength of 45.629 were obtained.

In more detail, as can also be seen from Table 2, the top three publications in the bibliographic coupling analysis based on the number of citations are "Pascarella, E.T & Terenzini, P.T. (1980)" with 483 citations, "Nagda, B.A., Gregerman, S.R., von Hippel, W., & Lerner, J.S. (1998)" with 390 citations and "Cabrera, A.F., Nora, A., & Castaneda, M.B. (1993)" with 381 citations. In this context, the authors with the highest number of citations are E.T. Pascarella, B.A. Nagda, and A.F. Cabrera.

Table 2. Top 10 Most Cited Documents

Title of the Study	Author(s)	Year	Source	Number of Citations
Predicting freshman persistence and voluntary dropout decisions from a theoretical model	Pascarella, E.T & Terenzini, P.T.	1980	Journal of Higher Education	483
Undergraduate student-faculty research partnerships affect student retention	Nagda, B.A., Gregerman, S.R., …, & Lerner, J.S.	1998	Review of Higher Education	390
College persistence: Structural equations modeling test of an integrated model of student retention	Cabrera, A.F., Nora, A., & Castaneda, M.B.	1993	Journal of Higher Education	381
Pre-service and beginning teachers' professional identity and its relation to dropping out of the profession	Hong, J.Y.	2010	Teacher and Teaching Education	378

Blended learning in higher education: Students' perceptions and their relation to outcomes	Lopez-Perez, M.V., Perez-Lopez, M.C., & Rodriguez-Ariza, L.	2011	Computers & Education	377
Factors influencing adult learners' decision to drop out or persist in online learning	Park, J.H. & Choi, H.J.	2009	Educational Technology and Society	325
Comparing dropouts and persistence in e-learning courses	Levy, Y.	2007	Computers & Education	325
A review of online course dropout research: implications for practice and future research	Lee, Y. & Choi, J.	2011	ETR&D-Educational Technology Research and Development	318
Studying attrition and degree completion behavior among first-generation college students in the United States	Ishitani, T.T.	2006	Journal of Higher Education	301
The influence of active learning on the college student departure process: Toward a revision of Tinto's theory	Braxton, J.M., Milem, J.F., & Sullivan, A.S.	2000	Journal of Higher Education	278

Among the top three publications with the highest total link strength, "Gross, J.P.K., Torres, V., & Zerquera, D. (2013)" leads with 866 link strengths, followed by "Cabrera, A.F., Nora, A., & Castaneda, M.B. (1993)" with 824 link strengths and "Nora, A., Cabrera, A., Serra Hagedorn, L., & Pascarella, E.T. (1996)" with 794 link strengths (Table 2).

Bibliographic Coupling Analysis for Sources

In line with the research objectives, an analysis was carried out using 24 sources that met the criteria of having at least 10 publications from a source and each publication having at least 10 citations, in order to create a network map based on sources (journals, full-text conference papers, and books). The result of the analysis was 3 clusters, 263 links and a total link strength of 31.509. Figure 5 illustrates the bibliographic coupling links of publications.

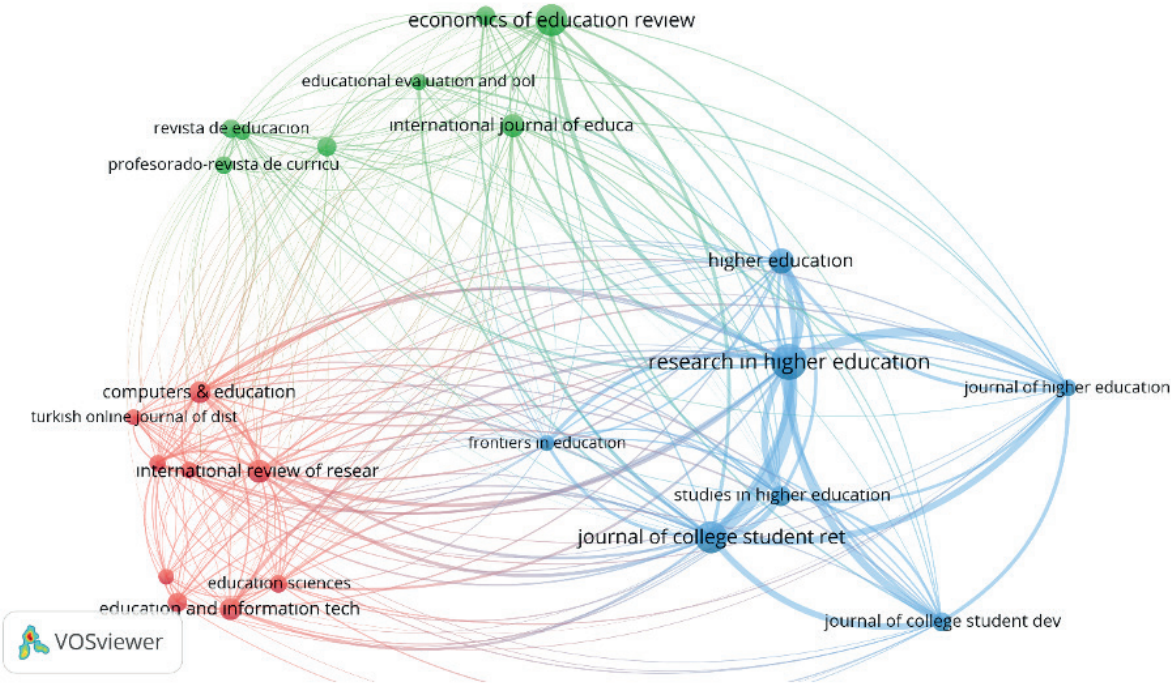

Figure 5. Bibliographic Coupling Links of Sources

In the bibliographic linkage analysis based on the number of journal publications, the top three sources are "Research in Higher Education" with 62 articles, "Journal of College Student Retention: Research, Theory & Practice (CSR)" with 48 articles and "Economics of Education Review" with 46 articles. In the analysis based on the number of journal citations, the top three positions are held by "Research in Higher Education" with 2.719 citations, "Journal of Higher Education" with 2.032 citations, and "Computers & Education" with 1.678 citations. The top three journals with the highest total link strengths are "Research in Higher Education" with a link strength of 15.777, "Journal of College Student Retention: Research, Theory & Practice (CSR)" with a link strength of 12.437, and "Journal of Higher Education" with 5.561 links.

Bibliographic Coupling Analysis for Countries

In order to create a network map related to the countries of publications on the research topic, an analysis was carried out using the criteria "at least 10 publications from a country" and "publications with at least 10 citations". The analysis was carried out on 35 countries that met these criteria and had links between them. The result of the analysis was 8 clusters, 593 links and a total link strength of 142.148. Figure 6 shows the bibliographic coupling links between countries.

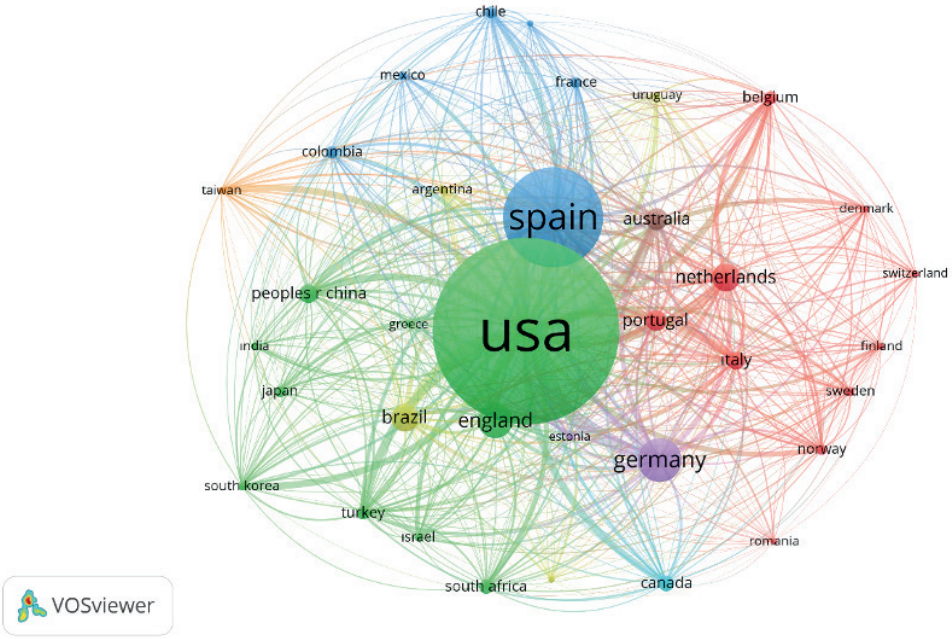

Figure 6. Bibliographic Coupling Links of Countries

In the analysis of the bibliographic coupling based on the number of publications from countries, the top three countries are as follows "USA" with 416 publications, "Spain" with 223 publications and "Germany" with 99 publications. In the analysis based on the number of citations to country publications, the top three countries are "USA" with 12.163 citations, "Spain" with 1.937 citations and "England" with 1.550 citations. The top three countries with the highest total link strengths are "USA" with 74.535 link strength, "Spain" with 24.953 link strength and "Germany" with 23.525 link strength.

Co-Authorship Analysis (Authors, Institutions and Countries)

Co-authorship analysis uncovers and illustrates the social network within the field by measuring the centrality of actors (authors, institutions, and countries). This measure can identify the most significant actors in the network. Centrality is a proportional measure of an actor's total possible ties relative to their number of

direct ties. The degree centrality scores within a defined social network are higher when the focal actor is connected to a larger number of actors (Hollenbeck & Jamieson, 2015; Zupic & Cater, 2015). Additionally, technical research co-authorship is significant as it involves two or more authors or organizations (Hebebci & Ozer, 2023; Kumar, 2015).

Co-Authorship Analysis for Authors

A network map was created based on the co-authorship analysis of authors related to the research topic, using the criteria of at least one publication and one citation. Figure 7 displays the bibliographic matching links of the authors.

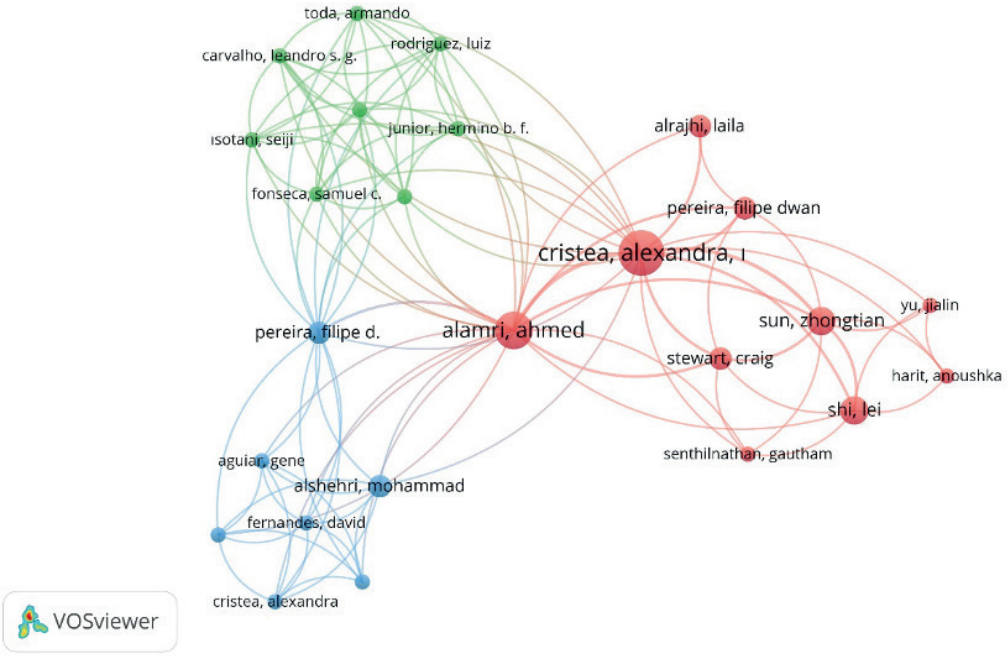

Figure 7. Co-Authorship Analysis of the Authors

The analysis revealed three clusters, 111 links, and a total link strength of 126 among the authors. Filipe D. Pereira (Brazil, Federal University of Roraima) had the highest number of links, with a total link strength of 30, out of the 25 authors. The social network in the career field is centered around two scientists, Ahmed Alamri (UK, Durham University) and Alexandra I. Cristea (UK, Durham University), who have 29 and 28 total link strengths, respectively. They contribute significantly to the formation of the social structure of the field and facilitate the flow of information within it. Upon analyzing Pereira's works on Google academic page (https://scholar.google.com.br/citations?user=UCv3rJQAAAAJ&hl=eng), it was found that the author has produced 79 publications, primarily articles, in the fields of machine learning, data science, artificial intelligence, learning analytics, and educational data mining. Alamri's academic page (https://scholar.google.co.uk/citations?user=zHrHsRYAAAAJ&hl=en) indicates that he specializes in Computer Science and has produced 30 publications, mostly articles. His publications on MOOCs have been widely cited. On Cristea's academic page, which ranks third in terms of total link strength after Pereira and Alamri (https://scholar.google.ca/citations?user=jQMxCKYAAAAJ&hl=en), the author's research interests include user modelling, learning analytics, web science, artificial intelligence in education, and personalization. Cristea has published 420 articles, mostly in the form of articles.

The reviewed studies, published mainly as articles after 2000, focus on the e-learning model that utilizes technology to make learning independent of time and space. The aim of these studies is to enhance the open and distance learning process and increase satisfaction levels of all stakeholders, particularly students.

Research has shown that there is an attempt to adapt models based on "dropout" or "persist", which are indicators of stakeholder satisfaction, to current conditions using computer-based tools, methods and techniques. To minimize dropout rates, various tools, methods, and techniques are employed, including computer-based prediction methods, personalization, gamification, motivation, learning analytics, machine learning, educational data mining, artificial intelligence, semantic web, educational adaptive hypermedia, multifaceted open social learner modelling, MOOCs, Adaptive hypermedia and web-based systems, collaborative learning standardization, and open social learner modelling.

Co-Authorship Analysis for Institutions

The co-authorship relations formed by the institutions to which authors are affiliated were analyzed as part of the research. The analysis included institutions with "at least 2 publications and 2 citations" in the research context. The analysis of 25 institutions resulted in 3 clusters, 111 links and a total link strength of 126. The co-authorship network for collaboration between institutions is shown in Figure 8.

Figure 8. Co-Authorship Analysis of the Institutions

In the co-authorship analysis based on the number of institutional publications, the top three universities are "Universitat Autònoma de Barcelona" with 19 publications, followed by "Vanderbilt University" with 15 publications and "University of Minnesota" with 15 publications. In terms of citations of institutional publications, the top three positions are held by "University of Michigan" with 814 citations, "State University of New York at Albany" with 681 citations and "University of Illinois" with 676 citations. The institutions with the highest total link strengths are "University of Michigan" with 18 link strengths, followed by "Maastricht University" and "University of Pennsylvania".

Co-Authorship Analysis of Countries

In order to create a network map of citations received by authors based on their countries within the scope of the research, an analysis was carried out on 53 countries that had published at least 5 articles and received at least 5 citations from each country. The analysis revealed 10 clusters, 179 links and a total link strength of 306. The network of co-authorship between countries is shown in Figure 9.

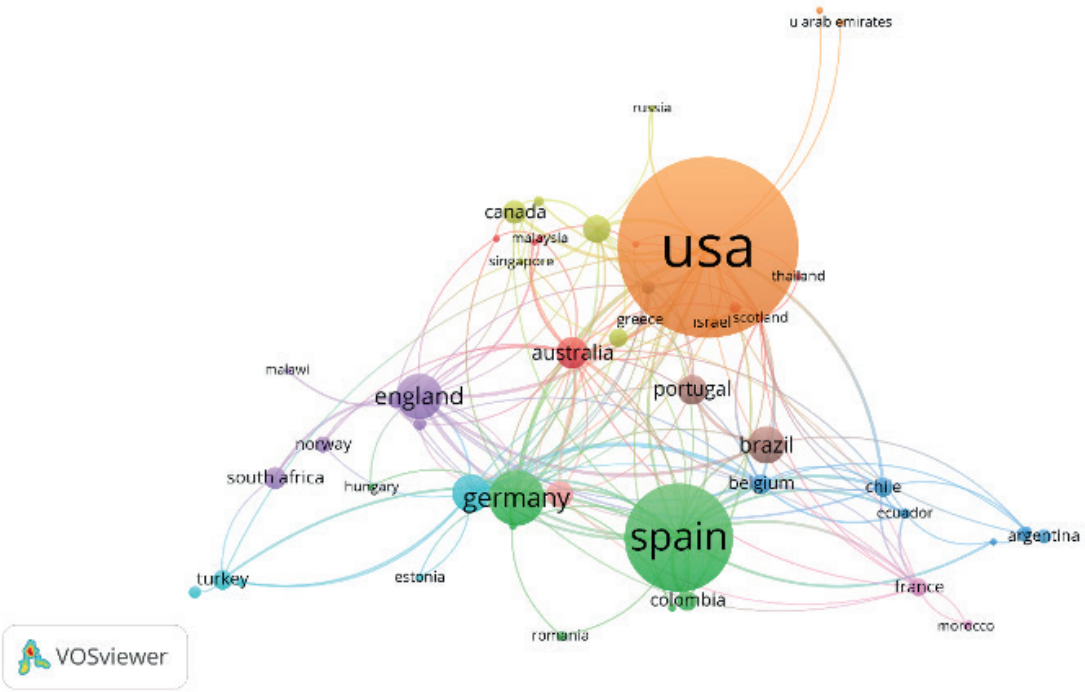

Figure 9. Co-Authorship Analysis of the Countries

In the joint authorship analysis based on the number of publications by countries, the top three countries are "USA" with 416 publications, "Spain" with 223 publications, and "Germany" with 99 publications. In the analysis based on the citation counts of publications, the top three positions are held by "USA" with 12.163 citations, "Spain" with 1.937 citations, and "England" with 1.550 citations. The top three countries with the highest total link strengths are "USA" with 78 link strengths, "Spain" with 55 link strengths, and "England" with 44 link strengths.

Co-Citation Analysis (Authors)

Co-citation analysis is a form of document matching that measures the relationships between co-cited papers. For a robust co-citation analysis, multiple authors must have previously been co-cited together. In this context, co-citation focuses on jointly cited authors, terms, sources or documents. Co-authorship analysis is considered a measure of collaboration in scientific publications, indicating a strong social network. Furthermore, co-authorship analysis can reveal collaborations between institutions and countries by using bibliographic data, including authors' affiliations and geographical regions (Noyons, 2004; Small, 1973; Zupic & Cater, 2015).

In this analysis, publications with a minimum of 20 citations within the scope of the study were selected, resulting in an analysis involving 205 authors. The results showed a total of 5 clusters, 7.634 links and a total link strength of 52.580. The network of collaborative authorship between authors is shown in Figure 10.

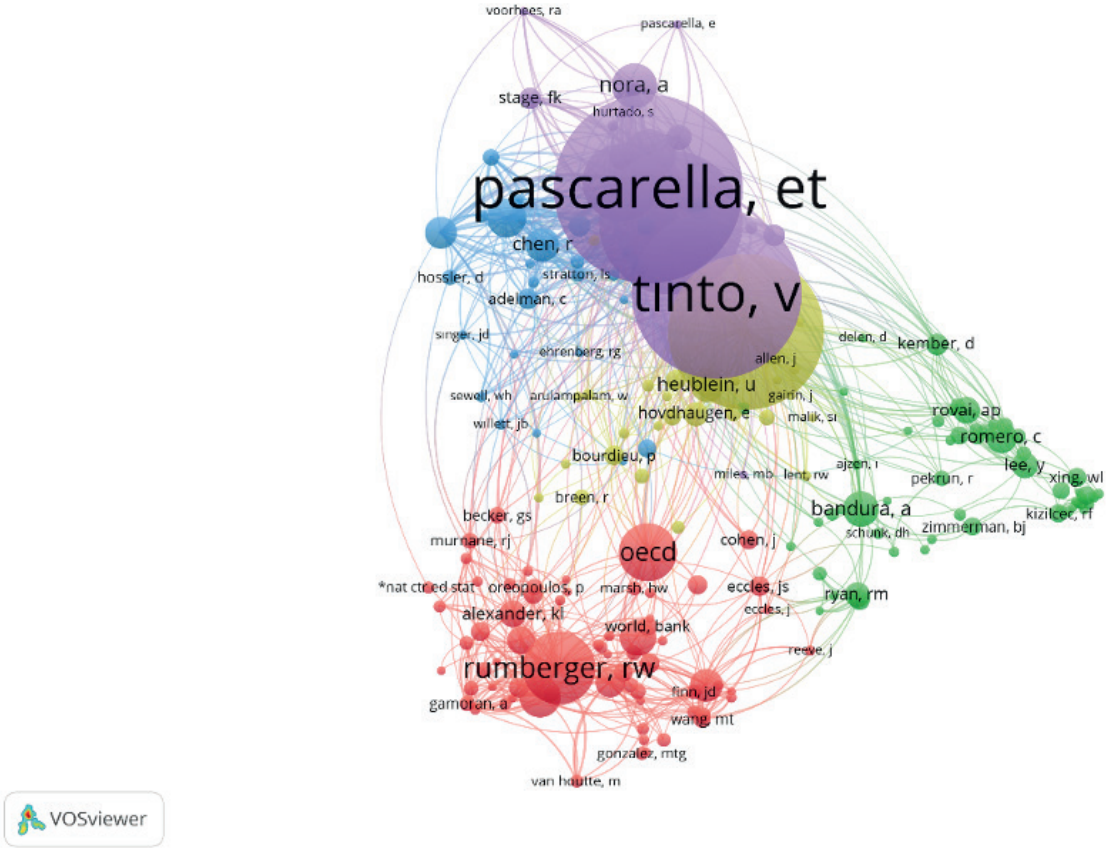

Figure 10. Co-Citation Analysis of Authors

According to Figure 10, the authors who have received the highest number of citations for their work are "E.T. Pascarella" with 531 citations, followed by "V. Tinto" with 473 citations and "J.P. Bean" with 395 citations. The authors with the highest total link strength in the network are "E.T. Pascarella" with 7.085 link strength, "J.P. Bean" with 6.040 link strength and "V. Tinto" with 5.463 link strength.

Co-Occurrence of Keyword Analysis

Co-occurrence of keywords analyses reveal connections between concepts (words or themes) that appear together in keywords or abstracts. In addition, thematic networks or clusters created from the results of co-occurrence analysis have the potential to synthesize and organize existing knowledge in the field, thus providing insights for identifying potential future research directions (De Bakker et al., 2005). Common keyword analysis can be based on document titles, keywords or abstracts (Ozturk, 2021).

In this analysis, instead of using titles and abstracts, the most frequently used keywords were used. In this context, the "co-occurrence" type of analysis was selected in VOSviewer, with "author keywords" as the unit of analysis. Of the 3.340 terms extracted from the author keywords section of the 1.615 documents obtained from the literature search, 171 keywords were identified that were repeated at least 5 times. As a result of the analysis, 10 clusters, 1.251 links and a total link strength of 2.088 were obtained. The network structure showing the relationships between the keywords is shown in Figure 11.

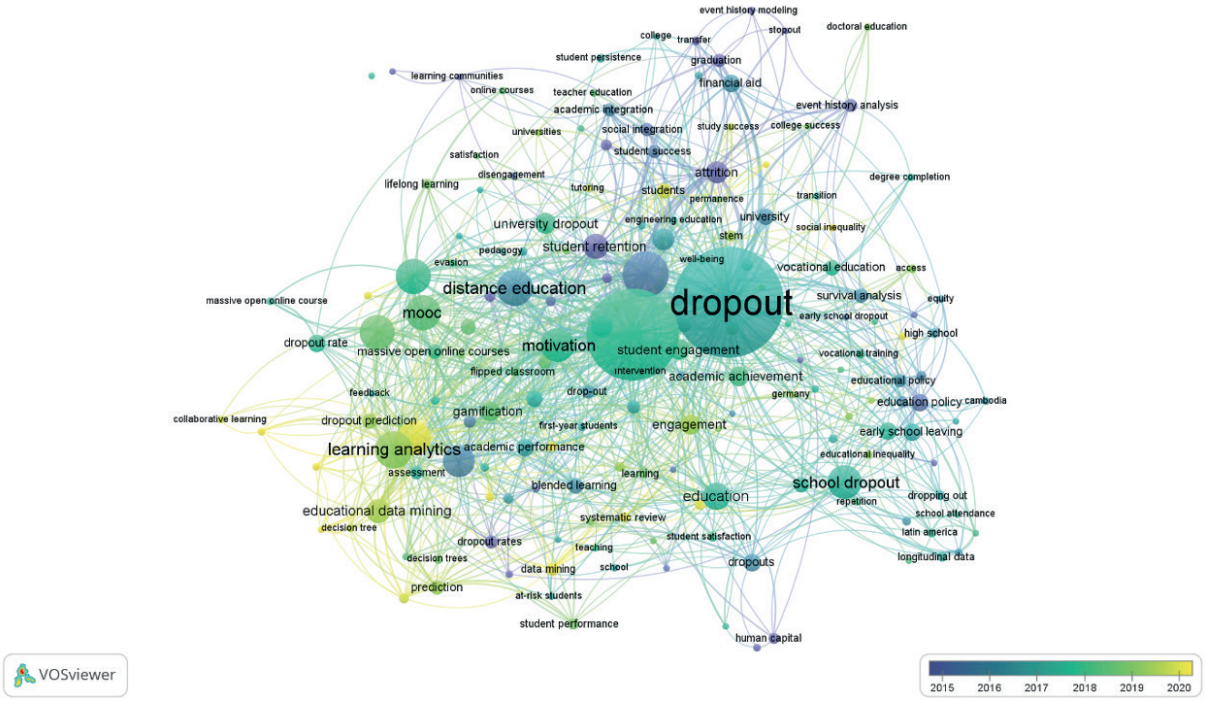

Figure 11. Layer Map of the Most Used Terms in Keywords

Figure 11 shows the results of the layer visualization, where the most commonly used keywords are hierarchically categorized based on the publication year. The figure also demonstrates that concepts such as "dropout", "student engagement", "learning analytics", "distance education", "school dropout", "motivation" "massive open online course", and "dropouts" are frequently used. From 2015 to 2018, it was noted that these concepts were favored over standard terms such as "distance education", "student retention", "well-being", "attrition", "early school leaving", and "education". After 2019, the keywords have transformed into concepts such as "learning analytics", "educational data mining", "systematic review" "engagement", "drop prediction", "decision tree", "student performance", "gamification", "massive open online course-MOOC", and "artificial intelligence".

DISCUSSIONS

Open and Distance Learning (ODL) institutions embrace the principle of global accessibility, aiming to provide educational opportunities beyond the constraints of time and space, thus serving as a mission to reach millions of people. While these institutions have the potential to have a profound impact on lives and societies, they have also been the subject of legitimate criticism regarding their effectiveness. At the heart of these criticisms is the remarkably low completion rates of open and distance education institutions on a global scale (Lee & Choi, 2011). For example, when looking at dropout times and rates at institutions such as the Open University, it has been found that approximately 14% of students drop out before the start of the course and a further 18% drop out before the first assignment is due. In addition, 14% drop out informally before assignments, 12% fail exams where resits are allowed, 3% have the opportunity to resit exams but don't, and 1% are removed from the register for persistent poor performance and another 1% for non-payment of registration fees. These are the statistics that manifest themselves as different reasons for student attrition in the context of The Open University and similar institutions. While open and distance learning institutions hold the promise of widening access to education, addressing the challenges that lead to such attrition rates remains an ongoing concern. In this context, it can be noted that the dropout rate of students is quite significant, reaching up to 67%. Similarly, Anadolu University Open Education System, which has a significant position in the world, has a total of 3,550,945 students enrolled in the 2020-2021 academic year as of December, and only 32% of them continue to attend classes (Anadolu University, 2022).

Under the principles of open universities, students have the right to continue or interrupt their education whenever they wish. However, the fact that only around 32% of students continue to attend classes in the open education system, while the remaining large proportion of around 68% either do not return to the system or have unpredictable completion rates among those who do, raises questions about the efficiency of the system. Similar situations are observed when looking at other universities offering open and distance education. The percentage of graduates among students at these institutions is as follows 5.3% at Athabasca University in Canada, 2.5% at the Open University in the Netherlands, 14% at Ambedkar University in India and 6% at the University of South Africa (Simpson, 2010).

In this study, the bibliometric profile of publications on the reasons for dropping out of school, which is an important issue in ODL, between the years 1980 and 2022 was examined under the headings of descriptive and evaluative findings. When examining the distribution of publications by years in the descriptive analysis findings of the study, it was observed that the number of research papers within the scope of the study generally remained stable between 1980 and 2004. The period from 2004 to 2018 shows significant fluctuations in the number of publications. On the contrary, there was a peak in the number of publications in 2019, with 188 research papers. It is noteworthy, however, that there was a decrease in the number of publications between 2020 and 2022. The reason for this decline can be attributed to the COVID-19 pandemic. During this period, due to the adverse effects of the pandemic, some journals were unable to publish, while others chose to postpone their issues. However, the stages of stay-at-home orders during the COVID-19 pandemic led to distance learning becoming the global norm in 2020 (Williamson et al., 2020). From this perspective, it can be said that research on dropout in ODL may increase even further after 2022. Moreover, it can be predicted that future studies will focus on the development of more predictive methods using artificial intelligence technologies.

The evaluative analysis process of the study includes; citation analyses & bibliographic coupling analyses by publications, sources and countries, co-authorship analyses of authors, institutes and countries, co-citation analysis of authors, and finally co-occurrence of keyword analysis.

In the bibliographic coupling analysis carried out on the publications included in the study, the most cited research is the article entitled "Pascarella, E.T. & Terenzini, P.T. (1980). Predicting freshman persistence and voluntary dropout decisions from a theoretical model. *The Journal of Higher Education*, *51*(1), 60-75" with 483 citations. This study stands out with its 78.5% correct prediction of students' persistence/voluntary withdrawal decisions (Pascarella & Terenzini, 1980). This highlights the importance of using scientific methods to predict outcomes in dropout research, as it can effectively contribute to the determination of preventive measures. This analysis also revealed that the article titled "Gross, J.P.K., Torres, V., & Zerquera, D. (2013). Financial aid and student achievement in a state with changing demographics. "*Research in Higher Education*, 54(4), 383-406." has the highest link strength with a value of 866. This situation suggests that, despite having only 15 citations and not being in the top 10 in terms of citations, the strong co-authorship networks of J.P.K. Gross with other researchers are prominent.

In the field of ODL, the standout source in terms of citation counts for dropout studies is the journal "Research in Higher Education", with a remarkable 42.3 citations per publication and a link strength of 15.777. The journal, which began publication in 1970, serves as a premier outlet and leading source for scholarly endeavors aimed at improving the effectiveness and productivity of colleges and universities (Volkwein et al., 1988). The journal's official website reports a 5-year impact factor of 3.5 for 2022 (Research and Higher Education, 2023). Looking at the distribution of publications by country, the most prolific contributor is the USA with 416 articles. This phenomenon can be explained by the fact that the USA has a history of early implementations of distance education dating back to the 1870s. Thus, with an impressive 12.163 citations and a link strength of 24.953, the country tends to stand out more than others in studies of dropouts in the context of ODL.

Based on the co-authorship analysis of the authors, three names emerge with the strongest connections among 25 authors. The author with the highest total connection strength (30) is Filipe D. Pereira, followed by Ahmed Alamri (29) and Alexandra I. Cristea (28). These authors closely follow current developments in their areas of interest, are at the center of the social network in their career fields, make significant contributions to the formation of the social structure in the field, and regulate the flow of information in the field.

In the analysis of inter-institutional co-authorship, based on citation and total link strength (814 citations and a link strength of 18), the "University of Michigan" emerges as the most productive institution. In terms of number of publications, the "Universitat Autònoma de Barcelona" stands out with 19 publications. Founded in 1814, the University of Michigan is a prominent state university in the USA (University of Michigan, 2023). The fact that it has the highest number of citations and the strongest links with other institutions can be interpreted as an indication of its strong tendency to stand out from other institutions. When analyzing co-authorship between countries, the USA stands out as the leading country with 416 publications, 12.163 citations and a link strength 78. This can be explained by the USA' support for research capacity and the tendency of authors to develop collaboratively rather than competing individually (Tynan & Garbett, 2007; Hebebci & Ozer, 2023), reflecting a commitment to mutual progress.

Keyword analysis in scientific publications aims to reveal thematic developments and topics that have been studied to varying degrees in the relevant literature, with the aim of providing guidance for future research (Sevim & Iscan, 2012). In the context of open and distance education systems, flexibility and support for social and individual differences play an important role in ensuring students' persistence in schools or programs. In 21st-century school dropout research, it is observed that the keywords used are directed towards these specific functions. Especially in the early years of research, keywords like "student engagement", "learning analytics", "academic achievement", "social exclusion", and "self-efficacy" took prominence, while in later years, they were replaced by terms such as "learning analytics", "educational data mining", "systematic review", "engagement"," "drop prediction", "decision tree", "student performance", "gamification", "massive open online course-MOOC", and "artificial intelligence".

Given the large number of students involved, the high dropout rate in universities offering open and distance education is one of the major challenges in the field. Identifying the reasons why students drop out of open and distance education is therefore of paramount importance. In the coming years, predicting students at risk of dropping out before they reach that point could be a fundamental step in taking the necessary measures to prevent them from leaving the system. The results of this research may also be useful for studies aimed at identifying and predicting groups at high risk of dropping out. Even a 1% improvement in dropout rates could mean thousands of people receiving the education and training they need to meet national and university targets. Therefore, a thorough analysis of the dropout situation is crucial for improving the efficiency of open and distance universities (Agus, 2019). In this context, it can be said that research on dropout in open and distance education is influenced by technological and social developments.

CONCLUSIONS

Open and distance learning has become the fastest-growing area in education in terms of the number of students and the market revenue of the related industry. However, there is a growing concern about the significantly higher student dropout rates compared to traditional education. Research on distance learning suggests that students who drop out of school may experience a reduction in their confidence in learning, leading to disappointment. Such failures can result in social isolation and economic losses. Therefore, it is necessary to establish a framework to identify trends, prominent studies, and institutions related to dropout in higher education in the field of open and distance learning. This study employs bibliometric analysis methods to examine academic research on 'dropout in open and distance education' in higher education between 1980 and 2022. The analysis identifies and examines the leading studies, researchers, institutions, and countries in research on dropout in open and distance learning in higher education.

Suggestions

Academic research conducted on ODL has the potential to contribute to the understanding of the phenomenon, analyze its societal impacts, develop strategic approaches, and create prevention and intervention strategies. These studies provide knowledge and analyses based on scientific foundations, thereby assisting stakeholders in the 21st century in understanding the challenges they face in distance education and in generating strategies to address these challenges. These strategies can include policy recommendations

aimed at identifying the reasons for dropout and implementing necessary measures to ultimately reduce dropout rates. In light of the research findings and information gathered from the literature, below are some recommendations for researchers planning to work from a bibliometric perspective on dropout in ODL:

- This study is based on the Web of Science database. A more comprehensive study can be conducted using data from global databases such as Scopus, ERIC (The Education Resource Information Center), and Google Scholar, or from national databases such as Dergipark and the Higher Education Board National Thesis Center.
- The bibliometric analysis method was used in this research. A more comprehensive analysis can be conducted by using one or more different analysis techniques together, such as meta-analysis, descriptive scanning, mixed scanning, critical scanning, scope/map scanning, qualitative systematic scanning, umbrella scanning, theoretical and realistic scanning.
- Although bibliometric analysis has many advantages for literature, it also has some weaknesses. To address these weaknesses, focus can be directed towards web-based measurements called "Altmetric" as suggested by Bornmann (2014). Altmetric involves measurements conducted through social media to mitigate some of these limitations.
- Studies may be conducted in more specific areas. For example, research on socio-cultural factors, which are one of the important factors influencing dropout, or studies on students' information-seeking behavior can be examined to obtain more detailed results.
- This research includes studies on dropout in higher education. Other studies may examine research conducted at different levels of education.
- This study focuses primarily on students. More comprehensive analytical studies can be carried out based on research related to academics, administrators of educational institutions who play an important role in ODL, and senior bureaucrats responsible for education policy in countries.
- Bibliometric analyses comparing different periods (e.g., pre-and post-COVID-19) can be carried out.
- In this study the VOSviewer software was used for data analysis. In other studies, other software such as CiteSpace, Biblioshiny and Pajek may be preferred.

Limitations

This research has some limitations, which can be outlined as follows:

- The publications examined in this study were obtained from the WoS database, which includes qualified peer-reviewed journals. Therefore, one of the most critical limitations is that the publications obtained are only from a specific database.
- Bibliometric studies often lack detailed information about relevant studies and their results as they typically focus on a large number of documents. It is important not to overlook these benefits. However, as noted by Gulmez et al. (2020), the bibliometric method offers valuable contributions, such as analyzing thousands of studies together, revealing authorship, keyword, and citation relationships, and utilizing high-level visual mapping.
- Another limitation is the use of VOSviewer software in the analysis of the data obtained.
- The research excludes the 2023 data from WoS because the study began in August 2023 and the year has not yet been completed.
- The research data is limited to the query sentence entered in the topic field on the advanced search page. The search terms used were TS=((“dropout*” or “drop-out*” or “school dropout*” or “dropping out*” or “open learn*” or “open edu*” or “open learn*” or “distance edu*” or “distance learn*) and (“higher edu*”))”.

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UP-CLOSE AND SOCIAL RISKS IN DISTANCE HIGHER EDUCATION: A QUALITATIVE ANALYSIS OF EMERGENCY REMOTE TEACHING EXPERIENCES

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ABSTRACT

Education is both an institutional process and a set of conscious actions. Since its institutionalization, education has been viewed not only as an act of acquiring knowledge, but also as a socialization process. The traditional understanding of education, which views socialization as the its main purpose in addition to acquiring knowledge and shapes education policies accordingly, has emerged as a multi-dimensional sphere of discussion within "distance education", which has become almost mandatory today with Covid-19. This study aims to examine the problem areas of distance education experienced with Covid-19 by using an interdisciplinary approach in a psychological, sociological, and socio-psychological framework. To examine the subject in-depth and make analytical generalisations, the research reflects the opinions of the main actors, students, and faculty members, as well as the researchers' observations, in addition to the experts on the subject. The data analysis was conducted through the subjective evaluation of the researchers' own experiences and the content analysis of teacher and student opinions. The results reflect that education is not only an activity of acquiring knowledge but also a socialization process, the educational bureaucracy and environment make a significant contribution to the socialization of students, and that distance education can only be used as a supportive model. Education isolated from real life that does not contribute to the socialization processes of students may bring important psychological and social problems.

Keywords: Distance education, higher education, emergency remote teaching, online learning, student socialization, alienation.

INTRODUCTION

Distance education has emerged as an alternative to traditional education problems, and has developed as a teaching method applied to online learning environments specially prepared for communication between practitioners and students (Icten, 2006). According to the United States Distance Learning Association (USDLA), distance education is the delivery of education to distant students with the help of electronic tools such as satellite, video, audio graphics, computers, and multimedia technology. Distance education is a method that makes use of electronic tools, written materials, and printed materials. Distance education is a system that provides education and training opportunities to people independent of time and place by removing time and geographical barriers that cause disruption of education (Mshvidobadze & Gogoladze, 2012; Schlosser & Simonson, 2009; Schoun, 1995; Casey, 2008; Kearsley, 2011; Taylor, 1992; Tapscott, 1996). Distance Learning is an online education technique based on information and communication

technologies that allow the learner, the teacher, and the learning resources to be far from each other. It is characterized by concepts such as learning by correspondence, flexible learning, tele learning, e-learning, and online learning (Bozkurt, 2017). Although the concepts of distance education and open education are used interchangeably, in the current study, distance education has been used in a way to cover all the descriptions except formal face-to-face education.

Education is mental, social and psychological upbringing, maturation, knowledge, and skill acquisition process carried out with various models, including face-to-face, formal, informal, and distance education. Although there have been various discussions on distance education and formal education models before, Covid-19, which emerged in China and spread all over the world, caused a great crisis in the field of education as in other areas of life; however, there have been some heated interdisciplinary debates on the extent to which distance education can replace formal education. The data announced by UNESCO in April 2020 indicate that education was suspended in 192 countries due to quarantine, and more than 1.5 billion students had to stop receiving face-to-face education all over the world. During this period, more than 1.5 billion students were left alone with education in an imaginary (virtual) world disconnected from the real world, with insufficient teaching materials prepared for formal education and a "faulty" education. People have lost their familiarity and normal in the sociology of everyday life, have begaun to be offered an education that is uncertain and suitable for the "new normal". The transition from normal to new normal has arisen with an obligation that did not happen by choice, which continues to cause a Durkheimian anomie. Because of the uncertainty brought about by this "new normal", students face the "inability to grasp the process in its entirety", that is, they experience alienation, which was first expressed by Hegel. In fact, this "new normal" is a multidimensional problematic that has brought along an existential crisis that has become concrete with various adaptation problems. Therefore, the subject needs to be examined with an interdisciplinary approach bringind various fields together, such as psychology, social psychology, and even the sociology of everyday life.

Distance education continues as an education system that isolates people from the real world, and as an alternative education model in which all real-life interactive channels of building a "social person" are closed. Without communicating within a social structure and participating in social processes, the quality of "becoming human" cannot be easily attained. In formal education, the school is not only a place to deliver information, but also the social education institution that makes an important contribution to the socialization process and the most important tool for the interaction of the student with real life. In addition to education, the school functions to ensure the student's interaction with different segments of society and the continuity of culture. It improves the productive capacity of the individual in the real world, and provides knowledge, skills and practical opportunities appropriate to the conditions of the age. Possible channels for a student deprived of the "value"-laden climate of the school to add value alone at home and develop ethical principles are closed. The experience of Covid-19 has once again demonstrated that, detached from everyday life, distance education by itself does not provide the adequate school environment to foster social skills. The most important tool of an education system that develops communication skills between individuals, prevents social exclusion and opens possible channels to be involved in social processes is formal education in which face-to-face communication and social interaction occurs. Open and distance education can be a palliative solution that can only be applied in times of crisis when formal education is not possible, or can be used as an education model that supports formal education. In cases where formal education is not possible, the ground for transitioning to a model that combines access to distance education and the interaction of formal education should be paved.

As an education system that isolates people from real life, distance education is an education model in which all channels of building a "social person" are closed. In this study, with the assumption that what is happening in nature cannot be understood haphazardly and the necessity of thinking based on the collective mind, the theoretical basis of the research is based on the existentialist and progressive scientific theories in education as well as the assumptions of the symbolic interaction theory. In cases where a single theory is not sufficient to fully understand the subject, multiple theories are used to handle the subject in a multidimensional way. According to Kuhn (1962), theories are never alone, they must be supported by certain auxiliary theories. Sometimes empirical data can support more than one theory, and sometimes a phenomenon can be explained by referring to multiple theories. The reason why this study is based on symbolic interactionism

is because of the emphasis on the concepts of "becoming human" and "socialization", one of the important concepts of the theory in question. Symbolic interactionism is undergirded by the assumption that reality can only be constructed socially, that although the basis of social reality is knowledge, society can realize the existence of human beings in society which is a factual and objective reality, that the connection between the psychological and the sociological can only be established by using social processes (Berger et al., 1973).

"Becoming human" is actually not independent of existentialism's assumption that "existence precedes essence", and "human is not being in itself, but being for himself" (Sartre, 2017) because, according to existentialism, man can only find his own self in the social self. Social life consists of social practices, and this can only be possible by using processes such as students, school teachers and education bureaucracy together (Magill, 1991; Gutek, 2004). There is a constant change in life, but when organizing educational activities, commitment to unchanging elements and universal realities must be shown. In addition to imparting knowledge, education should prepare students for life. Another important goal of the school is to ensure that the cultural structure is transferred to the new generations in a healthy way. Instead of prioritizing professions, humanity must be emphasized and taught. First of all, people should be informed about how to be human, which is in line with the basic argument of this research. In the light of these theories, the basic question of the current study is "What are the possible conditions, problem areas, and risks of becoming a human being through distance education rather than using it simply to deliver information?"

The formal education method, with all its results, is a process in which institutional knowledge and consciousness contents are conveyed, and even if distance education allows the transfer of the subject consciousness contents, it does not allow the transfer of institutional practices. Distance education, which is carried out with homework, synchronous or asynchronous lessons, cause minds who are accustomed to the normal of formal education to have adaptation problems because habit change is not a momentary event like a change of thought, but a process of differentiation and transformation that spreads over time. Adaptation of normal education to the "new normal" requires a long transition experience. The replacement of traditional educational methods and techniques by a new educational paradigm requires a painful transition period. Taking away everything that traditional formal education has inherited from its past, replacing it with distance education according to the new normal means losing the ground that constitutes the cultural personality of young minds who are accustomed to formal education and learn the process of becoming an individual in learning environments.

While traditional formal education paves the way for people to transition from individual life to social life on the one hand, it also serves a function that limits the individual's coexistence with society. Students at different stages of education are now surprised by the shifting of the ground on which traditional habits are built. It may take decades to repair this morbid condition and adjust to the new normal. However, traditional formal education was an education designed for "social people". Those who imagine that they grasp this world well with an instrumental mind, even those who know it well enough to abuse it more and more, are astonished at not knowing what direction to go from the edge of a cliff. Today, a calculating, self-seeking, utilitarian, and functionalist "instrumental mind" that looks at everything as added value is no longer enough to avoid confusion. This "instrumental mind", which has long been sacrificing qualities to quantities and ends to means, is not enough to adopt the new normal. In addition to the instrumental mind that views human beings only as a piece of data, today there is a need for an education policy based on "purposeful reason" that not only knows but also understands and thinks, not only grasps but interprets, can make analytical inferences from what he/she sees instead of just being a passive viewer of the reality. Instrumental reason (Adorno & Horkheimer, 2010: 43) is merely a reductionist "technical mind" belittled by Aristotle based on the use of reason for capitalist technological developments. To design post-COVID-19 education policies, there is a need for a purposeful mind that enables the free development of the human being, the construction of the social mind and values as well as the objective mind.

We have now realized that with only the objective use of instrumental reason, as done by distance education, method, analysis, classification, objectivity and logical thinking are not sufficient for education. Clearly, there is a need for an education policy that contributes to the process of existence of the human being and transforms him/her into an individual with a system of values and life principles as a social person, ensuring integration with "meaningful others" in the social world. While the use of reason in formal education makes it necessary to think through objects and live with the world (but not in the world), instrumentalized

distance education consists of an education that embodies human thought within a categorical structure independent of objects and is based on dialogue. How will it be possible for this person, who is being isolated from the world in this search for "new normal" and being educated under virtual isolation conditions in the electronic kiosk of the student and teacher equipped with new media? How can the uncertainty about the solid ground to build on education be overcome in a period in which everything from formal education is being abandoned? The normalization of "normal education" in this "new normal" process, which looks like a distorted photograph of the human essence, is a fundamental problem of all societies.

PURPOSE OF THE STUDY

When the studies on the deficiencies and problems in distance education in the literature are examined, the main problems that arise in distance education are the interaction problems arising from the inability to communicate face to face, insufficient feedback, inadequate professional development support, administrative problems, failure to meet the expectations from education, not designing student study materials for distance education, belonging, lack of feeling, lack of access to library services, lack of experience of teaching staff, problems with creativity in developing course materials, faculty members not seeing distance education courses at the same value as formal education courses, problem of carelessness in the course material (Falowo, 2007; Li, 2009; Yazici, Altas & Demiray, 2001; UNESCO, 2002; Cronje, 2001; Pina, 2008) all of which make distance education controversial. Besides, problems such as the lack of opportunity for the student to socialize in the classroom or between lessons with peer support, the problem of focusing on the subject, and the loss of the feeling of being a part of the community bring further controversy. The answers to the main question of "What are the main problem areas and risks of distance education in higher education institutions that provide formal education with the pandemic" and the following sub-questions were sought:

- What is the impact of distance education on maturation, skills, and socialization?
- What are the problem areas of studying away from the school climate and interaction opportunities?
- Is there a problem with the need for course material, self-disclosure, and success in distance education?

METHOD

This study was designed as qualitative research (case study) to gain an in-depth understanding of student and teacher views in distance education. The case study design was preferred in the research is that this design is suitable for examining current situations based on the opinions of people who have in-depth knowledge. In addition, the case study design was preferred in the research as it is more convenient to reveal the essence of the researched subject and to reflect the event as it is (Hancock & Algozzine, 2006). The current situation, the lack of researcher control over it, and the fact that the examined phenomenon is not manipulated are other reasons for choosing the case study design in the research (Merriam, 1998; Yin, 2014; Tutar & Erdem, 2020). There are different case studies techniques. In this study, the techniques of a collective case study developed by Stake and exploratory case studies developed by Datta were used due to its compatibility with the subject's essence. A collective case study is a case study used in research to examine a few cases with similar characteristics, and it fits the purpose of this research. The collective case technique is a very convenient case study to reveal the unknown general characteristics of particular cases. On the other hand, the exploratory case study was preferred because it is suitable for the research subject to be convenient in cases where there are no clear and specific findings of the subject of the research. The exploratory case study was preferred because it is convenient to obtain information about the operation of a specific program or system, such as distance education.

Participants

Qualitative research is conducted with people who have deep knowledge of the research topic. The sample for the current study was selected according to the purposive sampling technique, which requires the participation of those who have deep knowledge about the research subject. The data were collected through face-to-face interviews.

Table 1. Participant Codes

Participant code (lecturer)		Participant Code (Participating Student-PS)				
P1	P8	PS1	PS8	PS15	PS22	PS29
P2	P9	PS2	PS9	PS16	PS23	PS3o
P3	P10	PS3	PS10	PS17	PS24	PS31
P4	P11	PS4	PS11	PS18	PS25	PS32
P5	P12	PS5	PS12	PS19	PS26	PS33
P6	P13	PS6	PS13	PS20	PS27	PS34
P7	P14	PS7	PS14	PS21	PS28	PS35

Data Collection and Analysis

Data were collected using a semi-structured interview form in the interviews with 14 faculty members and 35 university students. The questions determined by the main purpose and sub-questions of the research were asked through face-to-face and internet interviews with the students. A semi-structured interview form was used to interview within the framework of an order. During the interview process, the interview was deepened with the probes. The data collected in the research were analyzed with inductive qualitative content analysis technique. In this process, first the analysis framework was created, and then the data were processed according to the thematic framework. Then, the analysis process was completed by defining and interpreting the findings. After giving the frequency of repeated descriptive statements in the study, codes, sub-themes, and central themes were obtained from participant expressions (Gay et al., 2012; Denzin & Lincoln, 2005). In addition, the reliability and trustworthiness of the research were ensured by directly reflecting the participants' views in the analysis (Tutar & Erdem, 2020). Afterward, the analysis findings were interpreted, and various suggestions were made. The participating faculty members were coded as P1, P2, and so on, and the students were coded as PS1, PS2, and PS3.

FINDINGS

Participants' Opinions on the Problem of Maturation, Skills, and Socialization in Distance Education

Within the framework of what the pandemic experience taught, the participants were asked, "What are the effects of distance education on maturation?" "What are the effects of distance education on skill acquisition?" The questions "What are the effects of distance education on socialization?" were asked. The answers given by the participants to these questions were gathered under the main theme of "Inadequate education and socialization problems." The descriptive expressions reflecting the views of the participants and the frequency of common opinions of the participants, codes, sub-themes, and main themes are shown in Table 2.

Table 2. Content analysis of the participants' views on the problem of maturation, skills and socialization in distance education

Main theme	Sub-themes	Codes	f	Participant code	Descriptive statements
Inadequate education and socialization problems	The problem of maturation and quality of education	Maturation, face-to-face training	4	P3, P5, P9, P10	It is very important in the maturation of the students and that the education is carried out in a face-to-face and classroom environment. There is always something missing in distance education. There is a job satisfaction problem.
		Feeling of lack, quality problem in education	9	PS1, PS4, PS9, PS15, PS17, PS24, PS28, PS32, PS34	I do not feel like a student enough in non-face-to-face education. Education provided online, away from the school environment, provides information but does not contribute enough to our maturation and growth.
	The problem of education and course material	Upskilling, insufficient educational material	8	P2, P4, P5, P7, P9, P11, P13, P114	We do not have the opportunity to provide sufficient skills to students in distance education. Especially in cases where the application is necessary, it is not enough to teach only the slide.
		Gaining insufficient knowledge and skills	11	PS3, PS5, PS6 PS8, PS13, PS15,PS16 PS17,PS21 PS24,PS32	We cannot gain enough skills through distance education. When we graduate, they will claim that we have distance education, and in this case, it will be a disadvantage for us compared to those who have formal education.
	The problem of socialization and productivity in education	Socialization problem, perception of loneliness	9	P1,P3,P5, P7, P8,P9,P11, P13, P14	Studying online away from the school environment is an important obstacle to the socialization of students. Especially the isolating and disconnecting aspect of distance education from real life will cause big problems in the future.
		Incomplete student perception, insufficient information transfer	12	PS4,PS7, PS8,PS10, PS13,PS14 PS17,PS21, PS23,PS26 PS28,PS31	Distance education is an education-based only on information transfer and insufficient knowledge. However, organizational education also enabled us to practice, socialize, show ourselves and make friends. It is a great loss for us to graduate by sitting at home.

In Table 2, the "maturation and quality," "education and course material," and "socialization and productivity" are the three major themes. The descriptive statements that stand out are given below:

> *Since we are in a place outside the classroom, it is more difficult to adapt to the lessons, it is not easy to get feedback from the students and control them.*
>
> *Since the training is not face-to-face, there is a shortage of feedback. Especially in practice courses, there are big problems.*
>
> *The lack of interaction is a big problem. The artificiality of the environment causes the problem of low interest and motivation. The student has a readiness problem. In synchronous lessons, it is not easy to check whether students listen to the lesson.*

Students' Views on This Theme are Given Below from Their Own Statements:

> *Faculty members have a lack of motivation. They think that they are doing distance education by putting slides in the system.*
>
> *Only 40 percent of the students watch the prepared videos. Its average viewing time is in the 20s to 30s.*
>
> *There is a general focus problem. Students and faculty members are not ready for distance education. We lose our ability to stay away from the school environment and interact with life at home.*
>
> *Students have a problem of inactivity. In addition to the absence of teacher-student interaction between students in the virtual classroom, the inability of students to participate in social activities and club activities is an important problem of distance education.*
>
> *The absence of any feedback on the emotional attitude of the students in the interaction process causes the process to take place in a mechanical context. This complicates and shortens the attention process of the student.*

One of the aims of distance education during the pandemic process, one of the participant statements, is the problem of "maturation and inadequate self-perception", which is a major source of problems in raising students and becoming an adult in the long run. Because the school provides information and information and an environment of maturation, growth, and modernization, it is a significant problem area that the student is deprived of this opportunity. Among the participant statements, one of the essential problems of distance education is the inadequacy of course materials and the inadequacy of the instructors trained for formal education for distance education. This situation may cause the inadequacy of distance education and the problem of socialization.

Opinions of the Participants on the School Climate and the Possibility of Interaction

Within the framework of what the pandemic experience has taught, to the participants, the questions "What are the problem areas of studying in a virtual environment disconnected from the real world", "What are the problems of staying away from the school climate?", "What are the problem areas of non-interaction" were asked. The answers given by the participants to these questions were gathered under the main theme of "socialization and inactivity problem". The descriptive expressions reflecting the views of the participants and the frequency of common opinions of the participants, codes, sub-themes and main themes are shown in Table 3.

Table 3. Content analysis of the participants' views on school climate and interaction opportunities

Main theme	Sub-themes	Codes	f	Participant code	Descriptive statements
The problem of socialization and inactivity	Socialization problem	Institutional climate, socialization bureaucracy	4	P3, P5,P6 P9,P10	*The structure called a school is not only made up of classes and students. A school is also a place of socialization and participation in social life. A school is also a place where one learns about bureaucracy. Online education deprives the student of all these opportunities.*
		Education and training, loss of integrity, construction of the future	9	PS1, PS4, PS9, PS15, PS17, PS21 PS24, PS28, PS32, PS34	*When we say university as students, we imagine a whole with its classrooms, faculty members and school bureaucracy. Distance education has ruined our university dream. This situation causes a feeling of inadequacy in us. School is where the future is built. How can we build our future by sitting at home? This makes us think.*
	Loss of job satisfaction and unfavorable school climate	Online course, virtual world, missing professional satisfaction	8	P2, P4, P5, P7, P9, P11, P13, P14	*I couldn't get used to doing my lessons in a virtual environment, not in the classroom for a long time. The virtual environment does not fill the space left by the real world. I can't find enough professional satisfaction when I can't see my students around. I miss seeing student voices and student faces at school.*
		Social environment, campus life, friendly relations	11	PS3, PS5, PS6 PS8, PS13, PS15, PS16, PS17, PS21, PS24, PS32	*For the student, the university is above all a living space, its social system. I have friends from the neighborhood, not from school. This is disturbing me. I think I missed out on college life. School meant a campus and a total living space for me. The pandemic has cut us off from the social life.*
	Occupational alienation and inactivity	Perception of loneliness, professional alienation,	9	P1, P3, P5, P7, P8, P9, P11, P13, P14	*Not being able to interact with people harms the socialization process. During the pandemic process, we stayed away not only from students but also from other faculty members. My perception of loneliness and desolation has increased a lot, and this causes me to feel cold towards my profession. Distance education causes me to see myself as a presenter rather than a lecturer.*
		Disappointment, campus life	12	PS4, PS7, PS8, PS10, PS13, PS14 PS17, PS21, PS23, PS26 PS28, PS31	*The most important problem of the pandemic on us students was the problem of inactivity. During my high school education, I always imagined myself in a campus environment. I found it very interesting to walk around campus, go to cafes, sing and listen to music together. I'm a college student now but not in college. Being away from the campus environment was disappointing.*

As shown in Table 3, the opinions of the participants can be gathered under the sub-themes of "socialization problem." "loss of job satisfaction and insufficient school climate problem", "problem of professional alienation and lack of interaction". The highlights of the participant's views are given below:

It is more difficult to adapt to the lessons because we are in a place outside the classroom.

It is not easy to get feedback from students and control them.

Since the training is not face-to-face, there is a shortage of feedback. Especially in practice courses, there are big problems.

The lack of interaction is a big problem. The artificiality of the environment causes the problem of low interest and motivation. The student has a readiness problem.

In synchronous lessons, it is not easy to check whether students are listening to the lesson or not.

Student opinions on this theme are given below:

Faculty members have a lack of motivation. They think that they are doing distance education by putting slides in the system.

Only 40 percent of the students watch the prepared videos. Its average viewing time is in the 20s to 30s.

There is a general focus problem. Students and faculty members are not ready for the distance education paradigm.

The opportunity to stay away from the school environment and interact with life at home is lost.

Students have a problem of inactivity. In addition to the absence of teacher-student interaction between students in the virtual classroom, the inability of students to participate in social activities and club activities is an important problem of distance education.

When the descriptive statements of the participants, themes, and sub-themes are examined together, the transition of students who are accustomed to formal education to distance education is understood to cause an adaptation problem in the first place. The adaptation problem arises especially because the lecturers are not trained according to distance education and the inadequacy of the course materials. Another important problem is the professional satisfaction of faculty members. The fact that the faculty members who receive their orientation according to the organization's education cannot see students in front of them harms the sense of professional satisfaction. The main problem is students' perception of insufficient studentship, socialization, and lack of interaction arising from being deprived of the school climate and campus environment.

Course Material and Interaction Problem in ERT

Regarding meeting the need for course material and success in distance education, where formal education is compulsory during the pandemic process; Questions such as "does distance education adequately meet the need for success", "is there a problem with the functionality of the course material in distance education", "is there a problem of self-disclosure and realization in distance education" were asked. The answers given by the participants to these questions were gathered under the main theme of "Insufficient course material and teacher-student interaction problem". Descriptive expressions reflecting the views of the participants and the frequency of common opinions, codes, sub-themes, and main themes are shown in Table 4.

Table 4. Analysis findings regarding the participants' views on digital innovation in agricultural enterprises

Main theme	Sub-themes	Codes	f	Participant code	Descriptive phrases
Insufficient course material and teacher-student interaction problem	Skill problem and lack of satisfaction	Lack of skill, loss of interest, attention problem, control problem	4	P3, P5,P7 P9,P10,P12	We are people who have been brought up according to organizational education. Distance education requires skillful use of complex information technologies, and there is a lack of skills in this regard. The other issue is that it is not possible to see the attention and interest of the student in the virtual environment. This situation is not enough to meet the success needs of people in distance education. Another problem is the lack of control.
		Sense of satisfaction, sense of accomplishment	9	PS2,PS5, PS8, PS11, PS15, PS17 PS22, PS26, PS31	Students do not get enough satisfaction and a sense of accomplishment in distance education. The subject described in distance education is not fully understood. Since there is no class in the middle, there is no perception of success. There is not much opportunity to see what is done in distance education.
	Inadequate course material and feeling of isolation	Insufficient course materials, inadequate course follow-up	8	P2,P3,P4, P5,P7, P9,P10,P12, P13	Faculty members who are self-taught compared to formal education lack skills in using information technologies. This situation does not allow faculty members to use the course material practically. There is also the problem of course material required for online education. The fact that the student appears online does not mean that he is attending the course. No communication is as effective as face-to-face communication.
		Feeling of isolation, incomplete communication	11	PS2, PS3, PS4 PS7, PS11, PS13, PS14, PS15, PS17, PS19, PS24, P332	In distance education, when I am doing lessons remotely, when I look around, it gives a strange feeling of isolation that there is no one next to me. He cannot fully express himself through verbal communication with people whose faces he has not seen, without making eye contact with anyone. For us, not being able to communicate face-to-face and content with the virtual environment is a big problem in terms of maturation.
	Low productivity, measurement and evaluation problem	Anxiety about the future, Not being able to see the result of the work, the problem of self-actualization	9	P1,P4,P6, P7, P9, P10,P11, P13, P14	Formal education could reveal the successful and the unsuccessful, the student who listened and did not listen to the lesson. Unfortunately, we cannot see the fruits of our work in distance education. In addition, not being able to show ourselves in a virtual environment away from the student causes low satisfaction. The fact that a person cannot fully demonstrate his professional knowledge and skills takes away the opportunity for self-realization.
		Education quality, communication problems, measurement, and evaluation problem.	12	PS2,PS3, PS5,PS7, PS9,PS11 PS13,PS17, PS21,PS25 PS29,PS31 PS33	As students, we cannot get the efficiency we get from face-to-face education in distance education. Not being able to make eye contact with faculty members causes interaction problems. The unilateral progress of the course, the inadequacy of the course material, and the student's inability to express himself weaken our sense of achievement. In addition, there are various difficulties in measurement and evaluation. This significantly reduces the quality of education.

When Table 4 is examined, the opinions of the participants gather around the sub-themes of "skill problem and lack of satisfaction," "insufficient course material and feeling of isolation," and "low productivity and measurement and evaluation problem." The highlights from the participant views are given below:

> *Students with a high desire to participate in the course cannot find enough opportunities to do so, which causes successful students to lose their interest in the course.*
>
> *The lack of interaction causes the problem of evaluating the students' performance, and the possibility of effective measurement and evaluation decreases.*
>
> *The method that enables students to be active through question-answer in the classroom environment has been disabled. Students remained more passive. Distance education does not have effective communication, it is not as effective as learning by sharing the same environment with the student, its social aspect is weak.*

Student opinions regarding this theme are given below:

> *I could not get the efficiency I got from face-to-face education from distance education in any way.*
>
> *Not being able to make eye contact with the teachers causes interaction problems.*
>
> *The unilateral progress of the course, the ineffective use of materials, and the inability of the student to express themselves are important problems.*
>
> *It is a big problem in distance education that it is almost impossible to attend the course and the inadequacy of measurement and evaluation.*
>
> *The loss of interactive learning and practice environment is a big problem.*

When the findings related to Table 4 and the descriptive statements of the participants are examined, it becomes clear that there is a skill problem in the effective use of information technologies used in distance education. Insufficient course material and discomfort experienced by students from listening to lectures in an isolated environment is an important issue to focus on. In addition, the problems experienced in measurement and evaluation in distance education make the efficiency and sustainability of distance education controversial. However, considering that the data of this study were collected during the adaptation process, it can be argued that the effectiveness of distance education can be increased by eliminating the problem areas after a successful adaptation process.

DISCUSSIONS AND CONCLUSION

According to the Turkish Statistical Institute (TurkStat) 2022 data, the use of the internet and ICTs in households needs to be improved. Although having internet access at 94.1% of the households is seen as an important advantage, it is inadequate to deliver live and interactive lessons. The problem of speed on the Internet, not reaching every student, and the low rate of computers in households are important problems. That the rate of having computers in households is 55.5%, smart phones is 98.7%, TVs that can connect to the Internet is 37.7% Internet access is 94.1%, and Internet use is 85% (TurkStat, 2022), indicates that there is no equal opportunity in education in distance education, just like the case in formal education. The main problem areas of distance education emerge as not receiving feedback from students, dissatisfaction with distance education, and weakness of digital literacy. Distance education does not allow learning through socialization, which is one of the main functions of the school. In distance education, students are deprived of opportunities such as imitating, talking about the subject, and answering questions. All these problems indicate that distance education is actually limited to "distance learning" rather than "education." Social Learning Theory, developed by Bandura (1977), is an educational theory that emphasizes the impact of social interactions, observational learning, and modeling on a person's learning and behaviour. It emphasizes the role of observation and modeling in learning. It suggests that people learn by observing and imitating the behavior and outcomes of others and emphasizes the role of both social and environmental factors in shaping an individual's cognitive development. It suggests that educators must consider the influence of peers, teachers, and models in the learning environment. Positive role models, constructive feedback, and collaborative learning experiences can facilitate the acquisition of new knowledge and skills. It also highlights the importance of creating supportive learning environments and promoting self-efficacy to increase motivation and learning outcomes. Social Learning Theory underscores the idea that learning is a

socially embedded process and that modeling desired behaviors and attitudes is critical to education. Our findings are supported by this theory.

Evaluation of Findings and Theoretical Implications

Since distance education is an education system removed from organizational environments, it causes the individual to lack a sense of organizational commitment, and his/her relationship with the organization remains reduced to the level of "network connection". Lack of social sharing may also lead to alienation from self and occupation. Online education also makes "organizational learning" impossible. The flexibility of the course hours can negatively affect the physical and psychological health by switching to a life that is disconnected from the natural biorhythm of the human being. Although flexibility has advantages such as offering the opportunity to work in an environment away from noise, traffic, and organizational conflict in the beginning, social isolation may lead to adaptation problems (social phobia) in the long run. Online education is an "asocial education model." In traditional formal education, people feel mental and psycho-social satisfaction. Tasks in online education, lacking the sense of belonging, representation, and participation provided by the school climate and culture, cause the individual to become cold, lonely and alienated.

Education transferred to the home environment damages this comfortable and cozy nature of the home, forcing it to surrender to technological rationality and artificiality. Working at home removes the traditional sense of belonging at home, and it becomes difficult for people to comprehend their own integrity in the rationalized and artificialized home environment (Fromm, 2013: 57). In this instructional model, the home ceases to be a home, as well failing to become a school. Thus, the traditional "family texture" is ruined, the traditional "home" quality is lost, it becomes just a shelter or an accommodation. The person is at home, but not as a family member, but as a member of the profession. The person is at work, but not at school. This may also cause damage to individual and family roles. In online education at home, the individual can do this at the expense of breaking away from other members of the family. In this model, individuals are in the company of a PC and some imaginary people who receive their messages and respond to them, but cannot establish genuinely interactive relations. The individual is in a virtual or hypothetical realm, far from "physical reality". While the student is free from the supervision of the school, s/he is subject to the uncontrolled private life. Being "synchronous" with the virtual team may mean being "asynchronous" with the family members (Kurlend & Bailey, 1999).

People who study online are knowledgeable but lonely individuals who live at home amongst the masses of information unaware of the real life that matters. There are some serious doubts that data stacks can give them real insight, understanding, and interpretation. Information abundance destroys wisdom. Real experiences disappear through virtualization, and virtual experiences emerge through imaginary lives. Humans just pretend to live, far removed from real experiences. In this unreal world that comes with virtualization, the questions of how to value self, how to build an identity and a natural world, and where to find real-life experiences gain importance. However, the human finds true meaning only in a social life because the qualities potentially possessed by human beings only have a value in social life. Unlike other creatures, the human lives embedded in a world of meanings and the "significant/generalized others", not with biological instincts. Without a meaning map, value system, or desire to socialize, a person is considered to have lost his/her world of meaning. Success can only be realized through the "other" in social settings. Unfortunately, online education does not provide sufficient opportunities to meaningfully express the relations between private and social life.

Practical Implications

Based on the experience of the recent pandemic, it can be predicted that distance education will continue with further support from augmented reality applications as a model that replaces the formal education system. Since distance education provides easy access to resources, it can be predicted that its importance in education will grow even stronger. However, it is necessary to consider the risks of the distance education model that offers limited social interaction (Ivanec, 2022; Majali & Abuhmaidan, 2022). Face-to-face communication is needed to increase the interaction between students and instructors, however, distance education does not allow effective and complete communication, and in this model, communication generally remains

one-way or overcrowded. Distance education contains important problems the organization of education. The presentation of information and using educational materials in the traditional education system gives the student practical skills, but distance education does not provide an opportunity for this, especially in technical education. Also, the deficiencies in the design and dissemination of information, academic supervision, and administrative inadequacies stand out as the problem areas of distance education. Further, the lack of student-teacher and student-student interaction becomes clear as the most important handicaps of distance education. As the opportunity to learn from anywhere in distance education is obtained and the limit of distance disappears, the psychological distance between learners and instructors and the social distance between students and society increase. The following opinions support this conclusion:

The most important drawback of the atypical study is on the psychology of the individual. In the traditional sense, the school is a place that not only meets the physiological needs of a person, but also the social needs and provides a perception of space. Mobile workers are the nomadic travelers of the information societies. The most important aspect of the school idea is that it has an institutional climate and culture with social support. In online education, this causes the social support in question to disappear, leading to social isolation. Isolation is a state of loneliness and detachment. Like techno-stress caused by technology, it is an addiction to ICTs. Being an "unschooled student" in online education creates a sense of deficiency. Although this situation is viewed as a contributing factor to freedom at first sight, it actually brings along a very important drawback. Flexibility first and foremost reduces the student to information-laden but asocial beings by removing them from the real world and the socializing climate of the educational bureaucracy. The student may be aware of many things but since s/he has not grasped anything in full, and thus cannot apply any knowledge to real life work processes, s/he is left alone with the problem of lack of skills and ability (Dobson & Dobarah, 2000: 65). Ineffective teaching skills in distance education, psychological and communication problems of children who are confined to home, problems in developing interesting course materials to facilitate learning are some major technical problem areas in distance education.

Limitations and Future Research Suggestions

This is an autoetnographic study based on the observations of the researchers on the subject, and the issues they have personally experienced in this field. It should be supported by quantitative, mixed, meta-analysis and metasynthesis studies to deepen our understanding of the subject. Based on the results, distance education should not be viewed as the primary education method, but as an education model that supports formal education in times of crisis. The critical contribution of formal education to socialization processes should not be overlooked. Its contribution to young minds' social value judgments and their acceptance of these values should not be ignored. Especially in a period when schools are closed, students who continue distance education should be supported in developing their social and emotional skills. In addition, it is an important issue that distance education is designed as a tool to teach learning, not as a tool to transfer information.

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INFORMAL DIGITAL LEARNING OF ENGLISH TO SUPPORT A FORMAL SPEAKING COURSE: EFL PRESERVICE TEACHERS' PERCEPTIONS AND IMPLEMENTATION IDEAS

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ABSTRACT

This study aimed at exploring how English as a foreign language (hereafter, EFL) preservice teacher (hereafter, PSTs) who had no teaching experience perceived Informal Digital Learning of English (hereafter, IDLE) and their IDLE implementation ideas for their future students' out-of-class activities to support formal classroom instruction. The researchers employed a basic qualitative design to understand the participants' perceptions and implementation ideas. The data were gathered through interviews and document analysis, and subsequently, 14 EFL PSTs with no prior teaching experience were recruited using a purposive sampling strategy. The data were transcribed, coded, and analyzed using inductive thematic analysis. The findings give new insights that the participants had positive perceptions towards IDLE and had various implementation ideas of IDLE for their future students, mostly through disrupting Web 2.0 technology tools, even though they had no teaching experience using technology. Two implications for English educators and teacher education programs are highlighted in this article: changing teachers' mindsets towards EFL learning and the insertion of IDLE as a topic into pedagogy courses.

Keywords: EFL preservice teachers, informal digital learning of English, TELL, online learning.

INTRODUCTION

Current technological advancements and innovations have significantly increased language learners' opportunities to acquire EFL outside of the classroom (Kern, 2006; Lamb & Arisandy, 2020; Lee et al., 2021; Xodabande, 2017), yielding a new form called IDLE (see Lee, 2019a, 2019b; Lee & Dressman, 2018; Lee & Lee, 2021). Recent studies indicate that IDLE has been implemented around the globe, such as in South Korea (Lee & Dressman, 2018; Lee & Lee, 2021), France (Sockett & Toffoli, 2012), Turkiye (Dincer, 2020), Taiwan (Wang & Chen, 2020), Denmark (Jensen, 2017), Iran (Soyoof, 2022; Xodabande, 2018) and Indonesia (Lamb & Arisandy, 2020; Rahmawati et al., 2019). Moreover, among the studies mentioned above, IDLE is quite popular to support English-speaking skills development, such as linguistics elements

to support speaking skills (e.g., Sockett & Toffoli, 2012; Pia Sundqvist, 2019) and oral communication (e.g., Lee, 2019b; Lee et al., 2021; Lee & Dressman, 2018). For example, Lee (2019b) reported that his research participants communicated in English using social media, which supported their informal English learning. In addition, Lee also discovered that doing IDLE helped develop his participants' willingness to communicate in English.

Even though IDLE brings many advantages to English learning, many in-service EFL teachers have different perceptions towards IDLE, especially when it is implemented to support formal learning. For example, several teachers did not believe IDLE could support English learning (Chik, 2011). Additionally, some of those teachers believed that IDLE should not be included in formal education because it is a part of the students' lives (Toffoli & Sockett, 2015). As a result, in-service EFL teachers lacked enthusiasm for IDLE which supported their opposition to employing technology in English education (Djiwandono, 2019; Drajati et al., 2018)

Nevertheless, the recent EFL PSTs showed different attitudes toward using technology in English education. Some studies have suggested that many of these PTSs had positive attitudes toward using technology in English education. They adopted various platforms, mainly social media, for facilitating formal English learning activities in their teaching practices (e.g., Akayoglu et al., 2020; Baz et al., 2018; Fathi & Ebadi, 2020; Nugroho & Mutiaraningrum, 2020; Park & Son, 2020). Perhaps because these EFL PSTs knew how to use technology for teaching, there is a high level of technology adoption in English education (Park & Son, 2020).

As EFL PSTs' intentions to adopt IDLE to support formal English education are gradually increasing, knowing their attitudes toward IDLE is necessary. However, previous studies did not discuss EFL PSTs' attitudes toward IDLE in detail. Prior research also lacked in-depth discussions of how EFL PSTs, especially those with limited teaching experience, design IDLE to support formal English learning with their prospective students. Exploring this information is crucial to expand the existing literature and provide considerations for those who want to implement IDLE. The aim of this study has therefore been to explore how EFL PSTs with no teaching experience perceived IDLE and their IDLE implementation ideas for their future students' out-of-class activities to support formal classroom instruction. Moreover, the context in this study has been focused on speaking skills since, as previous studies explored, IDLE is often done for developing speaking skills. To guide the exploration in detail, the following questions were posed:

1. How did the English as a foreign language preservice teachers perceive informal digital learning of English to support the development of speaking skills?
2. What informal digital learning of English implementation ideas did the English as a foreign language preservice teachers have to support formal classroom instruction?

LITERATURE REVIEW

Informal Digital Learning of English

Mobile technology, such as YouTube (www.youtube.com), Facebook (www.facebook.com), Telegram (www.telegram.org), has been widely used to teach speaking skills (e.g., Amiryousefi, 2019; Cepik & Yastibas, 2013; Kusuma, 2022; Sun & Yang, 2015). For example, Kusuma (2022) implemented YouTube, a social media platform, to facilitate EFL students' speaking skill development. The students with their smartphones were asked to create speaking videos, uploaded them on YouTube, and provided comments after watching their friends' videos. This example indicates that mobile technology could be used to support formal speaking instruction. On the other hand, mobile technology also provides opportunities for EFL students to conduct English learning in informal settings, known as IDLE.

Defined as "students' autonomous English learning on their initiative in out-of-class, digital contexts" (Lee, 2019b, p. 694), IDLE is a relatively novel phenomenon and a component of digital education. Digital education is a term that refers to educational changes that involve the conversion of a traditional educational system to a digital one via the use of digital technologies (Jie & Sunze, 2021). Digital technology represents not only Web 2.0 technology but also digital learning materials and activities or teaching methods that support digital learning (Harju et al., 2019). Moreover, with more opportunities provided by digital

technology for English learning, English learners are increasingly engaged in IDLE (Lee et al., 2022; Lee & Lee, 2021) for a variety of purposes, such as for form, meaning, (Lee & Dressman, 2018), receptive, and productive skills improvements (Lee & Xie, 2022; Zhang & Liu, 2022).

A large and expanding body of literature has defined the term IDLE over the past decade (Lee, 2019c; Lee & Dressman, 2018; Lee & Lee, 2021; Rahmawati et al., 2019). The first serious discussion of IDLE emerged in the study of Lee and Dressman (2018); they defined IDLE as an independent informal digital learning in correlation to formal which has the potential to address the limitation of teachers' instruction and exposure to the development of the second language. The following year, Lee (2019c) simplified the definition of IDLE by using three key terms: self-directed, self-instructed, and semi-structured digital English learning. In imitation of Lee and Dressman's (2018) fundamental concept, Lee assumed that IDLE is still related to all formal language-related material.

Several keywords are used interchangeably with IDLE in the existing literature review and represent a similar context. For instance, "extramural English" (Sundqvist & Sylven, 2016; Sundqvist & Olin-Scheller, 2013), "online informal learning of English" (Sockett, 2014; Sockett & Toffoli, 2012; Toffoli & Sockett, 2015), and "IDLE" (Lee, 2019b, 2019c; Lee et al., 2022; Lee & Dressman, 2018; Lee & Lee, 2021) denote the extramural digital context to support language learners' language learning. Moreover, IDLE represents students' initiative to enhance language mastery through the unstructured use of digital technology outside the institutional context and is not assessed by a teacher (Lee, 2019c; Lee et al., 2021). For example, language learners can learn English through digital gaming, watching movies and YouTube videos (Lamb & Arisandy, 2020; Lee & Xie, 2022), and talking to experts or others using English on Skype or social media platforms (Lee, 2019c; Lee et al., 2021).

The Implementation of IDLE

To date, several attempts have been devoted to seeking the implementation of IDLE and its relationship with English learning, especially to facilitate the improvement of speaking skills. Sockett and Toffoli (2012) investigated how five French students engaged in their online informal learning of English. They reported that these students watched online English videos, listened to English songs, searched for information online, and chatted with friends on social media. Sockett and Toffoli reported that these students found more opportunities to learn English in real-life situations through doing those activities. Moreover, the students also learned greater English content and vocabulary, which supported their English mastery. Lamb and Arisandy (2020) used a 56-item questionnaire to identify the most and least popular IDLE activities among 308 Indonesian students. These activities included the use of the internet, Websites, Twitter (www.twitter.com), Snapchat (www.snapchat.com), Facebook, Skype (www.skype.com), and YouTube.

Additionally, those activities included listening to English songs, watching English films, talking in English with foreigners, posting in English on social media, and searching for supporting English materials. Lamb and Arisandy also reported that participants who engaged in more IDLE demonstrated a higher level of motivation for learning English. The aforementioned studies indicated that language learners engage in IDLE and consequently make greater improvements in their English learning.

Regarding IDLE activities to support English speaking skill development, previous studies indicate that EFL students did IDLE to acquire linguistic features to support their speaking skills. For instance, Socket and Toffoli (2012) reported that five French students paid close attention to movie dialogues to learn sentence structures, pronunciations, and new words and expressions. Another example, Sundqvist's (2019) study involving 1,609 respondents and 16 interviewees who played games as their IDLE indicated that they learned a great amount of English vocabulary, which supported their communication in the chat box while playing the games.

Furthermore, previous studies indicated that EFL students communicated with others in English through social media and/or video chatting as their IDLE activities. For example, Lee (2019a, 2019b) found that South Korean EFL students appeared to use Facebook, KaKao Talk (www.kakaocorp.com), and LINE (www.line.me) for communication activities with local friends who lived overseas or native speakers from English-speaking countries. Another example was also shown in Lee and Dressman's (2018) study, where the

participants were reportedly engaged in a variety of IDLE activities on Facebook, including video chatting and writing English-language posts. Lee and Dressman also reported that the diverse IDLE activities contributed to the students' willingness to communicate. Similar findings were echoed in Lee's (2019b) study, which discovered that their participants showed a willingness to communicate in English through social media. Interestingly, Lee also reported that familiarity with interlocutors and communities influenced the participants' willingness to communicate.

Teachers' Perceptions towards IDLE and Implementation Ideas

Considering that many English learners spend more time learning English informally than they do in formal classrooms (Toffoli & Sockett, 2015), IDLE should be embraced by English instructors as a means of strengthening formal English instruction. However, the majority of teachers are perhaps not tech-savvy who mostly began using digital technology, computers, and the internet as adults but did not grow up using them (Prensky, 2001). Therefore, most of them encountered difficulties enhancing innovative digital learning (Jie & Sunze, 2021). For instance, Djiwandono (2019) surveyed 110 English teachers, revealing that most of them found technology integration in the classroom a threat and yielded uncomfortable situations for them. Therefore, the idea of utilizing IDLE to help pupils learn English may not be possible for teachers who have negative attitudes toward technology. There are some plausible reasons why teachers resist using technology in their instruction, such as not being ready to face technology (Drajati et al., 2018), not knowing how to use technology (Mishra & Koehler, 2006), and are more confident using traditional teaching methods in the digital era (West, 2013).

In the past, not all teachers understood how their pupils learned English informally, which activities they had to engage in, which digital technologies to use, or how to use IDLE to support formal English instruction. For instance, Chik (2011) discovered that almost all 34 participants in the study did not believe that IDLE, such as games and online social networking activities, could provide the students with sufficient English resources. This may have been one of the reasons why the majority of participants opposed the use of digital technology in the classroom. In another instance, Toffoli and Sockett (2015) reported that only 21 out of 30 teachers recognized their students' informal English learning. This issue was aggravated by the discovery that only five teachers used IDLE with their students, as the remaining teachers claimed that informal activities were a private part of students' lives and were inappropriate for formal classroom settings. As a result of the aforementioned findings, teachers who may have years of teaching experience but are still adjusting to the use of technology in the digital world need more intention to utilize IDLE to enhance learners' language acquisition.

On the other hand, recent studies show that EFL PSTs who lack teaching experience showed great interest in teaching with technology (e.g., Akayoglu et al., 2020; Baz et al., 2018; Fathi & Ebadi, 2020; Nugroho & Mutiaraningrum, 2020; Park & Son, 2020). For instance, Akayoglu et al. (2020) reported on the use of social media by 113 EFL PSTs in their classroom activities, which indicates that EFL PSTs are more receptive to technology integration. Similar findings also appeared in several studies about the EFL PSTs' openness to integrating technology into their teaching practices (Fathi & Ebadi, 2020; Park & Son, 2020). Regarding out-of-class activities, a few studies have shed some light on the use of social media in these activities. For instance, Baz et al., (2018), through researching 36 EFL PSTs on their teaching practices, discovered that these EFL PSTs implemented Instagram, Skype, Twitter, and Facebook to facilitate the students' out-of-class activities. Unfortunately, little information was found about how those platforms were implemented. In another instance, Nugroho and Mutiaraningrum (2020) reported the use of Instagram to support students' English learning. For instance, one of the 15 participants instructed the students to routinely publish videos on Instagram. As a result of these investigations, it appears that EFL PSTs are more receptive to technology integration than their in-service counterparts. These studies showed that EFL PSTs might have many ideas for implementing technology, especially Web 2.0 platforms, to support English learning. However, those studies did not explain in much detail how those platforms were implemented in IDLE settings to support the formal ones. Thus, a preliminary study to explore EFL PSTs' perceptions and implementation ideas is necessary.

METHOD

Design, Setting, and Context

This study belongs to basic qualitative research to better understand the participants' perceptions and ideas through qualitative methods. The researchers adopted a basic qualitative approach because it provides more freedom when conducting a study without committing to a particular qualitative design (Merriam & Tisdell, 2016). This research was conducted in the Department of English Language Education at a public university in Indonesia. The researchers conducted this study in this department because it had potential EFL PSTs who had sufficient knowledge of teaching English using technology as the participants. Moreover, this department provided their PSTs with a technological pedagogical content knowledge framework, a framework to provide excellent knowledge of teaching a subject matter using technology (Koehler & Mishra, 2005, 2009; Mishra & Koehler, 2006) through the giving of pedagogy, contents, and technology courses in four years of the study program. For instance, they had to enroll in technology course, educational technology course, instructional design and technology course, and other related technology for education courses.

Furthermore, this study was conducted during the pandemic from April to June 2021, necessitating that the researchers performed the research remotely and limited physical contact with the participants following Indonesian government instructions regarding school closures because of the COVID-19 pandemic. Among the many characteristics brought by the Indonesian EFL PSTs, this study concentrated on framing the exploration around the perceptions and implementation ideas of EFL PSTs who were studying at a public university to apply IDLE to support formal classroom instruction.

Particularly, the department allowed the researchers to conduct the research in one microteaching class of 30 EFL PSTs. This course prepared EFL PSTs before having teaching experience in both laboratory settings and with school partners. The course mostly discussed instructional designs, English learning, and instruction in formal classroom settings, including teaching simulations in laboratory settings.

Participants and Researchers

The researchers sought IRB approval prior to recruiting the participants. The researchers sent an electronic Qualtrics consent form and explained the study's purpose, advantages, and risks. During the first recruitment procedure using the purposive sampling technique, only 20 out of 30 PSTs expressed an interest in participating. In contrast, ten others declined due to a lack of prior knowledge of IDLE or an unwillingness to participate. The participants were then selected based on several criteria, including the following: (1) They had used IDLE to aid in the development of their speaking skills, (2) They were enrolled in a microteaching course, and (3) They had no prior teaching experience.

Finally, only 14 participants (12 females and two males between the ages of 20 and 21) fulfilled the requirement, as the remaining six had teaching experience through informal part-time teaching jobs that did not match the study's criteria. In addition, the researchers also recruited the course instructor to collect the data as a triangulation method to confirm students' responses. A WhatsApp group for PSTs was created to facilitate communication. Subsequently, the researchers performed all scheduling interactions through this group. Additionally, online group interviews were conducted in which participants were separated into two interview groups of six and eight persons.

Data Collection and Analysis

The researchers collected the data from various sources, including online interviews with both EFL PSTs and their instructor and the researchers' notes as data/source triangulation (Farmer et al., 2006; Farquhar et al., 2020). The researchers did triangulation to ensure the validity of the research results (Farmer et al., 2006; Stake, 1995). Due to the COVID-19 pandemic, the researchers were unable to meet the participants in person. Instead, the researchers conducted online interviews using Zoom, Google Meet, and WhatsApp. The first group requested to use Zoom, whereas the second group was already acquainted with Google Meet.

Additionally, the researchers interviewed the instructor over WhatsApp video calls. To collect data, the researchers developed and piloted an interview technique that included six demographic questions, eight questions on EFL PSTs' opinions of IDLE, and fourteen questions about their goals and plans for future IDLE activities. All questions had been sent to two experts in educational technology for content and face validity evaluations. The content validity was measured using an inter-rater agreement model proposed by Gregory (2015), yielding 14 valid items. Furthermore, no revisions were given by the experts to the sentences and contents of the interview guide.

The example questions of the EFL PSTs' perceptions of IDLE were "What kind of IDLE have you experienced before?", "How do you think IDLE could help improve speaking skills?" and "What kind of advantages does IDLE provide?". Moreover, the example questions about the EFL PSTs' future IDLE activities for their students were "What kind of IDLE activities would you ask your students to do?", "What kind of technology tools will you ask your students to use and for what purposes?", What activities would you design for your students' IDLE regarding searching English materials?". Meanwhile, the interview questions for the instructor were only to confirm the participants' responses.

The researchers conducted the interviews in Indonesian to alleviate the participants' nervousness during the data collection. The researchers interviewed the two groups for 120 minutes per session twice a month, and the researchers took notes to support the bracketing approaches the researchers would use in the data analysis. The interviews were then transcribed for analysis purposes, and the transcriptions were shared with the participants to guarantee the data's correctness and reliability.

The data were analyzed using inductive thematic analysis to generate relevant themes (Braun & Clarke, 2006). While analyzing the data, all members carefully reviewed every transcript, making notes on any pertinent information, potential snippets for coding, and potential themes. Prior to comparing our data analysis, the researchers carefully determined the codes and themes connected to the research topic. They also used bracketing techniques to supplement their findings with notes. Then, the researchers compared the analyses, and the inter-coder reliability was 87% (Cohen's $\kappa = 0.87$). Even though they found little differences, the researchers negotiated the discrepancies through discussion. For example, after the discussion, the researchers changed the theme "the advantages of doing IDLE" into "Positive perceptions towards IDLE."

FINDINGS

The overall findings from the 14 participants were summarized to address each of the questions. From the analysis, the researchers found initial five themes and 22 sub-themes. Later, after conducting a thorough analysis, they found four themes, 20 sub-themes, and 232 codes (see Table 1). Their instructor's statements were also presented to confirm the participants' testimonies.

Table 1. Themes and Sub-themes

Themes	Sub-themes
Having experience of doing IDLE	Watching movies / YouTube videos
	Learning English using applications
	Searching English materials online
	Playing games to learn English
	Listening to music to learn English
	Using social media to learn English
Positive perceptions towards IDLE	IDLE improves vocabulary mastery
	IDLE improves pronunciation and fluency
	IDLE helps to find language expressions
	IDLE improves learning motivation
	IDLE supports formal English instruction
	IDLE suits the pandemic situation that requires distance learning

Considerations toward IDLE	Wrong sources can cause wrong learning
	Students will likely do informal activities than the formal learning
	Possibility of learning inappropriate English words
	IDLE cannot guide student learning
Possible IDLE Activities for future students	IDLE for searching information
	IDLE for searching language expressions and vocabulary
	IDLE for practicing pronunciation and fluency
	Using games for students' IDLE

According to the survey, all participants had experienced IDLE during their English studies at high schools or colleges through a variety of activities, either to support formal or informal learning. The accessibility of technology, particularly the internet, has increased students' opportunities to look for any speaking material, and it appears that all participants frequently used technology to seek information on online sources to supplement their knowledge for their courses, especially to support their speaking skills development. For example, Melati said, *"I searched for information for my courses on the Websites or YouTube if the materials given by my lecturers were not clear enough."* The instructor's confession supported this statement that she often asked the students to find other resources and it seemed that they often searched for information from online resources. With abundant learning applications out there, one participant was found to enhance her English learning by learning applications to learn some linguistics features to support her speaking skills development. For instance, Yanti reported, "*I had an experience of using Duolingo to learn English [speaking skills]*." Additionally, the interviews suggested that not all participants experienced IDLE designed to supplement classroom education, where they appeared to gain some informal experiences from their leisure activities. For example, all participants experienced IDLE through watching movies or YouTube videos to learn some language expressions as Delia echoed "*I remember I watched documentary videos and drama series on YouTube with English subtitles*."

Interestingly, only two participants experienced learning English from playing games as Suryani said "*I played games that used English on my smartphone. It helped me improve my English [communication skills]*." Then, the findings showed that only six participants unexpectedly learned English from listening to music because they liked this activity and had been a part of their hobbies. For instance, Rianti improved her English pronunciation by singing English songs and said, *"I often listened to English songs and saw the lyrics. It unexpectedly improved my English."* The existence of social media also seemed to color the participants' experience of English learning, especially for their speaking skills, as Mursia commented, "*I communicated in English with my friends outside Indonesia using Line and Instagram when I was a high school student*."

The interviews also revealed that the participants had positive perceptions of IDLE as it helped advance students' English learning, especially on the linguistics features that build speaking skills. Four out of 14 participants argued that IDLE could improve students' vocabulary mastery through informal learning, as Suryani said, "*I think, IDLE effectively improves someone's speaking skills. For example, someone can enhance his/her vocabulary mastery through watching movies or listening to English songs*." Unfortunately, not all participants assumed that IDLE could advance the students' fluency practices, as only three agreed that IDLE could assist the students in practicing their fluency. For instance, Bagas stated, "*In my opinion, IDLE can help us to improve our fluency. We can focus on finding materials to practice pronunciation and we have many opportunities to use English to improve fluency*." Moreover, it seems that not all participants knew how to make use of technology tools, such as social media, to find language expressions to improve speaking skills. For instance, only three participants deliberately stated that YouTube could work best for this purpose; as Rina said, "*I can find many English expressions on YouTube that help me improve my speaking mastery*." Interestingly, not all PSTs assumed that IDLE could enhance learning motivation, and only three participants believed that IDLE improved it. For instance, Anita mentioned, "*Doing IDLE can sometimes motivate us to learn English because of the comfort and informal learning situations it provides us with*." With all the benefits that IDLE can provide for student learning, the interview results remarkably show that almost all participants perceived that IDLE had the potential to support classroom instruction. The following excerpt is best to illustrate the above explanation:

> *"I support if IDLE can be implemented to assist the classrooms instruction because most of the time, classroom instruction cannot cover all materials, and the students need to explore them in out-of-class time. Thus, I think IDLE can support formal classroom instruction."* (Melia, female, online interviews, May 2021).

Moreover, during this pandemic time, no wonder that all participants agreed that IDLE suited the situations which required distance learning. For instance, Yanti reported, "*I listened to many students' [classmates] complaints during the pandemic time and most of them said they were mostly given tasks without being given any learning materials or activities. Thus, IDLE might help the [future] students*."

As the use of technology in learning has both positive and negative sides, all participants also showed some considerations for IDLE. Two participants raised concerns that inappropriate learning sources could affect the student learning. For example, Delia claimed, "*The students might be exposed to wrong or inappropriate sources. As a consequence, they might develop some misunderstandings towards some contexts*." Also, it seems that three participants were afraid of how IDLE had the potential to negatively affect formal learning. As Rianti mentioned, "*I think, for some students, they might not know how to properly do IDLE and might have less interest in formal learning*." The openness of online information, which inevitably contained negative information besides the positive one seems to influence three PSTs' concerns towards students' English learning, especially those that dealt with inappropriate English words. For instance, Darsiyah stated her concern by saying, "*Through doing IDLE, the students are likely to be exposed to the use of inappropriate English words or slang language, which is not good for student learning.*" Most importantly, the findings revealed that half of the participants agreed that students needed guidance when doing IDLE. The following excerpt is best to support the above explanation:

> *"I think, the students might directly apply what they learn from IDLE in real conversation without any filters. Without any guidance from teachers, they might not know what is right or wrong, or they might not know the weaknesses or strengths of their IDLE."* (Arsa, male, online interview, June 2021).

When talking about possible IDLE activities to support formal classroom instruction, the EFL PSTs were eager to convey their intentions and ideas for their future teaching. Most participants thought of Web 2.0 technology tools and learning applications to support their future students' IDLE activities. The tools that the researchers and the participants had talked about were YouTube, Instagram (www.instagram.com), Google, Google Translate, Google Meeting, Joox (www.joox.com), Wikipedia, Duolingo (www.duolingo.com), Webtoon (www.webtoon.com), TikTok (www.tiktok.com), Facebook, WhatsApp (www.whatsapp.com), Spotify (www.open.spotify.com), Zoom, Hello Talk (www.hellotalk.com), and Line. Furthermore, the participants would use those tools for some purposes, especially to support the development of speaking skills (see Table 2). Interestingly, according to the instructor, the participants often discussed such tools in the microteaching course and described their potential to be employed for educational purposes. In addition, the students also mentioned these technology tools in their assignments about instructional design in this course.

Table 2. Technology Tools and Purposes for IDLE

Technology tools for IDLE	Purposes
YouTube	To search for information about some contents and pronunciations and vocabulary materials; To practice speaking skills
Instagram	To search for information about some contents and pronunciations and vocabulary materials; To practice speaking skills
Google	To search for information about some contents and vocabulary materials
Google Translate (Text to speech feature)	To learn pronunciations
Google Meeting	To practice speaking skills by communicating in English
Joox	To learn pronunciations and search vocabulary materials

Wikipedia	To search for information about some contents and vocabulary materials
Duolingo	To search pronunciations and vocabulary materials; To practice speaking skills
Webtoon	To search for information about some contents and vocabulary materials
TikTok	To learn pronunciations and search vocabulary materials; To practice speaking skills through imitating or mimicking
Facebook	To practice speaking skills through posting, commenting, and communicating in English
WhatsApp	To practice speaking skills through texting and communicating in English
Spotify	To learn pronunciations and search vocabulary materials
Zoom	To practice speaking skills by communicating in English
Hello Talk	To learn pronunciations and search vocabulary materials; To practice speaking skills
Line	To practice speaking skills through texting and communicating in English

During the interviews, all PSTs proposed interesting ideas of how they would design their future students' IDLE to support formal classroom instruction. As mentioned earlier, they all understood that the formal classroom instruction had limited time for material coverage and speaking practices. Thus, IDLE could be the alternative for the students to immerse themselves in informal learning to facilitate the learning process that they could not get at schools because of the limitation of time. According to the instructor, the EFL PSTs never discussed such activities, as microteaching courses mostly discussed formal classroom instruction.

Regarding the IDLE activities, four participants planned to ask their students to use various applications to read digital texts, stories, or Webtoon, watch English videos, and play games to search for new language expressions and vocabulary. For instance, Melia stated, *"I will suggest my students to watch movies and play games as they can learn many language expressions from these sources*." The interview results also suggested that the participants would suggest their future students use some applications to help them practice their pronunciation. With the affordances of text-to-speech and voice recorder applications, eight participants explored many interesting ideas. The following example is best to illustrate the above description:

> *"I will suggest my students to use Duolingo and Google Translate to learn the pronunciations of some English words. These tools would help them to improve their pronunciations, and once they had possessed the pronunciations, I would ask them to do a podcast in English on YouTube."* (Eka, female, Teacher educator, online interview, June 2021)

Regarding using games for IDLE, interestingly, ten participants showed their enthusiasm to ask their future students to do both online and offline games. Nevertheless, they claimed they would ask the students to download learning games or digital game-based learning only. For instance, Rianti said, "*I will suggest my students do both online and offline digital game-based learning to support their English learning at home*." However, the other four participants argued that they did not want their students to play games, even if they were for learning. For example, Melati stated, "*I don't think both online and offline games can support students' language learning. Sometimes games make the students not focus on the courses*."

DISCUSSIONS

To address the first research question, interview findings indicated that EFL PSTs had favorable attitudes toward IDLE. The participants perceived that IDLE could increase motivation for learning speaking skills. This finding is in accordance with what Lamb and Arisandy (2020) had reported that those who are involved in IDLE seem to have better motivation to learn English. Moreover, such motivation is needed during this pandemic era, which requires additional learning activities at home to supplement formal English instruction (Evans et al., 2020). Additionally, participants appear to perceive that IDLE can help enhance speaking abilities through linguistic elements, such as vocabulary, pronunciation, and language expression study and practice. As some studies have reported, linguistic elements contributed to speaking performance (e.g.,

Bhattacharya, 2017; Bohlke, 2014; Brown, 2001; Hinkel, 2006; Huang et al., 2018). Thus, the participants who did IDLE for linguistic element practices, might perceive that this is the way of mastering speaking skills. To support this notion, some studies have shown that students who do IDLE exert better speaking performance (e.g., Lee, 2019b; Lee & Dressman, 2018). It is therefore reasonable to hypothesize that the EFL PSTs' experience with IDLE at high schools and/or colleges influenced their recognition of the benefits of this informal mode of English learning, resulting in positive attitudes towards IDLE.

Moreover, the results above also showed that the EFL PSTs had more positive acceptance towards IDLE than the in-service ones. Thus, these findings conflicted with those of Chik (2011) and Toffoli and Sockett (2015), who reported that in-service teachers were likely more resistant toward IDLE. Furthermore, the findings in this study implied that the EFL PSTs were more open towards technology integration in English learning, supporting previous studies' findings (e.g., Akayoglu et al., 2020; Baz et al., 2018; Fathi & Ebadi, 2020; Nugroho & Mutiaraningrum, 2020; Park & Son, 2020). Even though the participants had no prior teaching experience with technology that would have influenced their attitude toward employing technology in education, their positive attitude toward IDLE may be impacted by the fact that most of the current PSTs know how to use technology for teaching (Park & Son, 2020; Thompson, 2013) because they have grown up with technology (Chris Evans & Robertson, 2020). In addition to the Technological Pedagogical Content Knowledge, they acquired in their teacher education program, they may have developed an understanding of the benefits and positives of IDLE as opposed to in-service teachers, which are largely comprised of immigrants with no prior digital experience and even struggling to use technology in life.

However, participants discussed the difficulties of using IDLE, including how improper sources resulted in incorrect learning and how students could engage in more informal than formal learning. Participants who had implemented IDLE may become more aware of its drawbacks. In this case, it is plausible to argue that the participants' perceptions were not negative towards IDLE, as during the interviews, they did not show any resistance towards IDLE. However, they seemed concerned about implementing IDLE, as participants may have formed a strong sense of pedagogical content knowledge, a knowledge of teaching a subject matter (Koehler & Mishra, 2005; Shulman, 1986), during their PSTs. Thus, they are more sensitive to this knowledge and could identify some considerations to help the student learning (Kind & Chan, 2019).

The participants discussed alternative technology tools for future students' IDLE to address the second research question. The participants found Web 2.0 tools useful in making IDLE fun and interesting for their future students. Perhaps because they were familiar with such tools (et al.Lamb and Arisandy, 2020). Moreover, Kusuma (2021) noted in his study of English teacher education programs in Indonesia that numerous institutions provided PSTs with knowledge of possible teaching tools, including Web 2.0 technology. As a result, it is understandable why the participants in this study advocated Web 2.0 technologies, given their awareness of the potential benefits of such tools for IDLE.

During the discussions with participants about their visions for how those technologies could be used for IDLE, it was discovered that they suggested a variety of intriguing concepts. Interestingly, all of the responses alluded to technological disruptions. Even though they lacked teaching experience with technology-assisted instruction, they were able to generate some ideas for utilizing Web 2.0 technologies for academic purposes. It is possible that because these PSTs were immersed in technology and educational technology courses throughout their studies, their knowledge of teaching English using technology, especially how to disrupt technology for teaching and learning reasons, was strengthened (Kusuma, 2022). This claim is also in line with what other studies perceived that PSTs immersed in technology and educational technology courses might have better knowledge and considerations to implement technology in their teaching practices (e.g., Fathi & Ebadi, 2020; Kusuma, 2023; Park & Son, 2020). Moreover, these participants are perhaps tech-savvy who recognize the affordances of technology for student learning (Park & Son, 2020). As a result, it aided participants in developing a list of possible IDLE activities. Additionally, participants' experience with IDLE was projected to play a role. As a result of their studies and experience with IDLE, individuals may come up with some interesting IDLE ideas, as Thomas et al. (2013) delineated that the teachers' technology integration is mostly influenced by all the knowledge and experience they attained from their teacher education programs. As a result, it makes sense that EFL PSTs in this study, who lacked prior teaching experience, could propose engaging in IDLE activities by disrupting existing technology tools.

As a result of the data above, this article can offer two recommendations to all English educators and teacher education programs on the use of IDLE to supplement conventional English classroom instruction. To begin, it is critical to shift educators' mindsets away from the belief that EFL learning occurs exclusively in the classroom, as the affordances of current technology have significantly increased the options for learning foreign languages outside of the classroom (Kern, 2006; Lamb & Arisandy, 2020; Lee et al., 2021; Xodabande, 2017). Undeniably, many English educators still underestimate their students' informal learning (see Chik, 2011; Toffoli & Sockett, 2015). Meanwhile, many proficient digital learners find classroom instruction is not an engaging place to learn English (Lamb & Arisandy, 2020). Therefore, a changing mindset would influence educators' decisions to implement IDLE to support formal classroom instruction (Lamb & Arisandy, 2020; Toffoli & Sockett, 2015). Fortunately, as demonstrated in this study, participants exhibited favorable attitudes toward IDLE, which may serve as a critical foundation for building the mindset that successful English learning occurs not just as a consequence of formal classroom instruction but also as a result of informal ones.

To gain a thorough understanding of informal learning, IDLE should be integrated into the curriculum of all English teacher education programs as a topic covered in pedagogy courses. Considering that the students are doing IDLE, the EFL PSTs should have a thorough understanding of this type of English learning and how IDLE can be used to supplement conventional classroom instruction. Additionally, a significant challenge for teacher education programs is preparing PSTs who are informed and competent in the area of IDLE (Lamb & Arisandy, 2020). Thus, a thorough understanding of IDLE will assist teachers in maximizing the potential and benefits of IDLE to enhance formal classroom instruction in a manner that facilitates meaningful English learning. Incorporating IDLE materials into pedagogy classes could involve at least three discussions: the notion of IDLE, the technology tools that support IDLE, and feasible IDLE activities that supplement traditional classroom instruction. As revealed in this study, the EFL PSTs had interesting ideas on IDLE activities, including the possible technology tools they would use for their implementation. Kusuma (2021), in his research about teacher education programs, reported that many instructors did not know what technology tools to provide their PSTs. Thus, understanding the technology tools that PSTs frequently utilize should serve as a solid starting point for instructors in selecting useful tools for formal and informal learning. As instructors with pedagogical experience and PSTs who are familiar with the present learning environment using technology, they can explore the benefits and drawbacks of utilizing such tools for both formal and informal learning. They could continue exploring potentially engaging IDLE activities to supplement traditional classroom instruction.

CONCLUSIONS

In conclusion, this article sheds some new light on the attitudes of EFL PSTs about technology integration. The findings indicated that EFL PSTs had positive perceptions regarding IDLE, especially in developing speaking skills, which may provide a solid foundation for incorporating this style of learning into students' language learning processes. Additionally, despite their lack of teaching experience, the EFL PSTs recommended a variety of technology tools, particularly Web 2.0 technologies, to facilitate engaging IDLE activities to enhance their future students' speaking development. These findings contribute to our understanding of how EFL PSTs who know how to use technology for teaching view technology integration positively and may envision some informal learning practices that could be facilitated by technological disruption.

Nonetheless, this study has several areas for improvement. This study examined pre-service EFL teachers' perceptions of IDLE implementation for their prospective students. Our participants, on the other hand, were those who had not yet undertaken practice teaching. Thus, a study involving PSTs currently engaged in or have previously engaged in practice teaching may be needed. Specifically, to learn about their experience developing and integrating IDLE into their formal classroom instruction, as well as the difficulties encountered during implementation. In addition, this study focused exclusively on EFL PSTs and excluded their in-service counterparts, many of whom were digital immigrants. A further study should address the shortcomings identified in this study to add to the body of knowledge about English language teaching, particularly IDLE.

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BOOK REVIEW

ONLINE POSTGRADUATE EDUCATION: RE-IMAGINING OPENNESS, DISTANCE AND INTERACTION

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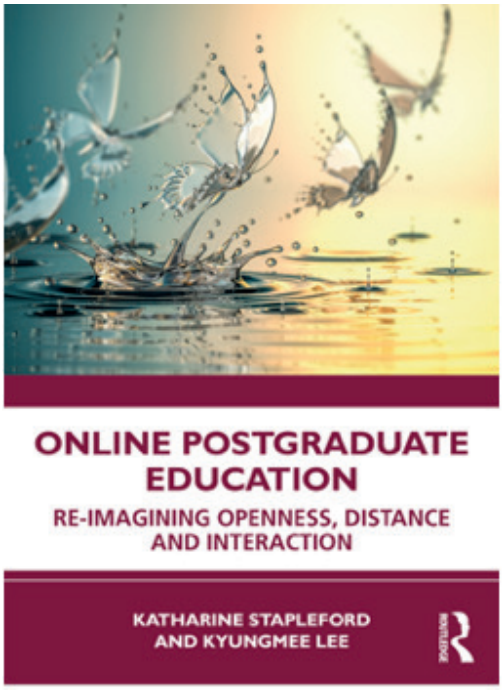

INTRODUCTION

"Online Postgraduate Education: Re-imagining Openness, Distance, and Interaction," authored by Katharine Stapleford and Kyungmee Lee, is an insightful exploration into the evolving landscape of postgraduate education facilitated by online platforms. The book delves into the themes of openness, distance, and interaction, presenting a comprehensive analysis of how these elements are being redefined in the context of online education. By addressing both theoretical perspectives and practical implementations, Stapleford and Lee offer a valuable resource for educators, administrators, and policymakers seeking to understand and improve online postgraduate education.

BOOK REVIEW

The book is structured into several parts, each focusing on different aspects of online postgraduate education. Stapleford and Lee begin with an overview of the historical context of distance education, highlighting the technological advancements that have transformed this field. This section sets the stage for a deeper exploration of the themes of openness, distance, and interaction.

Openness in Education

In the first part, the authors discuss the concept of openness in education. They explore how traditional boundaries of higher education are being challenged by online platforms that offer greater accessibility and flexibility. The discussion is enriched by case studies that illustrate the practical implications of openness, such as the implementation of Massive Open Online Courses (MOOCs) and open educational resources (OERs). However, while the authors successfully highlight the democratizing potential of openness, there is a notable absence of critical analysis regarding the quality and academic rigor in open educational environments. MOOCs and OERs often suffer from high dropout rates and inconsistent quality. A deeper investigation into how institutions can ensure and maintain high standards while expanding access would strengthen this section. Furthermore, the book could discuss the sustainability of such open models, considering the financial and institutional support required.

A significant strength of this section is its ability to present a balanced view of openness. The authors commend the democratization of education through online platforms, acknowledging the vast potential for increasing access to higher education globally. However, they also critically evaluate the challenges, such as the variability in the quality of MOOCs and the potential for a dilution of academic standards. The case studies provide concrete examples that ground the theoretical discussions in real-world scenarios, offering readers a practical understanding of the issues at hand.

Distance in Education

The second part of the book focuses on distance, emphasizing how online education has redefined the notion of physical and temporal separation between students and institutions. The authors explore various models of distance education, from asynchronous learning environments to real-time virtual classrooms. They highlight the importance of creating a sense of community and belonging among online learners, despite the physical distance. While the authors effectively emphasize the importance of community and interaction in distance learning, they could have addressed the diverse technological capabilities and digital literacy levels of students. The book could benefit from more in-depth discussions on strategies to bridge the digital divide and ensure equitable access to online learning tools. Additionally, the psychological impacts of isolation in online learning are an important aspect that warrants more exploration, with suggestions on methods to mitigate these effects.

One of the book's strengths is its detailed examination of different models of distance education. Stapleford and Lee provide a thorough analysis of asynchronous and synchronous learning environments, highlighting the advantages and challenges of each. For instance, asynchronous learning allows for greater flexibility, enabling students to engage with the material at their own pace. However, it can also lead to feelings of isolation and disconnection (Provenzi & Tronick, 2020). On the other hand, synchronous learning fosters real-time interaction and community building but may be less flexible for students in different time zones or with varying schedules. The authors' ability to present these nuances enhances the reader's understanding of the complexities involved in designing effective online learning experiences.

Interaction in Online Education

Interaction is the central theme of the third part, where the authors delve into the dynamics of online communication and collaboration. They discuss the role of technology in facilitating interaction, including the use of discussion forums, video conferencing, and social media. The book provides practical strategies for enhancing student engagement and participation in online courses. However, while the authors provide valuable strategies for enhancing interaction, there is a need for a more critical examination of the psychological and social aspects of online communication. Issues such as the lack of non-verbal cues and the impact of online anonymity on student behavior are underexplored.

Additionally, the book could discuss more about the training and support required for instructors to effectively facilitate online interactions. The role of instructor presence in maintaining student engagement and ensuring academic integrity is crucial and warrants deeper analysis.

Stapleford and Lee excel in their discussion of the technological tools that can enhance interaction in online education. They provide a comprehensive overview of various platforms and tools, such as learning management systems, video conferencing software, and collaborative tools like Google Docs. The practical tips and strategies offered for fostering interaction are particularly valuable for practitioners looking to improve student engagement in their courses. However, the book could benefit from a more detailed exploration of the challenges instructors face in adapting to these tools and the support they need to use them effectively. Additionally, a discussion on best practices for maintaining academic integrity and managing online interactions would add depth to this section.

Societal and Ethical Dimensions

Throughout the book, the authors maintain a critical perspective, questioning the assumptions and implications of online postgraduate education. They highlight issues such as the digital divide, equity, and the commercialization of education, urging readers to consider the broader societal and ethical dimensions of online learning. This critical lens adds depth to the discussion and encourages readers to think beyond the immediate benefits and challenges of online education. However, some sections could benefit from more concrete solutions or recommendations for addressing the highlighted issues. The discussion on commercialization, for instance, could be expanded with more examples and potential policies to mitigate its negative effects. The authors could also explore the ethical implications of data privacy and surveillance in online education more thoroughly.

A notable strength of this section is the authors' willingness to tackle difficult and often overlooked issues in online education. The discussion on the digital divide, for example, is particularly relevant in light of the COVID-19 pandemic, which has exacerbated existing inequalities in access to technology and the internet. Stapleford and Lee effectively highlight the importance of addressing these disparities to ensure that online education is accessible to all students, regardless of their socio-economic background. Their critical examination of the commercialization of education is also commendable, as it raises important questions about the motivations and interests driving the expansion of online learning.

"Online Postgraduate Education: Re-imagining Openness, Distance, and Interaction" is a compelling and timely contribution to the field of education. The book's strength lies in its comprehensive analysis and critical perspective, which provide a nuanced understanding of the complexities of online education. Stapleford and Lee's thorough examination of the themes of openness, distance, and interaction offers valuable insights for educators, administrators, and policymakers. The book is particularly relevant for those involved in designing and implementing online postgraduate programs. Its practical recommendations and case studies provide actionable strategies for enhancing the quality and effectiveness of online education. Additionally, the critical discussions on equity and access make it a valuable resource for those interested in addressing the broader societal implications of online learning. The book's strength also lies in its balanced approach, acknowledging both the potential and the pitfalls of online education, thereby providing a realistic and pragmatic view of the field. By integrating theoretical perspectives with practical insights, Stapleford and Lee offer a well-rounded resource that is both informative and thought-provoking.

CONCLUSION

In conclusion, "Online Postgraduate Education: Re-imagining Openness, Distance, and Interaction" by Katharine Stapleford and Kyungmee Lee is a must-read for anyone involved in the field of education. The book offers a comprehensive and critical analysis of the evolving landscape of online postgraduate education, providing valuable insights and practical recommendations. By addressing the themes of openness, distance, and interaction, Stapleford and Lee present a holistic view of online education, making it a valuable resource for educators, administrators, and policymakers. The book's blend of theoretical exploration and practical advice ensures it will be an important tool for those seeking to navigate and improve the domain of online postgraduate education. The strengths of the book lie in its balanced approach, thorough analysis, and critical perspective, making it an essential read for anyone interested in the future of higher education.

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