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PRESENTACIÓN

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Esperamos que este número resulte interés al lector dada la relevancia de las investigaciones publicadas.

Julio Ruiz-Palmero
Director de Innoeduca. International Journal of Technology and Educational Innovation

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ÍNDICE

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Preparing instructors to transition to online distance learning: A pandemic panacea?

Preparar a los instructores para la transición al aprendizaje a distancia en línea: ¿una solución para la pandemia?

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ABSTRACT

This research explores the interconnectedness between readiness, the adoption of online teaching, attitude, and behavioral intention concerning Online Distance Learning (ODL) within the realm of hospitality and tourism instruction. The study framework intergrates the Unified Theory of Acceptance and Use of Technology (UTAUT) model and Technology Readiness (TR) dimension. The data, collected through purposive sampling and online surveys from 248 instructors, was analyzed using Partial-least Square-Structural Equation Modeling (PLS-SEM) to assess the study's model and hypotheses. The outcomes reveal that factors such as effort expectancy (EE), performance expectancy (PE), and social influence (SI) directly impact instructors' attitudes towards ODL. Additionally, the study establishes that technical, pedagogical, and lifestyle readiness are robust indicators for enhancing instructors' behavioral intention towards ODL. Intriguingly, the sole distinction between the theoretical and practical class arises in the interaction between instructors' technical and lifestyle readiness regarding behavioral intention. The pragmatic implications of this study underscore the significance of instructors' attitude and technology readiness in driving the adoption of ODL within the hospitality and tourism instruction domain. Furthermore, the study's findings offer valuable insights to policymakers, aiding them in developing effective methodologies for practical class teaching within the ODL framework and aligned with the dynamic environment of online learning.

KEYWORDS online teaching; online distance learning; COVID-19; instructor readiness.

RESUMEN

Este estudio examina la interrelación entre la preparación del instructor, la adopción de la enseñanza en línea, la actitud y la intención de comportamiento entre cuatro instructores de turismo y hotelería de la ASEAN. Este estudio amplió el

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modelo de la Teoría Unificada de Aceptación y Uso de la Tecnología (UTAUT) con atributos de preparación tecnológica. Se utilizaron muestreos intencionales y encuestas en línea para recopilar datos entre 248 instructores. Los instrumentos de la encuesta se adaptaron a partir de escalas establecidas, y se utilizó el modelo de ecuaciones estructurales de mínimos cuadrados parciales (PLS-SEM) para probar el modelo de estudio y las hipótesis. El hallazgo mostró que la expectativa de esfuerzo (EE), la expectativa de rendimiento (PE) y la influencia social (SI) tenían un efecto directo en la actitud del instructor. Por otro lado, este estudio encontró que la preparación técnica, pedagógica y de estilo de vida es un fuerte indicador de mejorar la intención de comportamiento de un instructor para continuar impartiendo enseñanza en línea en el futuro. Además, la interacción entre la preparación técnica y de estilo de vida de los instructores sobre la intención de comportamiento difiere de la clase teórica y práctica. Los conocimientos prácticos del estudio facilitan la importancia de la enseñanza en línea de actitud y preparación tecnológica entre los instructores de hotelería y turismo. Los hallazgos del estudio también ayudan a los formuladores de políticas a diseñar un método de enseñanza de clase práctico y efectivo que sea flexible y se adapte bien al entorno dinámico de aprendizaje en línea.

PALABRAS CLAVE enseñanza en línea; aprendizaje a distancia en línea; COVID-19; preparación del instructor.

1. INTRODUCTION

The COVID-19 pandemic has had a significant impact on the educational field (Tiwari et al., 2020), forcing institutions and educators to rapidly adopt online distance learning as a contingency measure (Abou-Khalil et al., 2021; Lassoued et al., 2020; Sabet et al., 2022; Sidpra et al., 2020). However, the transition to online learning poses challenges for students and instructors, especially in hospitality and tourism. These hospitality and tourism courses traditionally rely heavily on hands-on experiences, such as culinary labs, hotel operations, travel planning, and customer service simulations. The sudden utilisation of adopt online distance platforms has disrupted this traditional practical and hands-on learning experiences approach (Munoz et al., 2021). As a result, it is not easy to harness the knowledge of online learning in a short period while maintaining the structural integrity of the taught courses, especially when dealing with practical classes (Dumford, & Miller, 2018; Eseadi, 2023; Prause et al., 2019). Consequently, a critical need emerges to scrutinize the significance of instructor preparedness and readiness concerning online distance learning solutions during this unprecedented crisis.

This study posits a fundamental argument: comprehending instructors' online teaching preparation and their preferred class type is pivotal in assessing the success of online distance learning (ODL) in hospitality and tourism courses. Furthermore, delving into instructors' unique requisites and concerns can furnish invaluable insights into designing effective support and training initiatives to enhance online teaching within this specialized domain. Given the unique nature of the hospitality and tourism courses that heavily rely on practical, experiential learning, it is crucial to understand the specific needs and challenges that instructors face in adapting their teaching approaches to an online format. The urgency and limited preparation time during the initial stages of the COVID-19 pandemic further highlight the importance of investigating instructors' readiness, attitudes, and strategies in online teaching.

In this context, this study is crucial for several reasons. First, instructors play a pivotal role in shaping the online learning experience. Their familiarity with online tools, adaptability to new teaching methods, and

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overall attitude towards online education can greatly influence the effectiveness of the transition. Hence, investigating instructor preparedness and attitudes towards online teaching is essential. On the other hand, well-prepared instructors with a positive attitude towards online teaching are more likely to design engaging and effective online courses. This, in turn, influences student engagement, learning outcomes, and overall satisfaction. Hence, understanding the factors contributing to the successful adoption of ODL is critical. On the other hand, comparing practical and theoretical classes is crucial in understanding the ODL phenomenon. With their hands-on nature, practical classes present unique challenges in an online format. Henceforth, exploring how instructor readiness and attitudes interact with class types can provide insights into effective strategies for delivering practical components through remote methods. As such, the outcomes of this research can inform the design of future hospitality and tourism curriculum.

This study objectives are twofold. First, this study examines the inter-relationship between online teaching readiness, adoption, attitude, and behavioural intention among hospitality and tourism instructors. Next, this study tests whether class types (practical or theoretical class) moderate the inter-relationship between online teaching readiness, adoption, and behavioural intention. The outcomes of this study bear substantial significance for enhancing the comprehension of ODL within the realms of hospitality and tourism. By shedding light on instructors' readiness, attitudes, and strategies in the context of ODL, the study enriches the discourse surrounding effective pedagogical approaches in these fields. The study's findings also highlight the potential to foster the creation of resilient and adaptable educational programs, equipping future learners to thrive in the face of uncertainty.

2. LITERATURE REVIEW

2.1. Instructor technology readiness

Instructor online teaching readiness pertains to how well-prepared and suitable instructors effectively engage with online education and design/deliver online courses. It encompasses technical skills, familiarity with online teaching tools, and pedagogical knowledge required to create interactive and engaging learning experiences (Brinkley-Etzkorn, 2018; McGee et al., 2017). Since instructors are responsible for course design and delivery, technological readiness is crucial in establishing a supportive and engaging online learning environment (Alea et al., 2020; Cutri et al., 2020; Tiwari et al., 2020). Past studies highlighted the importance of instructor readiness in delivering a practical instructional delivery experience (Eseadi, 2023; Hung, 2016; Junus, 2021; Tang et al., 2021; Wei, & Chou, 2020). Besides, the level of instructor readiness greatly influences the quality of the online learning experience (Cutri et al., 2020; Tiwari et al., 2020).

Online learning environments introduce unique challenges and demands for instructors. Technical readiness, encompassing an instructor's proficiency with online tools and technologies (Jung, & Lee, 2020). Hence, it is crucial for effective delivery of online courses. Lifestyle readiness, on the other hand, referring to an instructor's personal suitability for remote work and flexibility (König et al., 2020). It has since become particularly relevant when teaching online. Besides, pedagogical readiness, involving an instructor's familiarity with effective online teaching methods, is essential for designing engaging and interactive

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online learning experiences (Selvaraj et al., 2021). Integrating these readiness factors acknowledges the contextual nuances of online teaching.

The level of online teaching readiness can be evaluated using three scales: technical readiness, lifestyle readiness, and pedagogical readiness (Boettcher, & Conrad, 2021; First, & Bozkurt, 2020). Technical readiness assesses the instructor's perception of technology integration to provide an optimal online learning and teaching environment (Phan, & Dang, 2017). Meanwhile, lifestyle readiness assesses the instructor's online teaching environment, including self-managed learning and time management skills (First, & Bozkurt, 2020). On the other hand, pedagogical readiness evaluates online instructor experiences, confidence levels, and attitudes toward the online environment for teaching (Alea et al., 2020).

Many studies have evaluated instructor readiness in online teaching based on their technology skills, lifestyle, and pedagogical training (Brinkley-Etzkorn, 2018; McGee et al., 2017; Oguguo et al., 2023). Oguguo et al. (2023) and König et al. (2020) empirically validated that instructors' competence and opportunities to acquire digital competence are significant factors in adopting online teaching. However, most recent literature led to inconsistent findings concerning the impact of readiness toward using and applying online teaching in developing nations (Ayodele et al., 2018; Owen et al., 2020). This is pertinent as developing nations have limited exposure to technology compared to the first world countries. Hence, further research is required to understand how these readiness factors contribute to instructors' attitudes toward their adoption and challenges with online teaching.

2.2. Attitudes towards online learning

Instructor attitude is one of the key agents in utilising online teaching in any educational institution. Kaplan (1972) defined attitude as a tendency to respond to an event favourably or unfavourably. Meanwhile, Semerci and Aydin (2018) described attitude as an element that guides an individual's behaviour in line with his feelings and thoughts. In addition, Triandis (1971) also stated that attitudes consist of three components: affective, cognitive, and behavioural. The affective component includes statements of likes and dislikes about certain objects (Stangor et al., 2014). On the other hand, the cognitive part refers to an instructor's statements that provide the rationale for the value of an object. At the same time, the behavioural aspect explains what an instructor does or intends to do (Koet, & Abdul Aziz, 2021). Notably, all three components of online teaching help form an instructor's general attitude toward online teaching.

Many studies on online teaching acceptance have shown that attitude significantly predicts behavioural intention to use online teaching. Instructors with continued training and support were highly optimistic about online teaching (Karen, & Etzkorn, 2020). However, Guðmundsdóttir and Hathaway (2020) found that although most instructors had adequate experience teaching online before the COVID-19 pandemic, they had to operate in "triage mode" during the early stage of COVID-19 with limited time to prepare, learn, and build online courses contents. Such urgency affect attitude especially those who had never taught (or even learned) online (Davis et al., 2019; Iyer, & Chapman, 2021). As a result, instructors who had never taught or learned online before may have faced greater challenges and uncertainties, which could have influenced their attitudes towards online teaching. It could have impacted instructors' perceptions and

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approaches to online instruction. Therefore, it is crucial to understand the nature of instructors' attitudes better to understand their behavioural intention in online teaching.

2.3. Online learning behavioural intention

Mailizar et al. (2020) defined behavioural intention in online teaching as behavioural tendency and willingness to conduct classes in online teaching; therefore, it determines the acceptance of the technology. Notably, instructors' behavioural intentions are influenced by their attitudes in online and face-to-face classes (Mokhtar et al., 2018). However, Chao (2019) has found that behavioural intention to adopt new technology was related to instructors' satisfaction, trust, performance expectancy, and effort expectancy to use technology in online teaching. Besides, the instructor's behaviour can differ based on class types, such as face-to-face and online teaching (Maheshwari, 2021).

The main difference between face-to-face and online classes is the experience and the pattern of engagement between instructors and students. Face-to-face classes involved many activities, practicals, and lectures (Kemp, & Grieve, 2014). Meanwhile, online classes demanded a significant shift in communication style, summative assessments, and subject delivery between lecturers and students (Junus et al., 2021; Oguguo et al., 2023). Meanwhile, online classes offered students more self-directed in their studies with less direction from the lecturers. Hence, transitioning from face-to-face to online classes often causes many challenges.

Looking at the hospitality and tourism educational perspectives, the transition from face-to-face to online classes brings about significant differences in the experience and pattern of engagement between instructors and students. Face-to-face classes typically involve various activities, practicals, and lectures facilitating hands-on learning experiences. On the other hand, online classes require a shift in communication style, assessment methods, and subject delivery, placing more responsibility on students for self-directed learning. This transition presents challenges for both instructors and students alike.

2.4. Hypotheses development

This study combines the Venkatesh et al. (2003) Unified Theory of Acceptance and Use of Technology (UTAUT) model with technology readiness attributes as proposed by Dwivedi et al. (2019). The effort expectancy (EE), performance expectancy (PE), social influence (SI), facilitating conditions (FC), behavioural intention (BI) to adopt the online learning system, and usage behaviour are the six fundamental constructs in the UTAUT model. Several educational and pedagogy studies have adopted and extended the UTAUT model to determine technology adoption behaviour (Akinnuwesi et al., 2022; Chao, 2019; Dwivedi et al., 2017; Nikou, & Economides, 2019; Mei et al., 2018). However, only a limited study tries to integrate the UTAUT model with technology readiness attributes, causing scarce understanding of the impact of different types of classes in ODL's operationalisation.

The UTAUT framework primarily focuses on end users' acceptance and use of technology. However, in an online learning context, instructors are active users and facilitators of technology. By integrating instructor readiness factors, the framework can provide a more holistic understanding of the technology adoption process, accounting for the unique perspective of educators (Al-Fraihat et al., 2020; Cutri et al., 2020).

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Besides, integrating instructor readiness factors can enhance the predictive power of the UTAUT framework when applied to online learning contexts (Ayodele et al., 2018; Owen et al., 2020). These factors can explain additional variance in instructor attitudes and behaviors beyond the core UTAUT constructs, offering a more accurate model for understanding technology adoption in online teaching.

There are various predictors of user's attitude towards technology. Notably, there is a positive link between effort expectancy and attitude towards technology. Studies has found that lecturers will portray positive attitude towards technology if it offers ease of search, ease of use and time saving (Md Yunus et al., 2021). Similarly, a study by Chao (2019) confirmed that effort expectancy influences the instructor's attitude toward technology adoption. On the other hand, users would be more open and confident to use a new technology if they felt it would save their time and effort as compared to the traditional platform (Nikolopoulou et al., 2021). Similarly, Sewadono et al. (2023) has demonstrated the significant influence of performance expectancy to elevate instructor's intention to use e-learning platform.

On the other hand, social influence is one of the most important factors to influence attitude towards technology adoption. Given that ODL is still a foreign concept among instructors, their attitude towards ODL may be influenced by their social circle like peers, family members, figurehead, relatives, and workmate. These peoples possess significant influence towards their thoughts, ideas, opinions and attitudes towards a new technology. Studies has found that instructors are prone to refer to their social circles to get the relevant ideas about online learning (Kim et al., 2020; Selvaraj et al., 2021). Besides, studies also have found that facilitating conditions are the strongest determinant and vital for technology adoption (Jung, & Lee, 2020; Sangeeta, & Tandon, 2021). Similarly, Mazman Akar (2019) study found that facilitating conditions positively influence teacher's technology adoption.

Hence, this study has put forward to test the following hypotheses:

H_{1a}: *Effort expectancy positively influences the instructor's attitude.*

H_{1b}: *Performance expectancy positively influences the instructor's attitude.*

H_{1c}: *Social influence positively influences the instructor's attitude.*

H_{1d}: *Facilitating conditions positively influence the instructor's attitude.*

Dwivedi et al. (2017) found that attitude played a critical role in the acceptance and behavioural intention in adopting technology. Another study by Khechine et al. (2020) found that attitudes were the main determinants of behavioural intention in adopting technology. Similarly, an instructor with a positive attitude towards e-learning tools maintains the quality of learning and forms an important part of instructor characteristics (Al-Fraihat et al., 2020). Besides, Jung and Lee (2020) and Selvaraj et al. (2021) also found that attitude towards e-learning is a key factor in developing technology and overcoming instructors' resistance to using the technology application in the teaching process.

On the other perspectives, past literature indicated that their readiness level could influence their use and application of online teaching, affecting course outcomes and student satisfaction (Alea et al., 2020; Cutri et al., 2020). However, most related literature has led to inconsistent findings concerning the impact of readiness toward using and applying online teaching in developing nations (Ayodele et al., 2018; Owen

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et al., 2020). König et al. (2020) empirically validated that instructors' competence and opportunities to acquire digital competence are significant factors in adopting online teaching. Meanwhile, Prause et al. (2019) highlight the importance of readiness to teach online as "the state of faculty preparation" to teach online. Specifically, many studies claimed that technical readiness is one of the most crucial factors influencing online learning behaviour (Gay, 2016). Besides technical readiness, lifestyle readiness also may affect the online learning behaviour among instructors (Loomis, 2000; Pillay et al., 2007). Similarly, Geng et al. (2019) found that pedagogical readiness can influence the instructor's behavioural intention in online teaching. Hence, this study has put forward to test the following hypotheses:

H_2: *Instructors' attitude influences their behavioural intention in online teaching.*

H_{3a}: *Technical readiness positively influences their behavioural intention in online teaching.*

H_{3b}: *Pedagogical readiness positively influence their behavioural intention in online teaching.*

H_{3c}: *Lifestyle readiness positively influences their behavioural intention in online teaching.*

A study by Peattie (2001) found that an attitude-behaviour gap usually exists with a mismatch between individuals' revealed preferences and their actual behaviours. To investigate the connection between attitude-behaviour, Alfy (2016) utilised Behavioural Reasoning Theory (BRT) to investigate the reasons for and against individuals' behaviours. Their study explains the existence of gaps between the instructor's attitude and behaviour intention in online teaching where the instructor's attitude might differ due to the nature and environment of different class types. In the case of practical classes, where hands-on activities are integral, the real-time interactions that can be challenging to replicate virtually (Estriengana et al., 2019; Schlenz et al., 2020). In contrast, theoretical classes might be perceived as requiring less effort to transition online, as they primarily involve content delivery and discussions. Therefore, it is assumed that instructors might exhibit different attitudes based on their perception of effort in adapting practical and theoretical classes to online teaching methods.

Meanwhile, hands-on experience and skill development are paramount in practical class. Hence, instructors may be concerned about online teaching methods' effectiveness in replicating the same learning outcomes (Simamora, 2020). They might be more skeptical about the efficacy of online methods in practical classes, potentially leading to differences in their attitudes based on the perceived performance outcomes as compared to the theoretical classes (Gopal et al., 2021). Similarly, in practical classes, instructors might be more influenced by the experiences of their peers who have effectively used online methods for hands-on activities. In contrast, theoretical classes might be perceived as having a more straightforward transition, leading to varied influences on attitude formation based on the type of class (Coman et al., 2020; Khalil et al., 2020). It is also important to note that the specific resources and support required for practical and theoretical classes could differ significantly. Differences in the availability and adequacy of these facilitating conditions could lead to varying attitudes towards online teaching methods based on the type of class (Gamage et al., 2020; Ramos-Morcillo et al., 2020).

Technical readiness pertains to individuals' perception of their preparedness to effectively use technical tools and platforms. In the case of practical classes, the technical requirements for replicating hands-on experiences online might be more complex, which could require a higher level of technical readiness than

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theoretical classes (Aditya, 2021; Geng et al., 2019). Besides, instructors teaching practical classes might need to redesign their teaching strategies significantly, affecting their pedagogical readiness differently than theoretical class instructors. Consequently, the effect of pedagogical readiness on behavioral intention could vary based on the type of class (Ersin et al., 2020; Kaushik, & Agrawal, 2021). Similarly, practical and theoretical classes might necessitate different adjustments to instructors' lifestyles. For instance, practical classes might demand real-time availability for online labs or simulations, while theoretical classes could offer more flexibility in scheduling. The differing lifestyle demands for the two types of classes could lead to variations in the impact of lifestyle readiness on behavioral intention (Aditya, 2021; Asghar et al., 2021; Mathew, & Chung, 2020). As per this matter, the class types are treated as a moderating variable for this study. As a result, the following hypotheses were proposed:

> H_{4a}: *The effect of Effort Expectancy on the instructor's attitude is significantly different for theoretical and practical classes.*

> H_{4b}: *The effect of Performance Expectancy on the instructor's attitude is significantly different for theoretical and practical classes.*

> H_{4c}: *The effect of Social Influence on the instructor's attitude is significantly different for theoretical and practical classes.*

> H_{4d}: *The effect of Facilitating conditions on the instructor's attitudes is significantly different for theoretical and practical classes.*

> H_{4e}: *The effect of Technical Readiness on the instructor's behavioural intention significantly differs for theoretical and practical classes.*

> H_{4f}: *The effect of Pedagogical Readiness on the instructor's behavioural intention is significantly different for theoretical and practical classes.*

> H_{4g}: *The effect of Lifestyle Readiness on the instructor's behavioural intention significantly differs for theoretical and practical classes.*

3. METHOD

3.1. Research design and population

The cross-sectional survey was used for this study as the data of variables were collected at one given time across pre-determined samples (Wilson, 2021). The population investigated in this study consisted of lecturers in Higher Education Institutions (HIEs) that offer Hospitality and Tourism courses. The inclusion criteria include the following: the respondents are hospitality and tourism educators in higher education institutions; ii) they conducted online teaching during COVID-19; iii) they teach either practical or theoretical classes. Malaysia, Philippines, Indonesia, and Thailand instructors were the focus of this study. These countries exhibit similar characteristics: provides numerous hospitality and tourism educational courses; alike technological landscape, with variations in infrastructure, access to resources, and levels of digital literacy among its population.

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3.2. Research instruments

The questionnaire was divided into three main sections. Section A measures the adoption level among online teaching instructors, while Section B measures the readiness and behaviour among the instructors regarding online teaching. The survey items (see Appendix 1) on instructor adoption items were adopted from Ventakesh et al. (2003) while for items for attitude were adopted from Mosunmola et al. (2018). In addition, the technical, lifestyle and pedagogical readiness items were adopted from Gay's (2016) study. Five-point Likert scale were used throughout the survey items. Lastly, the nominal scale was applied to obtain the instructor's demographic profile. Prior to data collection, the validity of a survey was determined through face validity engagement with a panel of experts. All comments or suggestions obtained from the validity check were recorded and evaluated for future usage in research methodology analyses. Next, the items were tested to ensure the reliability of the survey measures (Coakes et al., 2009), where the Cronbach Alpha for each construct was higher than the minimum threshold (>.70). Purposive sampling was used to collect primary data from the specified samples in this study (Zikmund et al., 2013). The minimum sample size was determined through G*Power software (N>138).

3.3. Data collection

The online survey has been chosen to conduct this study due to the COVID-19 movement control with the snowball approach utilised to gather the data where the first group of respondents shared the survey link with their colleagues (Dragan, & Isaic-Maniu, 2013). Besides, online surveys offer a convenient way for respondents to engage with the research from their own devices and at their preferred time (Geldsetzer, 2020). This accessibility is particularly relevant during periods of movement control, when physical interactions and traditional data collection methods are restricted.

A structured, close-ended English language online questionnaire via the Google Form platform was utilised. In order to reach the first group of respondents, the researcher identified universities that offer Hospitality and Tourism courses and gathered the educators' names and contact from the university website. Their written consent was obtained before emailing the online survey link.

3.4. Data analysis

The Partial Least Squares-Structural Equation Modelling (PLS-SEM) method was chosen due to its advantages over the covariance approach. This approach's advantages are its ability to estimate theoretical and measurement conditions and distributional and practical considerations (Hanafiah, 2020). Besides, PLS-SEM has several other advantages as it efficiently assesses data with complex hierarchical models as per this study's framework (Hair et al., 2020; Wang et al., 2019).

The PLS-SEM path models were constructed in two steps. The two-step approach begins with estimating the measurement model and then moves on to the structural model analysis. Next, the multi-group analysis (MGA) was utilised to test the moderation effect on the dependent variable as proposed by MacKinnon (2011). This study utilised two software applications for data analysis: IBM SPSS Statistics (Version 26) and Smart PLS version 3.1.1.

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4. RESULTS

A total of 248 respondents gave their feedback for this study. Most of the respondents were aged 31 to 40 years old (n=128, 51.6 percent), with most of them coming from the Philippines (n=108, 43.5%) and 101 respondents (40.7%) coming from Malaysia. Meanwhile, 9.3 percent of respondents came from Indonesia (n=23), while only 6.5 percent came from Thailand (n=16). Of the 252 respondents, 133 (53.6%) are from private universities, while the remaining 115 (46.4%) are from public universities. A large majority of the instructor's expertise area is in tourism, with 103 (41.5%) respondents. Another 86 respondents (34%) are experts in the hospitality field, while 53 respondents (21.4%) were experts in culinary and food fields, with six respondents (2.4%) being experts in event management areas. This study compared two types of classes: theory-based (lecture/mass lecture) and practical-based (kitchen/lab-small group of students). A total of 165 respondents (66.7%) conducted theory-based (lecturer/mass lecturer) classes in higher education institutions, while the rest, 83 respondents (33.5%), conducted practical-based (kitchen/lab-small group of students) classes. Most respondents have five years or less of teaching experience (n=83; 33.5%), and 75 (30.2%) respondents have equivalent to six to ten years of teaching experience in higher education institutions. Regarding their online teaching experience, 248 (98.4%) respondents have less than one year of basic online teaching experience before COVID-19.

4.1. Measurement model assessment

The measurement model (outer model) was used to assess the study model (Hanafiah, 2020; Hair et al., 2014). Four parameters are involved and must be established (i) indicator reliability, (ii) internal consistency reliability, (iii) convergent validity as well as (iv) discriminant validity in order to assess a reflective measurement model. Fig 1 and Table 1 below illustrate the outer loading scores, composite reliability, convergent reliability, and Cronbach Alpha for reflective measurement model assessment.

FIGURE 1. Measurement Model.

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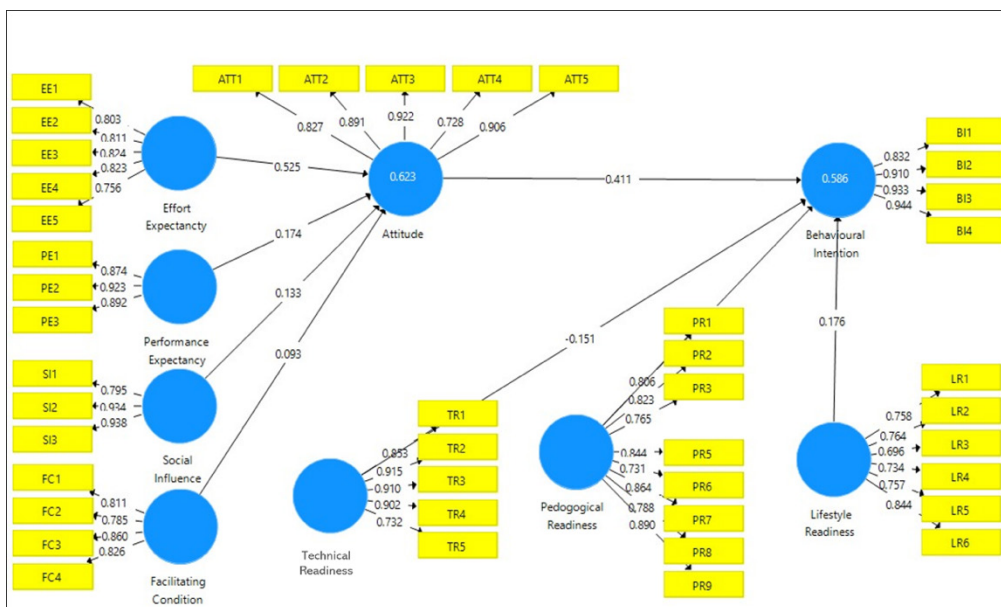
TABLE 1. Reflective Measurement Model.

Code	Outer Loading	Cronbach Alpha	Composite Reliability	Average Variance Extracted (AVE)
Performance Expectancy		0.878	0.925	0.804
PE1	0.874			
PE2	0.923			
PE3	0.892			
Effort Expectancy		0.863	0.901	0.646
EE1	0.803			
EE2	0.811			
EE3	0.824			
EE4	0.823			
EE5	0.756			
Facilitating Conditions		0.839	0.892	0.674
FC1	0.811			
FC2	0.785			
FC3	0.860			
FC4	0.826			
Social Influence		0.867	0.920	0.794
SI1	0.795			
SI2	0.934			
SI3	0.938			
Attitude		0.909	0.932	0.736
ATT1	0.827			
ATT2	0.891			
ATT3	0.922			
ATT4	0.728			
ATT5	0.906			
Behavioural Intention		0.926	0.948	0.821
BI1	0.832			
BI2	0.910			
BI3	0.933			
BI4	0.944			
Technical Readiness		0.915	0.937	0.749
TR1	0.853			
TR2	0.915			
TR3	0.910			
TR4	0.902			
TR5	0.732			
Lifestyle readiness		0.855	0.891	0.578
LR1	0.758			
LR2	0.764			
LR4	0.734			
LR5	0.757			
LR6	0.844			
Pedagogical Readiness		0.928	0.940	0.665
PR1	0.806			
PR2	0.823			
PR3	0.765			
PR5	0.844			
PR6	0.731			
PR7	0.864			
PR8	0.788			
PR9	0.890			

*N=248; Items removed: Indicators items below 0.7 – TR6, LR3, and PR4

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Table 1 illustrates the range of loading indicator scores between 0.728 and 0.944, which exceed the recommended value. However, items TR6, LR3, and PR4 are removed since the loading indicators score is below 0.708 9 (Hair et al., 2014). The composite reliability values of nine constructs in this study are between 0.839 to 0.928, exceeding the acceptable value of 0.70 – reflecting internal consistency of the items in each construct is adequate for this study. Meanwhile, the AVE values are between 0.578 to 0.821, which indicate satisfactory convergent validity. The Heterotrait-Monotrait Ratio of Correlations (HTMT) was used to confirm the discriminant validity of the model. The suggested threshold value should be as low as 0.90 (Henseler et al., 2015). As the HTMT values are less than 0.90, thus, no discriminant validity problems among the latent constructs can be found.

4.2. Structural model assessment

The next step in PLS-SEM analysis is evaluating the structural model by examining proposed hypotheses and identify the exogenous variables' effect on the endogenous variables. Four aspects were considered: i) estimation of path coefficient (β), ii) determination coefficient (R2), iii) effect size (f 2), and iv) prediction relevance (Q2) (Hair et al., 2019). Table 2 reports the outcomes of path coefficients, T-statistics, and significance levels for all hypothesised paths.

TABLE 2. Path Coefficients.

Path	Path coefficient (ß)	T Statistics	P-Values	R^2	Q^2	f^2	Hypothesis
H_{1a} : EE -> ATT	0.066***	7.977	0.000			0.351	Accept
H_{1b} : PE -> ATT	0.049***	3.562	0.000	0.623	0.424	0.013	Accept
H_{1c} : SI -> ATT	0.045**	2.985	0.003			0.043	Accept
H_{1d} : FC -> ATT	0.056	1.658	0.098			0.030	Reject
H_2 : ATT -> BI	0.062***	6.664	0.000			0.200	Accept
H_{3a} : TR -> BI	0.052**	2.906	0.004	0.586	0.448	0.033	Accept
H_{3b} : PR -> BI	0.070***	5.383	0.000			0.027	Accept
H_{3c} : LR-> BI	0.058**	3.014	0.003			0.108	Accept

Notes: **p<.05, ***p<.001

The results of the path coefficients revealed that the relationship between effort expectancy in online teaching (β=0.066***; t=7.977) and the instructor's attitude toward online teaching is significant. Secondly, this study confirms the significant relationship between performance expectancy in online teaching (β=0.049***; t=3.562) and the instructor's attitude toward online teaching. Thirdly, the relationship between social influence toward online teaching (β=0.045***; t=2.985) and the instructor's attitude toward online teaching is also significant. Unfortunately, the relationship between facilitating condition (β=0.056***; t=1.658) and the instructor's attitude toward online teaching is insignificant. This indicates that only effort expectancy, performance expectancy, and social influence of online teaching are the major determinants of the instructor's attitude toward online teaching.

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On the other hand, the results of the path coefficients also revealed that the relationship between the instructor's attitude (β=0.062***; t=6.664) and behavioural intention to continue online teaching is significant, confirming that the instructor's attitude in online teaching is a significant predictor of their behavioural intention in online teaching. Other than that, the relationship between technical readiness in online teaching (β=0.052***; t=2.906) and behavioural intention among the instructors is also significant. Next, the relationship between pedagogical readiness in online teaching (β=0.070***; t=5.383) and behavioural intention among the instructors is significant. In addition, the relationship between lifestyle readiness among the instructors (β=0.058***; t=3.014) and behavioural intention among the instructors is also significant. The results confirm that technical readiness, pedagogical readiness, and lifestyle readiness among the instructors significantly influence the instructor's behavioural intention to opt for online teaching.

The findings showed significant variance (R^2 values ranging from 0.586 to 0.623) in the study framework. Notably, 62.3 percent of the effort expectancy, performance expectancy, social influence, and facilitating condition can explain the variances in attitude construct. Next, the instructor's attitude and readiness could explain 58.6 percent of the variance in the behavioural intention. On the other hand, the effect size function of f^2 by Chin (1998) is utilised to calculate the inner-model change in the effects on the effect size. The f^2 values of 0.02, 0.15, and 0.35 represent weak, moderate, and substantial effects, respectively. Notably, the effect size of effort expectancy (0.351) on attitude is substantial, while facilitating condition, performance expectancy, and social influence on instructor's attitude reported a small effect size. On the other hand, lifestyle substantially affected behavioural intention, while technical and pedagogical readiness reported a small effect size. In addition, attitude has a substantial effect size on behavioural intention. Following the blindfolding procedure, the Q^2 value is greater than zero, which concludes that the study's model has predictive validity (Chin, 1998).

4.3. Multi-group analysis

This study differentiates the theoretical and practical classes to test whether the class types moderate how the independent variables influence behavioural intention among the instructors through the Multi-Group Analysis. This approach is suggested particularly if the independent or moderating variable are categorical (Henseler, 2012). Following the MGA approach proposed by Afthanorhan et al. (2014), the sample was first split into groups (subsamples) and the path relationships of exogenous/independent variable(s) were regressed with endogenous/dependent variable(s) using one subsample at the time. This allowed for each model to be deemed acceptable (or unacceptable) with regard to the measurement model. Next, the bootstrap method was applied (500 times) to re-sample the data in order to obtain the standard error of the structural paths in the subsamples under consideration. Subsequently, differences between the path estimators were tested for significance of the t-test values.

Out of 248 respondents, almost 66.5 percent had theory-based (lecturer/mass lecturer) classes in higher education institutions (n=165). In comparison, the remaining were practical-based (kitchen/lab-small group of students) classes in higher education institutions (n=83). Table 3 exhibits the estimated values of the structural relations for the two subsamples.

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TABLE 3. Multi-Group Analysis.

Path	(β) Theoretical Class	p-values	β) Practical Class	p-values	Result
H_{4a} : EE -> ATT*Mod	0.472***	0.000	0.640***	0.000	Reject
H_{4b} : PE -> ATT*Mod	0.217**	0.004	0.137*	0.011	Reject
H_{4c} : SI -> ATT*Mod	0.119**	0.022	0.092	0.187	Reject
H_{4d} : FC -> ATT*Mod	0.060	0.328	0.151	0.067	Reject
H_{4e} : TR -> BI*Mod	-0.180**	0.001	-0.143	0.119	Accept
H_{4f} : PR -> BI*Mod	0.343***	0.000	0.465***	0.000	Reject
H_{4g} : LR-> BI*Mod	0.322***	0.000	-0.136	0.087	Accept

Notes: **p<.05, ***p<.001

Referring to the Multi-Group Analysis (MGA), the interaction between effort expectancy, performance expectancy and facilitating condition on attitude is significant among the instructors with theoretical and practical classes. Henceforth, this study confirms that there are no significant differences in terms of the significant level for both types of classes. However, the interaction between social influence and attitude is significant among the instructors with theoretical classes (β_T= 0.119; p-value = 0.022) but not with the practical class instructors (β_P= 0.092; p-value = 0.187). Henceforth, this study confirms that class type moderates the relationship between social influence and attitude. On the other hand, the interaction between attitude and behavioural intention has no significant differences in terms of the significant level for both types of classes. However, the interaction between technical and lifestyle readiness and behavioural intention differs from the theoretical and practical classes. Likewise, this study confirms no significant differences of class types in the causal relationship between pedagogical lifestyle and behavioural intention.

5. DISCUSSION AND IMPLICATION

5.1. Study Discussion

This study investigates the factors that encourage instructors to adopt online teaching based on the challenges of learning models from offline to online platforms. The finding showed that effort expectancy (EE), performance expectancy (PE) and social influence (SI) had a direct effect on the instructor's attitude toward online teaching (Jung, & Lee, 2020; Md Yunus et al., 2021; Nikolopoulou et al., 2021; Sangeeta, & Tandon, 2021; Sewadono et al., 2023). Unfortunately, we found that facilitating condition (FC) does not directly affect the instructor's attitude toward adopting online teaching. The absence of a direct effect could be due to unique contextual factors of this study. Notably, online teaching environments can vary widely, and factors such as institutional policies, technological infrastructure, and instructor training programs can influence how FC impacts attitudes. Such results do not reflect the mainstream research findings (see Khechibe et al., 2020; Mei et al., 2018; Nikou, & Economides, 2019; Wong, 2016), which considers facilitating conditions the strongest determinant and positively influences the adoption of technology.

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Conversely, it is crucial to recognize that an instructor's attitude plays a pivotal role in directly and significantly influencing their behavioral intention to engage in online teaching, as evidenced by Khechine et al. (2020) findings. Significantly, a positive attitude demonstrated by instructors holds the potential to wield a substantial positive impact on their inclination to embrace online teaching practices. This phenomenon is consistently underscored by previous research. Researchers such as Estriengana et al. (2019), Keong et al. (2014), and Schlenz et al. (2020) have all concurred that a favorable attitude harbored by instructors tends to act as a catalyst in shaping their behavioral intention to adopt online teaching methods. The salient connection between attitude and behavioral intention lies in instructors' proclivity to align their actions with their optimistic attitude, ultimately fostering a harmonious integration of online teaching methodologies into their pedagogical practices.

This research underscores the pivotal role of technology readiness in predicting instructors' intentions to persist with online teaching in forthcoming periods. Existing studies by Alea et al. (2020), Cutri et al. (2020), Omotayo and Adekunle (2021), Rafique et al. (2018), and Tsourela and Roumeliotis (2015) validate this assertion. Specifically, the outcomes of this study affirm that attributes encompassing technical, pedagogical, and lifestyle readiness exert a discernible impact on instructors' behavioral inclination towards sustained online teaching, aligning with insights from Ayodele et al. (2018), Brinkley-Etzkorn (2018), McGee et al. (2017), Owen et al. (2020), and Prause et al. (2019). This empirical body of evidence conclusively demonstrates that instructors' preparedness in technical competence, pedagogical acumen, and adaptability to remote work significantly mold their intentions to adopt online teaching practices in the future.

The multi-group analysis was employed to examine the potential moderating effect of class type on the association between attitude and behavioral intention. Among the eight hypotheses tested, noteworthy significance emerged in the constructs of technical readiness and lifestyle readiness, as noted in the works of Aditya (2021), Asghar et al. (2021), and Geng et al. (2019). This divergence could be attributed to the fluid interchangeability of class efficacy types due to inherent distinctions, as evidenced by Alea et al. (2020) and Mathew and Chung (2020). Furthermore, the challenges faced by instructors leading practical classes in the online domain are noteworthy, often stemming from the constraints of the virtual learning environment, a matter elucidated by Goh and King (2020). These findings underscore the nuanced interplay between class type, instructor adaptability, and technological readiness, shaping the dynamics of technology adoption in diverse educational contexts.

However, it is important to note that there are insignificant differences between effort expectancy, performance expectancy, social influence, facilitating conditions and pedagogical readiness effect on the instructor's attitude based on the theoretical and practical classes. Notably, this study found that instructors' attitudes may be driven by their perception of the benefits and outcomes of their teaching efforts in both theoretical and practical classes. On the other hand, the social dynamics and influences on instructors' attitudes might not differ significantly between theoretical and practical classes. Perhaps, they could be influenced by similar factors such as colleague opinions, institutional culture, and peer recognition, leading to the rejection of this hypothesis. In addition, this study confirms that facilitating conditions, which relate to the availability of resources and support for teaching, might consistently impact instructor attitudes regardless of class type. Similalry, the instructors' preparedness in terms of teaching methodologies might be important regardless of class type.

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5.2. Study Implications

This study highlights the central role of attitude in determining instructors' behavioural intentions to conduct online teaching. It emphasizes that an instructor's attitude is influenced by performance expectancy, social influence, and effort expectancy. Besides, this study underscores the importance of the online learning system's ease of use and usefulness. Out of four attributes in technology adoption, the researcher found that only Facilitating Condition (FC) did not influence the instructor's attitude toward online teaching. Other basic technology adoption attributes (i.e., performance expectancy, social influence and effort expectancy) directly affected attitude towards online teaching (Rana et al., 2017; Weerakkody et al., 2017). Besides ongoing training programs and ongoing support for instructors and students, the online system must be easy to navigate, with clear instructions and accessible features that facilitate seamless interaction between instructors and students.

On the other hand, this study identifies technical, pedagogical, and lifestyle readiness as direct factors influencing instructors' behavioural intentions. Higher education institutions need to provide instructors with the necessary technical support and resources to ensure they have the skills and tools required for online teaching. Besides, providing instructors with the necessary pedagogical training and resources can boost their confidence and competence in delivering engaging and effective online instruction. On the other hand, supporting instructors in achieving a healthy work-life balance can contribute to their overall job satisfaction and motivation in online teaching.

An important implication of this study is that higher education institutions should develop comprehensive training programs and support mechanisms for instructors to enhance their technology readiness in online teaching. The type of class has been found to moderate the influence of technical and lifestyle readiness on instructors' behavioural intentions, highlighting the need for tailored training based on the specific requirements of different classes. Higher education institutions should design training programs specifically tailored to the different class types (theoretical vs practical) within the Hospitality and Tourism curriculum. These training programs should focus on providing instructors with the necessary skills and knowledge to effectively integrate technology into their respective class types. Practical classes may require additional training on virtual simulations, case studies, and other interactive tools. In contrast, theoretical classes may benefit from training on online discussion facilitation and innovative content delivery methods.

6. CONCLUSION

The choice to use the online learning platform for COVID-19 is revolutionary and timely, primarily due to the 4.0 Industrial Revolution. However, there are still concerns that online learning may have been a sub-optimal substitute for conventional teaching and learning activities. Besides, it is evidente that although online teaching and learning were deemed more dynamic, they could not holistically replace face-to-face physical classes. These findings would offer improvement for in terms of understanding online educational delivery, evaluation, and interaction among students and instructors, specifically in the hospitality and tourism settings. Hence, this finding can also guide higher education institutions to create relevant content for the program that should be focused on. Nevertheless, the outcome of this study also helps higher education institutions develop an effective hospitality curriculum that is flexible and well adapted to the dynamic

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environment in future. Since online teaching requires different skills and competencies than face-to-face teaching, instructors must adapt their pedagogical approach and learn to use technological tools to deliver classes effectively. In addition, they must consider the additional challenges students face when studying from home, such as a lack of social interaction and the need for self-discipline.

6.1. Limitations and future lines of research

One of the limitations of this study is the limited geographical scope of the respondents. The study participants came from only four ASEAN countries: Malaysia, Indonesia, Thailand, and the Philippines. As different countries may have unique educational systems, teaching practices, and student expectations, the study's findings may not fully represent the global or international context, limiting the generalizability of the results. Future research could consider expanding the participant pool to include educators and students from a more diverse range of countries, regions, and educational contexts to improve the study's validity and applicability. This would provide a broader perspective on online teaching readiness and preferences, allowing for a more comprehensive understanding of the subject matter.

Additionally, while this study extended the UTAUT model and technology readiness attributes, it is worth noting that each country is unique and adopting this integrated framework may not be directly applicable to other contexts or countries. Future research could explore the applicability of the extended model and readiness attributes in different cultural, educational, or regional contexts to assess their generalizability. In addition, future research could delve deeper into the specific factors that influence these constructs, such as investigating the challenges facing instructors' readiness and intention to continue online teaching. Meanwhile, given the sudden and unexpected transition to online teaching, the primary focus of this study is to explore the readiness, attitudes, and strategies of instructors in adapting to online teaching. This led to prioritising these aspects over demographic factors to better understand the nuances of online teaching adoption within this context. The UTAUT main emphasis, according to Ventakesh (2003) are on the key constructs and their direct impact on technology adoption and use, regardless of demographic differences. Nonetheless, this study acknowledged that by excluding demographic variables, the findings might not capture the full richness of potential moderating effects in the study frameworks.

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8. COMPETING INTEREST

The author declares that they have no known competing financial interests or personal relationships that could have influenced the work reported in this paper.

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APPENDIX 1

PERFORMANCE EXPECTANCY

1. I teach online during the outbreak of COVID-19 because I can have access to students at distant locations.
2. I teach online during the outbreak of COVID-19 because it helps me to reach students within the shortest time frame.
3. I teach online during the outbreak of COVID-19 because students can continue participating in discussion sections and lectures.

EFFORT EXPECTANCY

1. It is easy for me to deliver online lectures.
2. The students' feedback during online class is easy to understand.
3. I can solve the problems of students easily during an online class.
4. It is easy to customise the lectures online.
5. It is easy to participate in discussions during an online class.

FACILITATING CONDITIONS

1. I have been provided with the resources necessary to deliver online classes by my university.
2. I have the necessary knowledge to deliver the online lecture.
3. Delivering lectures online is compatible with other technologies I use.
4. I get help from my university when I face difficulties while delivering classes online.

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SOCIAL INFLUENCE

1. People whose opinions I value prefer that I should teach online during the COVID-19 pandemic.

2. My colleagues and peers think that I should adopt the online mode of teaching during the COVID-19 pandemic.

3. People who are important to me think that I should adopt online teaching during the COVID-19 pandemic.

ATTITUDE

1. The use of online teaching is a good idea.

2. Online teaching is engaging for me.

3. Online teaching is fun for me.

4. Online teaching makes learning more interesting for students.

5. I enjoy teaching online.

BEHAVIOURAL INTENTION

1. I intend to teach online teaching throughout the COVID-19 pandemic.

2. I intend to teach online teaching after the COVID-19 pandemic.

3. I intend to continue adopting online teaching in the future.

4. I intend to encourage my peers and colleagues to adopt online teaching in the future.

TECHNICAL READINESS

1. I own a computer/laptop/smartphone.

2. My computer setup is sufficient for online learning.

3. I can access software such as word processor, spreadsheet, or browser.

4. I have access to a dedicated network connection.

5. I have access to high-speed internet.

LIFESTYLE READINESS

1. I have a private place in my home that I can use for my teaching activities.

2. I have adequate time that will be uninterrupted in which I can work on my online.

3. I have resources/experts nearby who will assist me with any technical problems.

4. I am an active social media user.

5. I am comfortable working online.

PEDAGOGICAL READINESS

1. I am always eager to try new technology in education.

2. I am a self-motivated, independent learner.

3. I don't need to be in a traditional classroom environment to teach.

4. I communicate comfortably online.

5. I efficiently use the internet to find additional teaching resources.

6. I can work independently without the traditional class arrangement.

7. I always experiment with new pedagogical approaches.

8. I feel confident making online instruction.

The use of e-books to improve the academic performance of students in the subject of Physics: implications for counselling

El uso de libros electrónicos para mejorar el rendimiento académico de los estudiantes en la asignatura de Física: mplicaciones para la orientación

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ABSTRACT

The utilization of ICT resources has the potential to improve teaching and learning, according to the literature. To ascertain the possible influence of e-books on students' achievement in physics, no empirical research has been done in Nigeria. Hence the need for this study. Utilizing a simple repeated measures research design, this study was driven by a quantitative research methodology. The study included 58 senior secondary two (2) physics students who were randomly selected from secondary schools in the Nsukka Education zone. The Physics Achievement Test (PAT), which has been trial tested and face and content validated, was used to collect the data. The internal consistency dependability for the PAT components was .76. The repeated measures analysis of variance was used to analyze the data collected. It was discovered that the learners' access to e-books significantly impacted ($p < .05$) how well they performed in Physics. This research finding has implications for counselling in that teachers and their schools need to be provided educational guidance and couselling by the librarian-counsellor on the legal and ethical implications of using ICT resources like e-books to deliver physics instructions in schools.

KEYWORDS achievement; physics; grade three learners; ICT resources.

RESUMEN

La utilización de los recursos TIC tiene el potencial de mejorar la enseñanza y el aprendizaje, según la literatura. Para determinar la posible influencia de los libros electrónicos en el rendimiento de los estudiantes en física, no se ha realizado ninguna investigación empírica en Nigeria. De ahí la necesidad de este estudio. Utilizando un diseño de investigación simple

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de medidas repetidas, este estudio fue impulsado por una metodología de investigación cuantitativa. El estudio incluyó a 58 estudiantes de física de secundaria superior dos (2) que fueron seleccionados al azar de escuelas secundarias en la zona educativa de Nsukka. Para recopilar los datos se utilizó el Physics Achievement Test (PAT), que ha sido probado y validado de cara y contenido. La confiabilidad de consistencia interna para los componentes PAT fue .76. Se utilizó el análisis de varianza de medidas repetidas para analizar los datos recopilados. Se descubrió que el acceso de los alumnos a los libros electrónicos tuvo un impacto significativo (p < .05) en su desempeño en Física. Este hallazgo de investigación tiene implicaciones para el asesoramiento en el sentido de que los maestros y sus escuelas deben recibir orientación educativa y asesoramiento por parte del bibliotecario-consejero sobre las implicaciones legales y éticas del uso de recursos de TIC como libros electrónicos para impartir instrucciones de física en las escuelas.

PALABRAS CLAVE logro; física; estudiantes de tercer grado; recursos TIC.

1. INTRODUCTION

Prior to the emergence of coronavirus 2019, the temporary suspension of face-to-face instruction during the pandemic had a huge impact on how students learned (Ardi et al., 2022; Eze et al., 2021). Most industrialized nations resorted to online learning when the pandemic was at its worst, while the majority of developing nations closed all of their schools. One of the causes of this was the dearth of web resources in those developing nations. The use of information and communication technology (ICT) resources has been demonstrated in the literature to have the ability to enhance teaching and learning (Ugwuanyi et al., 2021). Also, ICT resource stimulates greater interest, initiative, and participation from the student body and allows for more autonomous learning on the side of the learners (Cupido, & Suárez, 2022; Marín-Díaz et al., 2022). The rapid development of ICT in the twenty-first century has changed and impacted human learning (Kwangmuang et al., 2021).

To represent modern society, the learning management model needs to be modified (Kwangmuang et al., 2021). Due to the rapid development of electronic publication, libraries are not only acquiring reading materials like printed books and journals but also setting up access to a wide range of learning resources in electronic form called e-books. The appeal of electronic resources has skyrocketed as a result. The majority of the global literature is found in e-resources. E-resources include, but are not limited to, e-books, e-journals, databases, CDs/DVDs, e-conference proceedings, reports, maps, pictures/photos, e-newspapers, the Internet/websites, listservs, newsgroups, subject gateways among others (Ugwuanyi, 2022a). More and more print sources are being converted to digital format. The multidisciplinary technology era we live in has led to a proliferation of e-books and other innovations in the market (Korat et al., 2014). Academics commonly use electronic resources as information sources. Around the world, educational institutions are phasing out textbooks (Almekhlafi, 2021). E-books have a number of benefits, such as being much cheaper to purchase online than in physical bookstores (Sung, & Chiu, 2022), being easier to access when traveling, and being portable enough for users to carry hundreds of volumes with them everywhere they go (Casselden, & Pears, 2020). Also, e-books are maintained in the reader's online personal account. As e-books have a "search feature", readers may quickly seek for any information without wasting time turning pages

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(Casselden, & Pears, 2020). The majority of e-books are cloud-based, and one can bookmark the page after searching. As a result, writers and authors can instantly update the connections online. E-books come with interactive features to make reading them more enjoyable. These include voice, video, and animations that are great for kids and those who are blind (Khoshimova, 2021).

E-books' disadvantages include the need for a power source, such as a battery. As a result, the reader is prevented from accessing e-books if the battery is not charged and a power source is not available. This causes a great deal of inconvenience; files cannot be downloaded on e-book devices without the proper software; notifications on the e-books device readers. This is more noticeable in phones or tablets because of how quickly technology changes. E-books must be updated in accordance with this. Failure to do so will put saved files, books, and document formatting at risk. There are health risks associated with reading at night, especially on tablets and with e-readers that have backlights. It may result in poor sleep, eye strain, and/or health problems.

1.1. Related works

Studies have been conducted on the effect of e-books on students' performance. A study was conducted by Dudung et al. (2022) to ascertain the impact of e-readiness, e-learning, and e-books on graduate students' performance. Graduate students made up the research population, and 210 doctorate students in Jakarta comprised the sample. The research strategy used was an associative survey method. The findings indicated that e-readiness, e-learning, and e-books had an impact on graduate accomplishment. Almekhlafi (2021) sought to determine how e-books affected the way students learned technological course material and to gauge how helpful e-books were perceived by preservice student teachers. Two experimental groups and one control group were used in the study's quasi-experimental, three-group pretest-posttest design. Participants were United Arab Emirates University pre-service student teachers taking a technology course. An iBook was utilized in the first experimental group, a PDF version of the same e-book was used in the second, and a physical copy of the same e-book was used in the third. All subjects also received a post-treatment questionnaire. Preservice teachers reported greater benefits and fewer drawbacks of the interactive version of the e-book compared to the other versions, and they had a considerably more favorable attitude about the utility of the interactive version for content learning. The findings, however, did not indicate any appreciable variation in students' mastery of the course material according to the types of book utilized.

To ascertain the effects of mathematics e-books on students' mathematics achievement, Wijaya et al. (2022) carried out a meta-analysis. This quantitative study used data from 17 studies with 26 effect sizes. The gathered information was utilized to examine the moderating effects of e-book type, degree of education, publication year, sample size, and treatment length on students' mathematical achievement. The findings revealed that consuming math e-books generally has a significant impact (g = 0.82) on pupils' mathematical achievement. Additionally, adopting e-books has a major impact on pre-school pupils who are more adept at using technology, and has no impact on students' mathematical achievement in publication year. Zhao et al. (2021) used a gamified interactive e-book approach to assist a flipped mathematics classroom. A quasi-experimental study was implemented in an elementary school mathematics course to assess the efficacy of the suggested approach. There were three groups: the GIEBFL group, the CFL group, and the traditional education group. The GIEBFL group was made up of students who used the gamified interactive e-book in

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the mathematics flipped classroom (the TI group). A paper-and-pencil test revealed that the GIEBFL students greatly outperformed the CFL and TI students in terms of performance. Based on the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) statement, Susilawati et al. (2022) carried out a systematic review. ScienceDirect, ERIC, ProQuest, Pubmed, and Wiley Online Library were searched for pertinent articles with a publication year of 2010-2021. The PICOS guidelines were used to determine eligibility requirements. After gathering the publications' key conclusions, designs, and applicable techniques, they were each given a thematic analysis. It was found that multimedia e-books enhanced students' learning processes more significantly than traditional instructional approaches.

Wilujeng and Lestari (2022) looked at how using interactive multimedia e-books affected the interest of lower-secondary school pupils in a science course. It used a quasi-experimental design with 64 students (ages 12 to 14) from a public lower-secondary in the Indonesian city of Yogyakarta are divided into the experimental (n = 32) and control (n = 32) groups. Whereas the control group used printed textbooks, the experimental group used interactive multimedia e-books. The hypothesis was tested using an independent and paired sample t-test with a significance level of 0.05. (data from the questionnaire). The use of interactive multimedia e-books increased students' interest in science courses significantly, according to the results of the paired sample t-test. Sari et al. (2022) studies how e-books can help students develop their skills for the 21st century based on the fact that many studies have been done on e-books and their use in high schools. Using physics learners, the researchers found that usage of e-books enhanced student learning performance, which in turn affected students' 21st century skills.

Sung et al. (2022) created an interactive e-book system based on the contextual learning paradigm to provide an interactive interpretation of the Analects of Confucius. To assess the effectiveness of the suggested technique, a quasi-experiment was carried out. 38 fifth graders from two classes at an elementary school in northern Taiwan participated in the study. They were split into an experimental and a control group. While learning the Analects of Confucius, the experimental group used an interactive e-book while the control group employed a traditional technology-enhanced teaching method. The findings demonstrated that using an interactive e-book to teach the Analects of Confucius in an elementary school course can improve students' learning motivation and achievement. Green et al. (2016) looked into an alternative testing method utilized in a managerial accounting course for undergraduates. They theorized that regular open-book testing strategies will improve learning and better equip students for the kind of decision-making they will face in the real world. Pre-quizzes and major exams were all open-book, with a mix of closed-book and open-book pre-quizzes throughout the whole semester. Findings showed that open-book final examinations were the only major exams where students who took open-book pre-quizzes fared higher. Results from their study also showed that students appreciated their textbooks more and used them regularly and extensively to prepare for class by utilizing open-book testing protocols rather than using conventional closed-book testing methods. Sun and Pan (2021) looked into how students' creativity and learning motivation might be increased through the usage of information technology in the classroom. The experimental study involved 232 college students from the province of Fujian. The findings demonstrated how the use of information technology in e-book instruction closes the gap between teachers and students and fosters a deeper comprehension of their learning needs, opening up new opportunities for lesson planning and instructional strategies.

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On the basis of the aforementioned, it can be seen that e-books are real resources for raising student achievement in both science and the arts. It is important to highlight that few studies have been conducted on physics ideas, with the majority of studies on this topic focusing mostly on literacy and numeracy. Thus, the purpose of this study was to investigate how e-books affected students' performance in physics.

1.2. Hypothesis

For the study, a single hypothesis with a 5% chance of being correct was put forth:

- Ho: E-books have no significant effect on student learning achievement in physics.

2. METHOD

2.1. Research paradigm, approach and design

The research paradigm for this study was postpositivist and scientific research paradigm. This is because the testing of the hypothesis led to the production of the study findings. Because the participant characteristics were defined and presented objectively, a quantitative research approach was adopted. Based on this method, a simple repeated measures research design guided the conduct of this research. This strategy is based on several assessments of the dependent variable at varied test intervals both before and after treatment. The choice of this design is because compared to other designs, it has more statistical power. Consequently, this kind of design can have significantly greater statistical power by accounting for subject differences. The statistical test for this design is more likely to find an effect if one exists. In this research, this design was applied by first administering pretests 1 and 2 to the participants at two weeks interval before the commencement of the treatment. Thereafter, the treatment started and after the treatment period, posttests 1 and 2 were administered at two weeks interval. Similar recent studies have adopted similar design (Ugwuanyi et al., 2020a; Ugwuanyi et al., 2020b; Ugwuanyi et al., 2021; Ugwuanyi, 2022b).

2.2. Participants

Fifty-eight (58) SS2 students of physics from secondary schools in Nsukka Education Zone, Enugu State, Nigeria were randomly chosen for the study. Two secondary schools in Nsukka Education Zone were specifically chosen for this sampling. Purposive sampling was used to ensure that secondary schools with computer and internet facilities were sampled because the study's treatment involved exposure to the use of e-books.

2.3. Instrument for data collection

The researchers' developed physics achievement test (PAT) was used to gather data. A 20-item multiple-choice questions with only one right response each was used for data collection (see Appendix A for the PAT items). The possibilities for each question were A, B, C, and D. These questions were generated using concepts from senior secondary two (2) Physics curriculum. A maximum score of 60 points and a minimum score of 0 were achieved by awarding two points for each right response.

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The PAT's content and face validities were ascertained prior to trial testing. The validity of PAT's content was confirmed using the Table of Specifications. Then, face validation was conducted by two specialists in physics education and one in educational measurement/evaluation. The language of the PAT items, their suitability for the student's level of ability, and their relevance to the research aim, among other factors, were all addressed by these experts in their helpful input. After that, the PAT was modified using the validators' feedback.

After being face validated, the modified PAT was put to the test on 20 SS 2 students who were not involved in the study. The data were subjected to Kuder-Richardson's 20 (K-R 20) reliability estimate in order to determine the internal consistency/dependability of the PAT items, which produced a reliability index of .76.

2.4. Procedure

The research ethics committee at the University of Nigeria approved the study. Prior to the start of the research, informed consent forms were also delivered to the participants' teachers. These forms were correctly completed and signed by the parties involved.

Before the start of the treatment, there were two sets of pre-testing spaced two weeks apart. The baseline data for the study could then be gathered by the researchers. Then, the treatment sessions started. The learners were exposed to e-books while learning about physics principles. E-books were used to teach physics concepts like machines, electricity, energy, and temperature. The students were instructed on these topics by exposing them to numerous ICT resources in the form of e-books that shared comparable ideas. This exposure was repeated four times over a four-week period. At every session, the teachers encouraged the students to raise questions regarding the material they were having trouble understanding. At the end of the treatment, the subjects received the PAT that had been reshuffled for the initial posttest. After two weeks of administering the first posttest, the second posttest was administered. The different measurement scores both before and after treatment were then arranged and cleaned in order to prepare for data analysis.

2.5. Data analysis

The study's research question was answered using decriptive statistics and the hypothesis testing was performed using repeated measures ANOVA at 0.05 probability level. The following steps were taken to analyze the data. The first step was to perform descriptive analyses of each tests administered to students. The second step involved the use of repeated measures ANOVA to ascertain the effect of e-books on students' achievement in physics. The following preliminary analysis were also carried out to ensure that the research data met the conditions for this kind of statistical test: sphericity test (Mauchly), normality test, homogeneity test (Levene's test) and pairwise comparisons with Bonferroni test (Guillén et al., 2020). The dependent variable, physics achievement, was evaluated in four time points to determine intra-group variations. SPSS version 26 was used for the analysis.

Figure 1 provides a summary of the study's research plan.

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FIGURE 1. Schematic Representation of the Research Method.

DESIGN
SIMPLE REPEATED MEASURES DESIGN

TARGET POPULATION
SS2 PHYSICS STUDENTS IN NSUKKA EDUCATION ZONE

SAMPLE
58 SS2 PHYSICS STUDENTS

SAMPLING TECHNIQUE
PURPOSIVE SAMPLING TECHNIQUE

INSTRUMENT FOR DATA COLLECTION
PHYSICS ACHIEVEMENT TEST

PRETEST 1

PRETEST 2

TREATMENT
EXPOSURE TO E-BOOKS

POSTTEST 1

POSTTEST 2

METHOD OF DATA ANALYSIS
MIXED DESIGN REPEATED MEASURES ANALYSIS OF VARIANCE

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3. RESULTS

The results were presented in line with results of the mean and standard deviation for each test. Mean was the measure of central tendencies while standard deviation was the measure of dispersion used for the data analysis.

Table 1 showed that the mean achievement scores of the students at pretests 1 and 2 are (M = 18.36, SD = 5.61) and (M = 18.81, SD = 5.42) while at posttests 1 and 2, their mean achievements are (M = 47.44, SD = 14.31) and (M = 49.72, SD = 13.92). This shows that the students' achievement in physics improved greatly at the posttests 1 and 2 after being exposed to e-books.

TABLE 1. Mean analysis of the scores of the student at pretests and posttests

Tests	N	Mean	Std. Deviation
Pretest 1	58	18.36	5.61
Pretest 2	58	18.81	5.42
Posttest 1	58	47.44	14.31
Posttest 2	58	49.72	13.92

Before the analysis in Table 2, the normality of the data was verified accordingly using the Box's M test. In addition, by observing the normal Q-Q and Q-Q graphs without a trend, it is verified that the distributions are close to normality in each of the subgroups of the measurement variable. Box's M test (M = 15.654; p = .356) allowed for the non rejection of the null hypothesis of equality of variance-covariance matrices and, therefore, it is concluded that the groups are equal.

On the other hand, the Levene test determined that the assumption of homogeneity of the variances was fulfilled, in the three intra-subjects factors: before, $F_{(1, 64)} = 0.001$, $p = 0.989$; during, $F_{(1, 64)} = 0.812$, $p = 0.371$; and after, $F_{(1, 64)} = 0.967$, $p. = 0.390$.

Lastly, the Mauchly sphericity test was not significant, thereby fulfilling the variance sphericity assumption, Mauchly W = .819, p = .276.

TABLE 2. Repeated measures analysis of variance of the difference in the test occasions

	Source	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared
Time	Sphericity Assumed	52356.034	3	17452.011	185.464	.000	.765
Error (Time)	Sphericity Assumed	16090.966	171	94.099			

Table 2 revealed that e-books had a significant impact on the achievement of students in physics, $F_{(3, 171)} = 185.464$, $p < .05$, $\eta p2 = .765$. This implies that the null hypothesis was rejected ($p < .05$). Moreover, the effect size of .765 suggests that there is a large effect size of the experimental manipulation on students' achievement in physics. Regardless of the scale that was used to measure the dependent variable, effect size, in the opinion of Lakens (2013), enables researchers to portray the magnitude of the reported effects in a standardized metric that can be understood. Instead of just presenting the statistical significance, such normalized impact sizes enable researchers to express the practical significance of their findings (i.e., the implications of the findings to everyday life).

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TABLE 3. Pairwise comparisons with Bonferroni test

(I) Time	(J) Time	Mean Difference (I-J)	Std. Error	Sig.b	95% Confidence Interval for Differenceb	
					Lower Bound	Upper Bound
1	2	-.052	.038	1.000	-.156	.053
	3	-29.155*	.503	.000	-30.531	-27.779
	4	-30.483*	.328	.000	-31.380	-29.585
2	1	.052	.038	1.000	-.053	.156
	3	-29.103*	.501	.000	-30.474	-27.733
	4	-30.431*	.329	.000	-31.331	-29.531
3	1	29.155*	.503	.000	27.779	30.531
	2	29.103*	.501	.000	27.733	30.474
	4	-1.328*	.423	.016	-2.483	-.172
4	1	30.483*	.328	.000	29.585	31.380
	2	30.431*	.329	.000	29.531	31.331
	3	1.328*	.423	.016	.172	2.483

Based on estimated marginal means
*. The mean difference is significant at the .05 level.
b. Adjustment for multiple comparisons: Bonferroni.

The pairwise comparisons with Bonferroni tests in Table 3 showed that the mean differences between posttest 2 (Time 4) and pretest 1 (Time 1); posttest 2 (Time 4) and pretset 2 (Time 2) had the highest positive mean difference and thus contributed most to the significant effect of e-books on students' achievement in phyiscs.

4. DISCUSSION

The goal of this study was to ascertain the possible influence of using e-books on students' physics achievement. The use of e-books was found to have a very high significant influence on students' achievement in physics, accounting for 76.5% of the improvement in their performance, using a straightforward repeated measures approach. This result is highly desired because it confirms the findings of the study and the researchers' experience throughout the intervention. The intervention in this example provided the students with plenty of opportunities to investigate physics issues by utilizing e-books under supervised circumstances. In this instance, the students were closely watched to make sure they did not have access to any resources besides those that were physics-related. Buttressing the findings of this research are the findings of Almekhlafi (2021), Dudung et al. (2022), Sari et al. (2022), Susilawati et al. (2022), Wijaya et al. (2022), Wilujeng et al. (2022) and Zhao et al. (2021). Dudung et al. (2022) found that e-books had significant impact on graduate students' performance. Almekhlafi (2021) revealed that students' mastery of the course material improved after being exposed to the sue of e-books. Wijaya et al. (2022) found that e-books had significant effect on students' mathematics achievement. Zhao et al. (2021) revealed that the used a gamified interactive e-book approach had significant effect on students' performance. Moreover, Susilawati et al. (2022) the usage of multimedia e-books had a significant impact on how well health sciences students learn. Wilujeng et al.

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(2022) showed that the use of interactive multimedia e-books significantly affected the interest of lower-secondary school pupils in a science course. Also, Sari et al. (2022) found that the usage of e-books enhanced student learning performance, which in turn affected students' 21st century skills.

The use of electronic books had a considerable impact on students' Physics performance (Ugwuanyi et al., 2022a). E-books can assist students at various levels in learning word meanings (Baskar, 2017). The e-book engagement had a significant long-term vocabulary impact (Shamir et al., 2018). Students in both learning groups improved their overall emerging literacy skills after encountering technological materials (Korat, & Shamir, 2008). According to another study, using electronic books or other versions of stories may cause students to become diverted from the plot, especially if they can interact with the screen and/or play games inside the text (Chen et al., 2020). According to a similar study, students often become familiar with e-books and enjoy the technology rapidly (Jones et al., 2011). The results of a study showed that the experimental group's academic performance changed between the pre- and post-test, demonstrating the usefulness of employing digital storytelling to teach scientific subjects (Shemy, 2020). According to the study's findings, students who taught statistics utilizing interactive electronic tools performed better academically than those who acquired statistics the traditional way (Lim et al., 2020).

4.1. Implications for Counselling

This research finding has implications for counselling in that teachers and their schools need to be provided educational guidance and couselling by the librarian-counsellor on the legal and ethical implications of using ICT resources like e-books to deliver physics instructions in schools. ICT resources assists in the efficient dissemination of information to all types of users, foster collaborative research efforts, stimulate the creation and dissemination of new knowledge through the use of communication network tools, and encourage the use of such tools (Dukper et al., 2019). According to a study on the effects of electronic resources on learning, students learned more from electronic resources than did adults (Almekhlafi, 2021). Electronic resources improved the performance of low and average performers (Chen et al., 2020). Nearly all students believed that digital literacy was essential for both academic and personal communication and information gathering (Chen et al., 2020). Given that digital technology makes teaching and learning more efficient, fun, and rapid (Baskar, 2017), providing schools with guidance on how to deploy and use e-books without infringingement of relevant copyright laws should be prioritized by the librarian-counsellor. The teachers, school principals and districts should be properly guided by the librarian-counsellors on how e-books can be effectivey utilized in teaching and learning to promote the desired learning outcomes among students. The librarian-counsellor can also guide and mentor students and teachers on how to navigate virtual libraries (Eseadi, 2022) by equipping them with requisite digital library use skills which would facilitate the efficient use of e-books and other digital library resources by students and teachers.

5. CONCLUSIONS

This study sought to ascertain the effectiveness of e-books on students achievement in physics and found that e-books had a significant impact on students' physics achievement, according to this study, accounting

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for a 95.4% increase in that achievement. This implies that usage of e-books improves students achievement in physics. Based on that, the researchers concluded that e-books have a considerable impact on students' physics achievement. In order to make it easier for secondary school teachers to use e-books to teach physics and other relevant courses, it is recommended that the Local Education Authority provide them with enough access to e-books.

The finding of this research may have been limited by some factors such as the number of schools used for the study. During the conduct of this study, the researchers could not find enough schools with ICT facilities and thus were able to use only two schools that were identified as having ICT facilities. This few number of schools that participated in the study may affect the generalizability of the findings to the entire population of secondary schools in the study area. The study did not include a comparison group as a result it was not possible to ascertain if the use of e-books will be better than or similar to the use of any other ICT resources in the teaching of physics. Thus, it was suggested that future researchers should replicate this research by using more schools from where more participants can be sampled and comparing the effects of e-books with other learning resources in promoting students' physics achievement. It is also crucial that future researchers should consider the analysis of the demographics of the participants like gender in replicating this study. This will help to empirically validate the influence of the potential moderators on the effectiveness of e-books on students' achievement in physics.

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APPENDIX A

Physics Achievement Test (PAT)

Instruction: Please use pen to tick the alphabet that bears the correct answer to each of the following questions.

Time allowed: 20 Minutes.

1. Which of the following statements is NOT true? Mercury is used in a thermometer in preference to alcohol because

   A. It is easily seen
   B. B. It does not wet the glass
   C. It is a better conductor of heat than alcohol
   D. D. It has a lower freezer point

2. Which of the following does not rely on the principle of moments for its operation?

   A. Block and tackle
   B. Pliers
   C. Screw-jack
   D. Spanner

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3. Friction in a machine is likely to reduce the (i) velocity ratio (ii) mechanical advantage (iii) efficiency, which is/are correct?

    A.   (ii) only

    B.   (iii) only

    C.   (i) and (iii)

    D.   (ii) and (iii).

4. In which of the following is kinetic energy converted into potential energy?

    A.   A car stops on level ground using its brakes.

    B.   A car runs at constant speed downhill using its brakes

    C.   A car runs downhill gathering speed

    D.   None of the above

5. A sample of water at 0^0C and its density measured after each degree rise in temperature.

    A.   Its density remains unchanged

    B.   Its density decreases steadily

    C.   Its density increases steadily

    D.   Its density increases for a while and then decreases

6. A balloon containing 546 ml of air is heated from 0^0C. to 10^0C. if the pressure is kept constant its volume at 10^0C will be

    A.   546 ml

    B.   556 ml

    C.   566 ml

    D.   576 ml

7. The coefficient of linear expansion of brass is approximately $0.0000/^0C$. therefore if 1000 mm^3 of brass is heated from 0^0C it expands

    A.   0.6 mm^3

    B.   0.2 mm^3

    C.   1.8 mm^3

    D.   0.06 mm^3

8. Provided the pressure is kept constant, the temperature to which 3 litres of gas at 27^0C must be raised in order to increase its volume to 4 litres is

    A. 36^0C

    B. 78^0C

    C. 127^0C

    D. 400^0C

9. If the speed at which a machine is operating is doubled and the force the machine exerts on an object is also doubled, then the power at which the machine is operating

    A.   Is decreased

    B.   Remains the same

    C.   Is doubled

    D.   Becomes four times as great.

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10. Which of the following liquids would be most suitable for use as a refrigerant in the domestic refrigerator?

    A.   Ammonia

    B.   Water

    C.   Brine

    D.   Kerosene

11. The main reason that foods are cooked faster in a pressure cooker than in a pot is that,

    A.   less heat escapes

    B.   the boiling point of the water is raised

    C.   they are not affected by the breeze

    D.   the vapour pressure is constant

12. 20 g of ice at -5^0C are converted into water at 50^0C. if the specific latent heat of ice is 336 J/g^{0}C, the amount of heat necessary to do this is

    A.   4410 J

    B.   4746 J

    C.   11,130 J

    D.   14,470 J

13. 150 g of a metal when cooled through 10^0C will give out enough heat to raise the temperature of 30 g of water by 5^0C. the specific heat capacity of the metal is therefore (Specific heat capacity of water = 4200 J/kg^{0}C)

    A.   420 J/kg ^{0}C

    B.   4200 J/ kg^{0}C

    C.   150 J/kg^{0}C

    D.   None of these

14. Two simple barometers X and Y have 1ml and 2ml respectively of water introduced into the tubes. After few minutes the height of mercury in each barometer is read. It is found that the height of mercury is

    A.   Unchanged

    B.   Significantly lower in Y than in X

    C.   Significantly lower in X than in Y

    D.   Lower and approximately equal in both

15. The instrument used for measuring the dew point is called a

    A.   Wet and dry bulb hygrometer

    B.   Dewar flask

    C.   Renault's hygrometer

    D.   Radio sonde

16. 16.8g of a metal, whose specific heat capacity is 400 J/kg^{0}C, was heated to 100^0C and then placed in a hollow in a block of ice at 0^0C. the amount of water produced was (Specific latent heat of ice = 336 J/g)

    A.   2.0 g

    B.   1.68 g

    C.   671 g

    D.   None of these

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17. A domestic refrigerator is cooled because

    A.   Cold air is pumped through it
    B.   A cold liquid is pumped through the coils around the freezing box
    C.   Heat is taken from the air to evaporate the freezing liquid
    D.   The ice in the refrigerator cools the air

18. When 30 g of methylated spirit whose temperature was 60^0c was mixed with 32 of water, contained in a calorimeter of negligible heat capacity, the temperature of the water and calorimeter was raised from 30^0c to 40^0c. if we neglect the heat loss ten the specific heat capacity of the methylated spirit was

    A. $1120j/kg\ ^0c$
    B. $4480\ j/kg\ ^0c$
    C. $2240\ j/kg\ ^0c$
    D.   none of these.

19. Which of the following sets of conductions would be most suitable for the formation of dew?

    A.   A clear calm night on cement
    B.   A cloudy calm night on cement
    C.   A clear windy night on grass
    D.   A clear calm night on grass

20. Which of the following conditions would be most suitable for the formation of snow?

    A.   A dew point below 00c
    B.   A region of high barometric pressure
    C.   Raindrops falling on a frozen ground
    D.   A very dry cold day

Understanding the Role of Self-Regulated Learning in Academic Success. A Blended Learning Perspective in Vocational Education

Comprender el papel del aprendizaje autorregulado en el éxito académico. Una perspectiva de aprendizaje combinado en la formación profesional

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ABSTRACT

This study aimed to investigate the impact of self-regulated learning (SRL) skills on the academic success of non-commissioned officer (NCO) students within a Special Vocational College (SVC) belonging to the government context. As blended courses become increasingly prevalent, there is a growing interest in understanding the role of SRL, a critical determinant of academic performance. While SRL has garnered substantial attention in higher education, limited research has focused on its relevance within SVCs. Furthermore, little is known about the factors influencing students' SRL levels in online learning settings and their subsequent impact on course performance. Therefore, this study endeavors to identify the factors that influence SVC students' SRL and assess how it impacts success in blended courses. The study was conducted during the Fall semester of 2022-2023, encompassing five distinct compulsory blended courses and involving a total of 203 SVC students. We utilized a path model, expanding upon the framework proposed by Liaw and Huang in 2013, to assess the influence of SRL on academic achievement. The findings demonstrated that students' perceptions of the interactivity in the learning environment (ILE) and their perceived self-efficacy (PSE) had a positive and significant impact on their perceived satisfaction (PS). Additionally, ILE, PSE, and PS significantly influenced the perceived usefulness (PU) of the learning management system (LMS). Furthermore, ILE, PU, and PS emerged as significant predictors of students' SRL skills. However, the observed results did not entirely align with the expected impact on academic success. The study's findings shed light on the complex relationship between course achievement and SRL in blended learning settings, as well as the interrelated factors at play. The practical implications of these findings extend to how LMS administrators can support students in blended courses in becoming more self-regulated learners.

KEYWORDS self-regulated learning; achievement; vocational college; blended learning; interactivity; self-efficacy; satisfaction; post-secondary education.

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RESUMEN

Este estudio tenía como objetivo investigar el impacto de las habilidades de aprendizaje autorregulado (AA) en el éxito académico de los estudiantes suboficiales (LES) dentro de un Colegio Vocacional Especial (CVE) perteneciente al contexto gubernamental. A medida que los cursos mixtos se vuelven cada vez más frecuentes, hay un creciente interés en comprender el papel del AA, un determinante crítico del rendimiento académico. Si bien la SRL ha sido objeto de gran atención en la educación superior, la investigación se ha centrado poco en su relevancia dentro de los CVE. Además, poco se sabe acerca de los factores que influyen en los niveles de SRL de los estudiantes en entornos de aprendizaje en línea y su posterior impacto en el rendimiento del curso. Por lo tanto, este estudio se esfuerza por identificar los factores que influyen en la SRL de los estudiantes CVE y evaluar cómo afecta el éxito en los cursos mixtos. El estudio se llevó a cabo durante el semestre de otoño de 2022-2023, abarcando cinco cursos mixtos obligatorios distintos e involucrando a un total de 203 estudiantes del CVE. Utilizamos un modelo de trayectoria, ampliando el marco propuesto por Liaw y Huang en 2013, para evaluar la influencia de la AA en el rendimiento académico. Los resultados demostraron que las percepciones de los estudiantes sobre la interactividad en el entorno de aprendizaje (EEA) y su autoeficacia percibida (SAP) tuvieron un impacto positivo y significativo en su satisfacción percibida (SP). Además, la EEA, la SAP y la SP influyeron significativamente en la utilidad percibida (UP) del sistema de gestión del aprendizaje (SGA). Además, EEA, UP y SP resultaron ser predictores significativos de las habilidades AA de los estudiantes. Sin embargo, los resultados observados no coincidieron totalmente con el impacto esperado en el éxito académico. Los resultados del estudio arrojan luz sobre la compleja relación entre el rendimiento en el curso y la AA en entornos de aprendizaje mixto, así como los factores interrelacionados en juego. Las implicaciones prácticas de estos hallazgos se extienden a cómo los administradores del sistema de gestión del aprendizaje pueden apoyar a los estudiantes en cursos combinados para que se conviertan en aprendices más autorregulados.

PALABRAS CLAVE aprendizaje autorregulado; rendimiento; formación profesional; aprendizaje combinado; interactividad; autoeficacia; satisfacción; educación postsecundaria.

1. INTRODUCTION

E-learning applications that enable web-based learning have become dominant in the majority of educational activities — especially after Internet connection speeds have increased — and higher education bodies across the world have expanded the scope of the courses they offer using the blended learning (BL) approach (Cigdem, & Ozkan, 2022; Cigdem, & Ozturk, 2016; Jonker et al., 2018; Mestan, 2019; Moreno, 2019; Vera et al., 2019). BL arose as a new style of education at the turn of the 21st century, as e-learning activities began to support face-to-face education (Eggers et al., 2021). BL has become a well-known concept that can be applied to a variety of educational settings (Spanjers et al., 2015) and is widely accepted in post-secondary education (Allen et al., 2007).

BL is a pedagogical approach that integrates classroom activities with opportunities for socialization, which can be accomplished in person or through online presentation systems. In courses that follow the BL approach, students can more flexibly organize their working hours (Smith, & Hill, 2019), have more efficient discussions with the instructor and their classmates (Han, & Ellis, 2019), develop styles of learning of their own to compensate different styles of teaching of their instructors (Boelens et al., 2018), and participate more intensely in the course with the use of various learning materials (Mestan, 2019).

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To promote a more flexible and student-centered approach to learning, BL combines traditional and online instructional methods. Some of the major current discussions about the BL approach recently involve the elements that affect how BL is utilized (Adekola et al., 2017) and students' self-regulation abilities as being one of these elements (Broadbent, 2017). BL supports the development of basic learning and reasoning skills by facilitating SRL and encouraging a deeper understanding of concepts, critical thinking, and the transfer of knowledge to practice (Dziuban et al., 2004; Osguthorpe, & Graham, 2003). Students' SRL characteristics have become more important thanks to the advent of electronic learning tools that enable students to learn on their own during extracurricular periods. Moreover, increasingly more research has highlighted the major role of self-regulation on how students perceive e-learning (Kramarski, & Gutman, 2006; Zimmerman, & Schunk, 2001).

Given the SRL premise, it is worth noting that the path model proposed by Liaw and Huang (2013) is one of the comprehensive models for estimating SRL from a variety of factors. They highlighted the importance of perceived usefulness (PU), perception of interactivity in learning environments (ILE), perceived satisfaction (PS), perceived anxiety (PA) and perceived self-efficacy (PSE) in understanding SRL, as well as the interrelationships among these elements. Their approach can serve as a useful baseline for predicting student achievement, which is the ultimate goal of education. A growing body of research has looked at the factors that influence student achievement in similar settings, none that we are aware of have attempted to predict achievement using the established model of Liaw and Huang (2013), particularly in blended learning environments. Our study will be the first to look into this situation. So, the goal of our research was to predict achievement based on the certain factors included and explained in the model of Liaw and Huang (2013) and extend their research by presenting its statistical significance, if any, in blended learning.

In addition to the extension of research that we explained above, another distinctive feature of our study is its unique setting in a Special Vocational College (SVC) belonging to the government. Unlike traditional colleges, SVCs are highly disciplined educational institutions with a specific focus on preparing students for specialized careers. This unique context presents several differences that set our research apart. Firstly, SVCs have a distinct educational mission, emphasizing not only academic excellence but also specialized training, leadership development, and character building. This dual focus creates a learning environment that is markedly different from that of traditional colleges, where the primary emphasis is on academic instruction. Secondly, the faculty members at SVCs are tasked with a unique challenge — they must deliver courses that not only meet academic standards but also align with the specialized curriculum and training requirements. This necessitates a tailored approach to teaching and learning that differs significantly from the methods employed in regular colleges. To address these distinctions and enhance the educational experience for SVC students, we implemented a blended learning (BL) approach, utilizing a Moodle-based course portal to complement face-to-face education. This approach was specifically tailored to the needs and demands of the SVC environment, taking into account the specialized curriculum and the importance of discipline and specialized training.

Liaw and Huang (2013) have already established in their model how certain factors relate to each other and SRL. We kindly ask the readers to refer to their study in that sense. What we provide next is the theoretical background on the hypotheses that perceived satisfaction, perceived usefulness, and SRL influence achievement in a significant way in the context of their model.

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2. THEORETICAL BACKGROUND

In this study, we take the study of Liaw and Huang (2013) one step further by predicting student achievement in certain disciplines from perceived self-efficacy, perceived anxiety, interactivity in learning environments, perceived satisfaction and perceived SRL. A major modification was made on the relationships Liaw and Huang (2013) offered in their study. A link between perceived self-efficacy and SRL was established as we strongly believe that there is a theory-based direct association between the two constructs as explained below.

2.1. Perceived Self-Efficacy and Self-Regulated Learning

PSE is one of the strongest estimators of learner achievement (Bandura, 1978; Olivier et al., 2019; Oppong-Gyebi et al., 2023; Schunk, 1991; Schunk, & DiBenedetto, 2016; Zimmerman et al., 1992) and is a favorable characteristic of effective learning (Liaw, & Huang, 2013). Therefore, a high level of PSE results in improved academic achievement and behavioral persistence in online learning settings (Chu, & Chu, 2010; Liaw & Huang, 2013). In this respect, students' attitudes towards learning, improvement of their skills, activity choices and motivation to continue learning are influenced by their PSEs.

Zimmerman and Schunk (1989) and Zimmerman (1990) define SRL as students' being "masters of their learning". It refers to students' capacity to formulate and periodically adjust their ideas, attitudes and behaviors to fulfill their educational objectives (Pintrich, 1995; Zimmerman, 1998, 2000). Gardner (1963) was perhaps the first person to come up with the idea of SRL in education. He acknowledged the importance of individual effort when learning something (Zimmerman, 1990). The educational system strives to give people the responsibility to sustain their personal learning tasks (Gardner, 1963). Since the sixties, SRL has been studied in different educational disciplines such as medical sciences, education, and cognitive science (Chitra et al., 2020; Cleary et al., 2020; Dignath, & Büttner, 2008).

Learners must have confidence in their ability to transfer what they have learned to a variety of settings; in other words, students must demonstrate strong PSE (Usher, & Pajares, 2008; Zimmerman, 1989; Zimmerman, & Pons, 1986). SRL, or learners' ability to utilize their competencies correctly and successfully, is linked to PSE, or their confidence in their capacity to complete an activity. Learners who have strong perceived self-efficacy and SRL skills can push themselves to learn new things (Bandura, 2006; Zimmerman et al.,2017). A strong sense of perceived self-efficacy positively affects SRL, resulting in stronger scholastic standards and ambitions, as well as a greater possibility of accomplishment. The feeling of accomplishment instilled in learners translates into increased confidence in their ability to thrive in school (Zimmerman, & Bandura, 1994; Zimmerman et al., 1992).

Even though perceived self-efficacy and SRL are significantly and positively correlated, self-regulation knowledge does not ensure effective implementation of self-regulation (Creer, 2000). Learners should also have confidence that they can attain their goals and reach their maximum potential by performing in line with their SRL skills. Therefore, people's faith in their ability to plan and carry out appropriate steps is essential for achieving desired results and is an inseparable part of how SRL occurs (Zeidner et al., 2000).

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Excellence of schools has been the determinant of their students' educational progress; but, thanks to the Internet, students now have more individualistic authority over what and how they learn regardless of time or location. In this new age, knowledge construction is increasingly based on electronic inquiry, and in web-based educational research, students with strong perceived self-efficacy for SRL are those benefitting most from courses over the web (Debowski et al., 2001; Joo et al., 2000; Venkatesh, 2000). However, while it has already been shown that PSE affects effective learning (Honicke, & Broadbent, 2016) and SRL processes (Dent, & Koenka, 2016; Zimmerman et al., 1992) in general, there has been no study to date examining the impact of perceived self-efficacy on SRL and its indirect impact on academic achievement through SRL in courses designed using the BL approach.

Students should have the belief that the necessary skills can be attainable to achieve their academic goals. Once they have attained the skills, they should be capable of setting appropriate skills and trust that they can achieve their goals. This highlights the importance of PSE as an indispensable precursor of SRL. Therefore, this study also examined the possible path from perceived self-efficacy to SRL and academic success.

2.2. Perceived Usefulness and Achievement

Perceived usefulness is the degree to which individuals believe they will be using a particular system because they expect it to improve their performance (Davis, & Davis, 1989). In research, PU predicts course achievement and satisfaction for online learners (Johnson et al., 2008; Liaw, 2008; Miltiadou, & Savenye, 2003; Young Ju et al., 2012).

If students think that an e-learning system is useful for study, they are motivated to use it. In addition, if students are satisfied with an online learning system, their participation in learning processes can get better. As a result, students' use of such a system is influenced by how useful they find it and how satisfied they are with it (Liaw, 2008).

2.3. Perceived Satisfaction and Achievement

Satisfaction is defined as the fulfillment of a need with the help of an activity (Bolliger, & Erichsen, 2013). Satisfaction with a learning system is considered a key requirement for the effective administration of BL (Abou Naaj et al., 2012). A significant correlation has been reported between learner achievement and satisfaction with the online learning environment (Eom et al., 2006; Marks et al., 2005; Puzziferro, 2008; Sun et al., 2008). Satisfaction has been identified to be one of the powerful predictors of many learning outcomes (Aghaei Sabet et al., 2022; Akyol, & Garrison, 2011; Bolliger, & Erichsen, 2013; Dziuban et al., 2015) Satisfied learners engage in less effort to learn, attend more BL courses, and recommend them to others (Abou Naaj et al., 2012). Academic success and course satisfaction can be considered as two complementary learning outcomes. This assertion is based on the well-established idea that when students are satisfied with their learning experiences, they are more likely to achieve positive academic outcomes. This relationship has been explored in numerous studies. For example, Miller (1977) and Pascarella and Terenzini (1991) found that student satisfaction with their educational experiences positively correlated with academic achievement. Additionally, Li (2022) discovered that there could be a possible relationship between perceived

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satisfaction, learning behaviors, and academic achievement. Li's (2022) study revealed that individuals with higher online participation outperformed those with lower levels in terms of both learning scores and satisfaction. These findings align with our perspective on the interplay between course satisfaction, learning behaviors, and academic success. Derived from the results of the aforementioned research, the hypothesis that there is a strong link between satisfaction and achievement was tested in this study, extending the model proposed by Liaw and Huang (2013).

2.4. Self-Regulated Learning and Achievement

Several studies (Bidjerano, & Dai, 2007; Joe et al., 2017; Pérez-González et al., 2022) have acknowledged the importance of SRL as an indicator of learner achievement in online systems. Few studies (Lin et al., 2016; Zhao, & Cao, 2023) have examined how learners' experiences of BL and their perceptions of BL environments affect SRL. To assist in understanding learners' attitudes regarding online learning, Liaw and Huang (2013) examined learners' SRL skills and proposed a theoretical framework to examine SRL skills in online learning settings. In their research, they found that perceived satisfaction, perceived usefulness and interactivity in learning environments factors predict students' self-regulation abilities when using e-learning environments. Hood et al. (2015) found that participant characteristics and roles in different groups in MOOC lessons affected their SRL skills and each dimension of SRL skills. MOOC students' age, gender, degree, and experience with online courses were important predictors of SRL, according to Li (2019).

Liaw and Huang (2013) examined the factors affecting learners' SRL skills in e-learning environments to try and understand student attitudes towards the whole e-learning process. Their findings suggest that interactivity in learning environments, perceived satisfaction of users and perceived usefulness of the ICT system are key variables needed to estimate how learners perceive their self-regulation in online learning settings. They concluded that perceived usefulness can be influenced by interactivity in learning environments, perceived self-efficacy and perceived satisfaction and that perceived satisfaction is closely linked to the perceived anxiety of users. In the model proposed by Liaw and Huang (2013), it was reported that perceived SR may be influenced by personal characteristics such as perceived self-efficacy and perceived anxiety, attitudes such as perceived satisfaction and perceived usefulness, and other factors including useful learning contexts such as interactivity in learning environments.

Research shows that a critical determinant of achievement is the learner's SRL skills (Anthonysamy et al., 2020; Zhu et al., 2016). Despite the advantages of the BL approach, success in this strategy is dependent on students' control of online learning processes, or self-regulation activities (Anthonysamy et al., 2020). To achieve satisfactory learning outcomes in any environment, learners must take the initiative to study, evaluate their learning needs, define learning goals, research educational resources, manage their time and learning setting, and implement useful techniques for learning (Rivers et al., 2022; Zhu et al., 2016). One of the challenges encountered in BL environments is students' learning processes (Boelens et al., 2017); that is to say, online learning is more challenging for undergrads because it requires greater learner participation and SRL, as well as enhanced learner control (Gedik et al., 2012; Zhu et al., 2016).

Given the online side of BL and the discussion above, it is reasonable to conclude that SRL has more to offer online learning than it does in regular classrooms (Rivers et al., 2022). Online environments demand

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more autonomous thinking and participation from students (Broadbent, & Poon, 2015; Jansen et al., 2019; Littlejohn et al., 2016). Acquisition of SRL skills in online learning has undoubtedly become a requisite, especially because learners in higher education are expected to have SRL skills to independently pursue the academic goals they set (Anthonysamy et al., 2020).

SRL is a key aspect in effective learning and has been extensively studied and widely used to explain the factors influencing success in e-learning research. In higher education, students with SRL skills have been found to achieve better learning outcomes (Barnard-Brak et al., 2010; Broadbent, & Poon, 2015; Cho, & Heron, 2015; Cho, & Shen, 2013; Greene et al., 2018; Hu, & Driscoll, 2013; Kauffman et al., 2011; Kizilcec et al., 2017; Paechter et al., 2010; Schunk, & Zimmerman, 1994; Tsai et al., 2011; Yukselturk, & Bulut, 2007). Given the importance of SRL, we propose that SRL, along with all of the related factors presented in the model of Liaw and Huang (2013), will effectively predict learning in BL environments and thus constitutes one of the primary goals of this study.

Based on the information addressed above, examining the elements that influence learner success through the online system they use on BL courses is a crucial undertaking not only to improve the use of the online system, but also to explain the influence of these possible factors. Based on the findings and recommendations proposed in the literature, this study was designed to reveal the associations among student achievement and select parameters such as SRL, perceived usefulness and perceived satisfaction in the courses delivered in a BL environment at a SVC (see Figure 1).

FIGURE 1. Theoretical framework of the study.
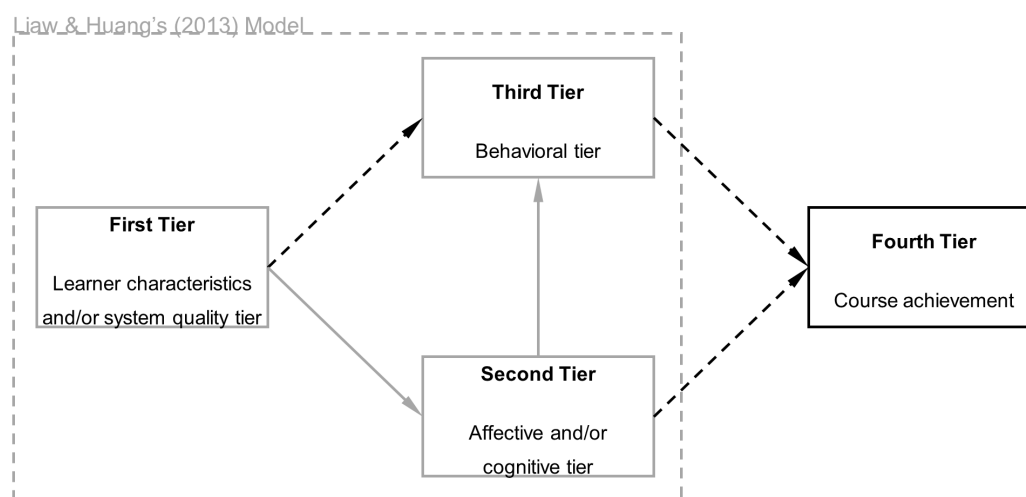
With the help of this study, researchers interested in online environments, BL approach and SRL can have a more comprehensive understanding of the factors affecting success in BL environments and design/offer better online systems and blended courses which can engage more audience and produce more effective learning results. Another significance of the study is related to the context of the study. SVCs can be seen as unique educational environments concerning the nature of communication among students and teachers due to certain authoritative standards. These standards instill in students discipline, time management, goal orientation, resilience and adaptability, which can positively influence their SRL behavior.

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The structured learning environment of SVC makes an important contribution to our research by further developing students' ability to organize and self-regulate their work. Therefore, the use of the BL approach in lessons is a valuable opportunity to motivate students, increase their participation and improve their SRL skills. Since very little research is done in SVCs, our goal was to add to the literature and offer examples of comparable learning environments.

Based on both the literature and the model proposed by Liaw and Huang (2013), a theoretical path model was established to present hypothesized associations between perceived self-efficacy and SRL, as well as between the perceived usefulness, perceived satisfaction and SRL and course achievement variables. Figure 1 shows this model in general terms. The relationships shown in the model with one-way straight lines are taken from the study of Liaw and Huang (2013), and the relationships shown with the dashed lines represent the contributions of our research to the existing model. For example, the dashed arrow from the third tier to course achievement indicates that SRL is expected to affect course achievement. The goal of this study was to extend a research model for SRL in terms of the sustainability of the e-learning system at a SVC.

As previously discussed, the current study hypothesized the inclusion of new pathways as additions to the model examined by Liaw and Huang (2013). Specifically, hypothesis (1): interactivity in learning environments, perceived self-efficacy and perceived anxiety predict perceived satisfaction; hypothesis (2): perceived satisfaction, interactivity in learning environments and perceived self-efficacy predict perceived usefulness; hypothesis (3): interactivity in learning environments, perceived self-efficacy, perceived usefulness and perceived satisfaction predict SRL; and hypothesis (4): perceived usefulness, perceived satisfaction and SRL predict course achievement.

3. MATERIAL AND METHOD

3.1. Design and procedure

This study was conducted at one of the SVCs in Turkey, which is a two-year college. Undergraduates are accepted to the college according to multi-stage selection criteria that include the national exam for entrance to university, followed by the school-specific physical exams and interviews. Candidates are given professional and technical training in addition to special preparation to become non-commissioned officers (NCOs). The school's courses use a BL approach, and an e-learning system called Course Portal, developed using Moodle to support face-to-face education.

The research was conducted within the scope of Information and Communication Technologies (ICT), English as a Foreign Language (EFL), Turkish Language, Mathematics and History courses, which are mandatory for all departments in the school. The courses' content was presented in the BL format, which included weekly face-to-face lessons over a 15-weeks period, as well as online presentations of the materials used in the face-to-face lessons to students via the Course Portal. During the face-to-face sessions, the students were taught the pre-planned content of the relevant week, and those who participated in the face-to-face sessions were able to review the materials through the Course Portal if they so desired. Students who were unable to attend or had difficulty understanding face-to-face courses were asked to review their lecture notes by logging into the Course Portal individually via an intranet.

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In the online portion, the students were also given extra presentations, example project demonstrations, learning exercises, homework, and film clips through the Course Portal. Thanks to these features, the students could interact with the content and write to the instructor from any location and at any time on the university campus. Students had complete discretion over what they studied owing to the Course Portal.

3.2. Sample

The convenience sampling method was employed to choose the participants. Participants consisted of 203 freshmen SVC students who took the five mandatory courses mentioned above in Fall 2022 and filled the Learner Self-Regulation Scale (LSS) on a voluntary basis. Since the research context is an SVC, the fact that all of the participants were male university students living on campus makes the study different and also constitutes a disadvantage (related details are discussed under the heading Limitations).

3.3. Instrument

The data collection instrument was administered online through the Course Portal. All of the respondents were informed that their answers would be kept private and anonymized. The LSS tested by Liaw and Huang (2013) was used to determine SRL skills and their perceptions of the e-learning system. The Course Portal had been utilized to complement face-to-face education in all courses from the first week of school, and the LSS was administered in the third and fourth weeks of the fall semester, presuming that students had learned how to use the Course Portal in the first two weeks.

LSS consists of six dimensions and 30 items with 5-point Likert-type options that varied from 5 = "I strongly agree" to 1 = "I strongly disagree". The scale is focused on responses related to interactivity in learning environments, perceived self-efficacy, perceived anxiety, perceived satisfaction, perceived usefulness and SRL in relation to the online portion of the BL system.

The final grades of the five courses that the students took and were used in the study were taken from the student affairs information system. The final grades of the selected courses consist of the averages of the midterm exam held in the eighth week of the school term and the final exam in the 16th week.

3.4. Data Analysis

Data were exported from the Course Portal (School LMS) to a comma separated values (csv) format and then imported into and analyzed using the Statistical Package for the Social Sciences (SPSS) version 23 software and Analysis of Moment Structures (AMOS) version 23. P values smaller than .05 were considered statistically significant. Cronbach's α statistics were used to analyze each dimension's internal consistency reliability.

To investigate the effects of the LSS dimensions on academic achievement, a conceptual path model was built using structural equation modeling as proposed in the literature. Our study did not have enough cases to run a full-scale SEM. Therefore, a path analysis was preferred using the mean scores of the variables in question.

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3.5. Instrument Reliability

Reliability analyses were carried out to determine the internal consistency of the scale. The results are presented in Table 1. The overall Cronbach alpha coefficient for the scale is .919.

TABLE 1. Min, Max, Means, standard deviations, Cronbach's alphas.

Variables	Min.	Max.	M	SD	Number of Items	Cronbach's Alpha
LSS Dimensions						
PSE	1.00	5.00	3.86	.86	4	.87
PA	1.00	4.50	1.76	.78	4	.79
ILE	1.33	5.00	3.84	.67	6	.83
PS	1.20	5.00	4.14	.63	5	.86
PU	1.67	5.00	4.03	.68	6	.87
SRL	1.60	5.00	3.94	.66	5	.80
Courses						
ICT	2.00	96.00	50.03	24.39		
English	3.00	100.00	79.71	17.02		
Math	7.00	100.00	83.65	18.46		
Turkish	10.00	97.00	73.05	19.01		
History	10.00	97.00	71.71	19.74		

ICT: Information and Communication Technologies

A reliability score of .70 or greater is acceptable in simple research in social sciences (Cortina, 1993). According to reliability analyses, all dimensions have good internal consistency reliability. Descriptive statistics of all observed variables integrated into the path model (including course achievement scores) and reliability tests for each of the dimensions in LSS are also provided in Table 1.

4. RESULTS

Descriptive statistics (Table 1) show that the participants reported low PA (M = 1.76, SD = .78) and high PS (M = 4.14, SD = .63) and PU (M = 4.03, SD = .68). The course with the lowest GPA was ICT (M = 50.03, SD = 24.39). The representative path analysis for academic success is presented in Figure 2. The analysis was repeated for each of the five courses in which participants were enrolled. Our data successfully fit the model that we hypothesized (For ICT, $\chi2$ =7.414, GFI=.990, RMSA=.049, CFI=.997; for EFL, $\chi2$ =7.351, GFI=.990, RMSA=.048, CFI=.998; for Math, $\chi2$ =5.318, GFI=.993, RMSA=.018, CFI=1.00; for Turkish, $\chi2$ =7.129, GFI=.990, RMSA=.046, CFI=.998; for History, $\chi2$ =7.799, GFI=.989, RMSA=.053, CFI=.997).

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FIGURE 2. The path model predicts achievement from SRL, PS, PU and indirect other variables.
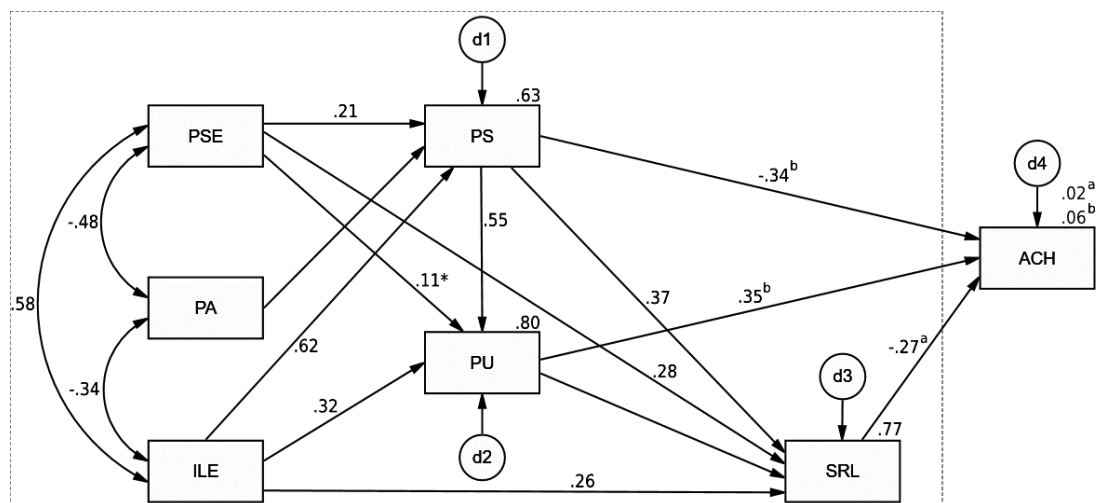
ACH: Course achievement. a: Value applies to ICT, b: Value applies to EFL. Only significant values are shown.
All path values are significant at p < .01 except for *, a, and b, which are significant at p < .05.

The primary interest as an outcome was course achievement (ACH), and summaries of the results of each path analysis are presented in Table 2. In terms of the significant paths that affected ACH, SRL has a significant negative influence on ICT Course achievement (-9.90). Similarly, perceived satisfaction has a significant negative influence on EFL Course achievement (-8.44). And PU has a significant positive effect on EFL Course achievement (9.34).

TABLE 2. Standardized and unstandardized regression weights of the path model
for five different course achievement scores as outcomes.

			ICT			EFL			Math		Turkish		History	
Path			β	B		β	B		β	B	β	B	β	B
SRL	→	ACH	-0.27	-9.90	*	0.18	4.54		0.17	4.85	0.00	-0.11	-0.03	-0.91
PU	→	ACH	0.08	3.20		0.35	9.34	*	0.10	3.02	0.27	8.23	0.13	4.07
PS	→	ACH	0.15	5.46		-0.34	-8.44	*	-0.13	-3.44	-0.09	-2.46	-0.02	-0.55
PA	→	PS	-0.08	-0.07										
ILE	→	PS	0.62	0.63	**									
PSE	→	PS	0.21	0.16	**									
PSE	→	PU	0.11	0.08	*									
ILE	→	PU	0.32	0.30	**									
PS	→	PU	0.55	0.51	**									
PU	→	SRL	0.09	0.09										
PS	→	SRL	0.37	0.36	**									
PSE	→	SRL	0.28	0.21	**									
ILE	→	SRL	0.26	0.25	**									
PSE	↔	ILE	0.58	0.34	**									
PSE	↔	PA	-0.48	-0.32	**									
PA	↔	ILE	-0.34	-0.18	**									

ICT: Information and Communication Technologies, ACH: Course Achievement, *significant at p < .05, **significant at p < .01

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The secondary interest as an outcome was SRL. The greatest overall causal influence originated from PS (.37), followed by PSE (.28) and ILE (.26). Perceived usefulness had the lowest influence and did not contribute to the prediction of SRL (.09) ($p > .05$). Our model explained approximately 77% of the variance in SRL.

Perceived usefulness was one other outcome of the model. The greatest overall causal influence originated from perceived satisfaction (.55), followed by ILE (.32) and PSE (.11). Our model explained approximately 80% of variance in PU.

Perceived satisfaction was an outcome variable, as well. The greatest overall causal influence originated from ILE (.62), followed by PSE (.21). Perceived anxiety had a negative influence and did not contribute to the prediction of PS (-.08) ($p > .05$). And our model explained approximately 63% of variance in PS.

5. DISCUSSION

Descriptive statistics indicate that the participants' perceptions of the LSS dimensions are generally positive. LSS was administered at the beginning of the fall term in the 3rd and 4th weeks, and the participant perceptions were based on their first month of experience with the Course Portal as they were in their first year. Course grades consist of the results of the midterm exam in the 8th week and the final exam in the 16th week. The ICT course had the lowest grade point average, according to the calculations (M = 50.03, SD = 24.39). The fact that the course is taught in a hands-on way in computer laboratories, while the exams are theoretically done in the form of paper-based exams, maybe the most crucial factor for the low ICT course performance.

5.1. Hypothesis (1): ILE, PSE and PA Predict PS

In our study, perceived anxiety has a negative effect on perceived satisfaction, but this effect is not significant. While the negative trend is consistent with Liaw and Huang (2013), the non-significant effect means that perceived anxiety may not be a very important factor for predicting perceived satisfaction, at least in the context of our study. Our all-male, cadet sample may have had an effect on this, but this is speculation that needs to be explored.

Interactivity in learning environments and perceived self-efficacy have a significant positive relationship with PS. This finding is consistent with other studies (Cigdem, 2015; Liaw, & Huang, 2013) and means that perceived self-efficacy and interactivity in learning environments are important factors influencing learner satisfaction with the Course Portal. And in our study, interactivity in learning environments had a relatively greater effect on PS compared to perceived self-efficacy than that revealed by Liaw and Huang (2013). This has demonstrated even more strongly that making learning environments interactive can improve learner satisfaction.

5.2. Hypothesis (2): PS, ILE and PSE Predict Perceived Usefulness

Consistent with the model of Liaw and Huang (2013), it was found that perceived usefulness could be predicted from perceived satisfaction, interactivity in learning environments, and perceived self-efficacy. Therefore, hypothesis 1 was accepted. Other studies have shown the positive effect of perceived satisfaction

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on perceived usefulness (Liaw, 2008) and perceived self-efficacy's positive effect on perceived usefulness (Sayaf et al., 2021; Teo, & Zhou, 2014; Venkatesh, 2000), and our model has consistently predicted the relevant variables. Considering our findings that are consistent with the link between interactivity in learning environments and perceived usefulness highlighted by Liaw and Huang (2013), interaction is a core aspect of all contemporary learning environments that may be strengthened with proper technologies and pedagogical techniques, as Cigdem and Öztürk (2016) points out. However, our study has also shown that the relationship between interactivity in learning environments and perceived usefulness is stronger than the estimate shown by Liaw and Huang (2013). Although their model has a bond between interactivity in learning environments and perceived usefulness about 2 times stronger than the bond between perceived self-efficacy and perceived usefulness (.20/.12, respectively), in our study this ratio is about 3 times (.32/.11, respectively). Based on this comparison, it is likely that the reason for the weaker relationship between perceived self-efficacy and perceived usefulness in our model is the direct link we hypothesize from perceived self-efficacy to SRL. Thus, while the indirect impact of perceived self-efficacy on SRL through perceived usefulness has been taken into account before, we have also envisaged a direct link in our model, and we were not wrong about it (βPSE → SRL = .28, p < .01).

In general, the PU dimension has been shown to influence the perceived satisfaction dimension in the literature. Liaw and Huang (2013) also stated that they would consider the effect of perceived usefulness on perceived satisfaction in their study. However, in their final results, they presented the effect of perceived satisfaction on perceived usefulness. Since this study is based on their model, the path from perceived satisfaction to perceived usefulness was adhered to in our model.

5.3. Hypothesis (3): ILE, PSE, PU and PS Predict SRL

Except perceived usefulness, interactivity in learning environments, perceived self-efficacy and perceived satisfaction were all positive predictors of learners' SRL skills in our study. This finding is consistent with previous studies (Cigdem, 2015; Kramarski, & Gutman, 2006; Liaw, & Huang, 2013). It can be said that satisfied students, find the environment interactive and have self-efficacy in using the LMS have strong SRL skills. One of the key reasons for the strong perception of SRL appears to be blended courses' support for learning pace and offering students the flexibility to customize their learning.

Perceived usefulness, which is a part of this hypothesis, did not significantly predict SRL. This finding is inconsistent with past studies (Cigdem, 2015; Kramarski, & Gutman, 2006; Liaw, & Huang, 2013). We believe that the most important factor that causes this is the strong link between perceived self-efficacy and SRL. Our hypothesis that PSE has a significant relationship with SRL, which we predicted to extend the model proposed by Liaw and Huang (2013), was confirmed. We also found that students with strong PSE had strong SRL skills in our study, which is consistent with the literature (Dent, & Koenka, 2016; Usher, & Pajares, 2008; Zimmerman, 1989; Zimmerman et al., 1992; Zimmerman, & Pons, 1986). It is worthy to note that there is a similar direct link between interactivity in learning environments and SRL. These direct links seem to have minimized the indirect effects over the PU (from perceived self-efficacy, as well as interactivity in learning environments). In other words, students who are confident and think the system is interactive are better able to manage their behavior in the system regardless of whether they find the system useful or not.

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5.4. Hypothesis (4): PU, PS and SRL Predict Course Achievement

The test of our hypothesis that course achievement is directly and significantly affected by perceived useful-ness, perceived satisfaction and SRL has revealed two different outcome scenarios concerning the ICT and EFL courses. There was no significant effect regarding the other courses.

We determined that SRL had a negative effect on the success in the ICT course. As discussed above, the fact that ICT is a practical course due to its nature, but that the exam is conducted theoretically (pa-per-based), may be an important reason for the negative effect. Despite the fact that the course space allo-cated for the ICT course on the Course Portal is rich in presentations, videos, and assignments for computer "applications," the theoretical conduct of the exams for student performance evaluation may have caused students to experience a perception that was contradictory to their expectations. It would be useful to re-member that the lowest mean achievement score belongs to ICT. Whoever thought that the system was optimal for self-regulation may have underestimated the ICT Course's expectations.

In the EFL Course, a direct and positive link between perceived usefulness and achievement was found in line with previous studies (Johnson et al., 2008; Liaw, 2008; Miltiadou, & Savenye, 2003; Young Ju et al., 2012). However, contrary to the literature (Akyol, & Garrison, 2011; Bolliger, & Erichsen, 2013; Dziuban et al., 2015; Eom et al., 2006; Marks et al., 2005; Puzziferro, 2008; Sun et al., 2008), a direct negative relationship was found between perceived satisfaction and achievement. The Course Portal space of the EFL Course contains many activities "for exam subjects." We think that this is the reason for perceived usefulness's sig-nificant and positive impact on course achievement. The negative and significant effect of perceived satis-faction on course achievement may be due to the fact that the scale was administered at the beginning of the school term and the students may have felt that they could not match the e-learning environment with the expectations of the course yet.

In the other courses, no significant relationship between LSS dimensions and course achievements was observed. The possible reasons for the incompatibility of this finding with many studies in the literature may be related to the environment and timing, such as the fact that the scale we used is for measuring SRL in online environments, the LSS was administered relatively early at the semester, and the students' achieve-ment status was determined in the sixteenth week. We anticipate that the results would differ if the scale was administered after the exam grades were determined. But a more likely speculation might be that SRL may not have similar effects on every course.

In this study, our aim was to evaluate the factors affecting achievement in terms of SRL by making an in-cremental contribution. As we mentioned above, the nature of each course may have affected achievement differently. Our aim was not to find and consider all the factors that could affect success but to examine the courses in their natural context non-intrusively. However, it is not possible to say that the SRL effect on achievement that we anticipate has occurred. Research that is also concerned with the nature of a course would, needless to say, necessitate the inclusion of more variables in the analysis as well as more experi-mental control of the learning environment. It was not possible to achieve this effectively with the sample and setting we had. As a goal, we can recommend that the way a course is delivered, its nature, be classified and included in analyses.

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6. CONCLUSIONS

Our study contributes to the literature on two issues. First, it introduces a new model on predicting achievement in the context of SRL by extending the model of Liaw and Huang (2013). Our model offers specific, valuable, and interesting connections in predicting achievement for at least two different courses. Second, our study validates the learner self-regulation model of Liaw and Huang (2013) in the context of SVC students with minor differences.

Our research has a unique potential as it was carried out in a specific context of blended learning and on students at an SVC — who have received little research attention in comparison to other groups in the literature. When students are given the opportunity to use an LMS, if they find it interactive, have strong perceived self-efficacy and are satisfied with it, they may find it more useful. Perceived positive usefulness can positively affect use behavior.

In conclusion, LMS administrators may contribute to the long-term student success by creating useful, interactive environments for students and teaching newly enrolled students how to use the LMS, which can improve student's perceived self-efficacy and thus their use.

6.1. Limitations and future lines of research

There are some limitations to our study. Participants are limited to boarding students at an SVC, and the findings are limited to the context of a single university. The fact that all participants are male makes it challenging to generalize our results to ordinary university settings (however, it is also an advantage in that it shows the specific effect on males). In addition, in our study, the LSS was administered relatively early during the semester. As we discussed earlier, its implementation towards the end of the semester can contribute to the formation of more informed student perceptions of the interactive environment.

7. DECLARATIONS

7.1. Competing interests

The authors declare that they have no competing interests

7.2. Funding

This research did not receive any external funding.

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An Effect of Assessment Delivery Methods on Accounting Students' Grades in an E-learning Environment

Efecto de métodos de entrega de evaluación sobre notas de estudiantes de contabilidad en un entorno e-learning

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ABSTRACT

The study aims to investigate whether a change in the delivery of assessment methods, from a full online assessment to a hybrid assessment, affected accounting students' grades during the COVID-19 Pandemic. This study also considers whether the change undertaken to assessment methods met their targets of improving assessment practices and maintaining academic integrity. The statistical analysis technique used was an independent sample t-test, chi-square, and ANOVA. A total of 473 final grades (fully online assessment = 224, hybrid assessment = 249) were collected to achieve the study purpose. The findings show a statistically significant difference in the final course grades between the two assessment methods. In each course, students scored significantly lower on the hybrid assessment compared to students who took the fully online assessment, indicating that changes in the assessment delivery method affected students' grades and that the shift to hybrid assessment had a positive effect assessment system. Additionally, the performance of males and females is too different; female students have made higher grades than peer males in both methods in each course, indicating that the grades between males and females are different. This research recommends that the use of a hybrid assessment approach would help in providing a unique educational environment and this approach of varied assessment can enable lecturers to find out student abilities in accounting courses and maintain academic integrity.

KEYWORDS Online assessment method; Hybrid assessment method; Assessment methods; Accounting student's grade; E-learning environment.

RESUMEN

El estudio tiene como objetivo investigar si un cambio en la entrega de métodos de evaluación, desde una evaluación completa en línea hasta una evaluación híbrida, afectó a las notas de los estudiantes de contabilidad durante la pandemia COVID-19. Este estudio también considera si el cambio emprendido en los métodos de evaluación cumplió con sus objetivos de mejorar las prácticas de evaluación y mantener la integridad académica. La técnica de análisis estadístico utilizada fue la prueba t para muestras independientes, chi-cuadrado y ANOVA. En este estudio se recogieron un total de 473 calificaciones finales (evaluación totalmente en línea = 224, evaluación híbrida = 249) para lograr el objetivo. Los resultados muestran una diferencia estadísticamente significativa en las calificaciones finales del curso entre los dos métodos de evaluación. En cada curso, los estudiantes obtuvieron puntuaciones significativamente más bajas en la evaluación híbrida en comparación con los estudiantes que tomaron la evaluación completamente en línea, lo que indica que los

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cambios en el método de realización de la evaluación afectaron a las calificaciones de los estudiantes y que el cambio a la evaluación híbrida tuvo un efecto positivo en el sistema de evaluación. Además, el desempeño de hombres y mujeres también es diferente; las alumnas obtienen calificaciones más altas que sus pares varones en ambos métodos en cada curso, lo que indica que las calificaciones entre hombres y mujeres son diferentes. Esta investigación recomienda que el uso de un enfoque de evaluación híbrido ayudaría a proporcionar un entorno educativo único y este enfoque de evaluación variada puede permitir a los profesores descubrir las habilidades de los estudiantes en cursos de contabilidad y mantener la integridad académica.

PALABRAS CLAVE Métodos de evaluación en línea; Método híbrido de evaluación; Métodos de evaluación; Nota del estudiante de Contabilidad; Entorno E-learning.

1. INTRODUCTION

An assessment is defined in the literature as the process of gathering, describing, or quantifying information about student performance (e.g., diagnosing students' strengths and weaknesses and grading student performance for certification purposes) (Marriott, 2009; Rovai, 2000). The aspects of assessment are a critical part of the education process (Jimaa, 2011). According to the general assessment theory, the timing of evaluations has been generally differentiated into summative assessment and formative assessment. The first method is usually used as evidence for grading students at the end of a subject, also known as the traditional assessment. The second method is seen as an activity that aims to improve education and learning and is conducted over the course of teaching to monitor student learning (Rovai, 2000).

Identifying appropriate assessment tasks in an online learning environment is the overriding concern of universities to discover what students learn more systematically and reliably (White, 2021). This attention has grown with universities' interest in identifying the best assessment activities when integrating online assessment into the educational system. It has become essential for them to measure the most effective online assessment practices for assessing learning outcomes. This attention has also been manifested substantially and broadly to the front again with the abrupt closure of universities and the shift to distance education, where their only viable option was online assessment.

Rovai (2000) mentioned that these assessments do not change in an online learning setting but rather change in the manner in which these assessments are implemented. The online learning environment and its digital tools are an excellent opportunity to implement numerous innovative assessment methods to promote student learning outcomes (Rogerson-Revell, 2015). Various assessment delivery methods are available that assess student progress in an e-learning environment. They encompass three distinct forms: the fully online assessment, the traditional face-to-face assessment, or a combination of both. The fully online assessment modality involves three forms of assessment: (a) an unsupervised online assessment, (b) a supervised online assessment, and (c) a face-to-face assessment in a classroom assessment within a system (Guangul et al., 2020).

The COVID-19 pandemic has compelled many universities to shift toward online learning and assessment, and they had to adopt distinct assessment practices and means of delivery and submission to ensure student progress and learning outcomes measurement under this compelling circumstance. In Saudi

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Arabia, the rapid transition into distance education led to universities using a range of alternative online assessments during this period, especially in the first year of this sudden shift, where the fully online assessment replaced a traditional on-campus paper assessment in the second semester and summer semester of 2019/2020. Those activities concentrated on a number of assessment methods that are diversified to include summative and formative assessment activities, usually an un-invigilated assessment, either in the form of timed LMS exams or take-home exams or assignments.

Most studies conducted in Saudi show that the use of summative assessments was the highest by instructors, while formative assessments were used less often during this pandemic (Almossa, & Alzahrani, 2022; Guangul et al., 2020). The implementation of online assessment activities contributes to promoting undergraduates' academic performance (Oguguo et al., 2023; Thathsarani et al., 2023).

Although these alternative assessment methods were adopted, their implementation has been the main challenge to lecturers and students. Guangul et al. (2020) noted that the main challenges identified in online assessment during the shift towards online learning were academic misconduct, infrastructure, coverage of learning outcomes, and commitment of students to submit assessment activities. Further, delivering efficient and reliable assessment methods for assessing student learning achievement through an online learning system is a complicated process, particularly when lecturers and students are not prepared, as well as to a lack of assessment security software (Gamage et al., 2020; Paz Saavedra., 2022; Sharadgah, & Sa'di, 2020).

Saudi universities, nevertheless, reconsidered alternative assessment delivery methods, where the epidemic was still raging, in the academic year 2020-2021 and decided to partially return to traditional assessment through the adoption of mid-term and final exams on-campus with the continued online learning delivery and some online assessment activities. This shift to the hybrid assessment designed with a mix of online and pen-and-paper assessment activities could be attributed primarily to preserving academic honesty and maintaining educational standards (Bilen, 2021; White, 2021). Newton (2020) indicated that many universities reported widespread cheating in 2ed semester of 2019/20 during the first year of the COVID-19 Pandemic.

The landscape of education is rapidly changing, with advancements in technology and evolving pedagogical approaches leading to innovative methods of delivering assessments. In the context of accounting education, it is essential to explore the impact of various assessment delivery methods on students' academic performance. Moreover, this experience led to the adoption of two forms of assessment delivery methods in a synchronous online teaching environment during this pandemic: 1) fully online assessment and 2) hybrid assessment. In this study, hybrid assessment has been described as mixed assessment practices combining modalities of online assessment and traditional assessment. Hence, two research questions arose: does the change in the delivery of assessment methods, from a full online assessment to a hybrid assessment, affect students' academic achievement in an online learning environment during the COVID-19 Pandemic? And do we observe a gender gap in the final course score across different assessment delivery methods? Therefore, the aim of this study is to investigate whether a change in the delivery of assessment methods, from a full online assessment to a hybrid assessment, affected accounting students' grades during the COVID-19 Pandemic, and to examine the gender difference in the final course score across different assessment delivery methods. This study also considers whether this change undertaken in assessment methods enabled universities to achieve their targets of improving assessment practices and ensuring academic integrity.

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In order to reach the goal of this study, the effect of assessment delivery methods on the final course grade of accounting students between a fully online assessment and a mix of online and traditional pen-and-paper assessments. Grades were compiled from two courses during the summer semester of 2019/2020 and the second semester of 2020/2021. The courses selected for this study were the internal audit and the financial reports analysis courses. Presently, there seem to be no studies that have explored how learning outcomes may be affected by the delivery methods of alternative assessments when using these methods during COVID-19. Thus, this study could positively contribute to the emerging literature on the effect of these differences in delivering assessment methods on the performance of a student in an online learning environment in an accounting context.

The rest of this paper is organized as follows. The next section reviews the literature related to this research. Section 3 describes the research methodology. Section 4 presents the results of this research. Finally, a discussion is conducted in Section 5, and the conclusion is revealed in Section 6.

2. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The use of e-learning systems and their digital tools in the assessment are appreciated by accounting students compared with a traditional on-campus paper assessment (Helfaya, 2019; Marriott, 2009), and their performance improves with online assessments (Aisbitt, & Sangster, 2005; Duncan et al., 2012; Haidar, 2022). There is a positive and significant relationship between the students' use of e-learning systems and their performance in the final assessments in accounting courses (Perera, & Richardson, 2010).

However, assessment methods have caused major anxiety for students with the sudden shift to online studying during the COVID-19 Pandemic (Bautista Flores et al., 2022). These students had often become entirely preoccupied with assessment tasks and their influence on their assigned grades and they might have reservations about the type of online assessment practices. Perhaps most troubling was the negative impact that assessment methods can have on the overall satisfaction with the online learning system adoption. Almossa (2021) found that the challenges of the sudden shift in learning mode and alterations in assessment methods highly impacted students' engagement with learning and assessment. Overall, some studies indicate that assessment methods had the general effect of altering student behavior (Chen et al., 2022; Schinske, & Tanner, 2014) and that students may hold fairly positive, and at least not overly negative, attitudes towards online assessment methods (Hewson, 2012).

2.1. The delivery of assessment methods and student's grade

Most of the studies have used the final grade indicator for measuring students' learning results and performance of students from five angles: 1) the effects of different learning styles (Hsiao, 2021); 2) the comparison of online courses to traditional courses (Bunn et al., 2014; Cater et al., 2012; Hafeez et al., 2022; Idrizi et al., 2021); and 3) the effects of testing (Aisbitt, & Sangster, 2005; Brallier et al., 2015; Gomaa et al., 2021; Perera, & Richardson, 2010; Pierce, 2011; Yates & Beaudrie, 2009). All these studies demonstrated that the difference in the delivery of learning and assessment methods affected performance, learning outcomes, and grades.

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Some of the studies of students in different subject areas, at different levels, and over different time periods found that students' grades on online assessment and traditional face-to-face assessments were not that different (e.g., Da Silva et al., 2015; Yates and Beaudrie, 2009). Other studies found that students' grades on online assessments were higher than those on traditional face-to-face assessments (Soffer, & Nachmias, 2018), while others found no difference between the two. In contrast, other studies proved students in traditional learning had more successful outcomes overall than those in online learning (Cater et al., 2012; Glazier et al., 2020).

Very few studies have nevertheless discussed the effect of both online and traditional face-to-face assessment delivery methods used by lecturers on students' overall scores in a synchronous online course in the accounting context (e.g., Da Silva et al., 2015; Gomaa et al., 2021). Furthermore, there is also a lack of recent research directly studying the effect of those methods on student grades during the COVID pandemic, with most of the noted studies being focused on the comparison of learning outcomes in students and their perceptions of online learning delivery modes. Therefore, no study has discussed the method and the effect of fully online and hybrid assessment delivery on students' achievement outcomes in a synchronous online learning environment. However, those studies that have discussed certain forms of assessment delivery methods can be used to support this study and its results.

For example, Da Silva et al. (2015) conducted a study to investigate the effect of the delivery of online assessment methods based on learning styles on the final course grades. They found that the grades obtained by students in online unsupervised assessment activities are higher than those grades obtained in online supervised assessment activities. Likewise, Gomaa et al. (2021) found that the average student grade in unproctored online exams is higher than that of proctored online exams in class in an intermediate accounting course. On the other hand, Bunn et al. (2014) found that students in the traditional classroom (Intermediate Accounting I) had higher mean scores than those online. Cater et al. (2012) demonstrated too that students in the traditional classroom outperformed students in the online classroom on tests with the average final grade in the course higher for traditional students.

A recent study concluded that student performance in completely online classes during the COVID-19 Pandemic was as effective as the pre-pandemic traditional learning classes, and students' final course marks showed that the participants in the online classes performed as effectively as participants in the conventional learning classes (Hew et al., 2020). On the other hand, Eurboonyanun et al. (2020) found that medical students who took the online assessment had significantly higher mean scores than those who took traditional assessments (the traditional written examinations).

In a different educational context, Yates and Beaudrie (2009) compared the impact of unsupervised and supervised assessments on students' grades in mathematics courses in a distance education environment. Their findings revealed no significant difference between the grades of the students who took exams in the classroom compared to students who took the unsupervised online. Pierce (2011) also found no differences in students' grades on unsupervised online assessment versus supervised face-to-face assessment for three of four exams, while a significant difference in grades was found for one of four exams in a pharmacy program. In contrast, Brallier et al. (2015) also found a significant difference in grades among students on un-proctored online assessment activities and traditional proctored paper and pencil assessments in a psychology course.

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Although some findings on the difference in students' grades were paradoxical, this study suggests two following alternative hypotheses: first, accounting students who took fully online assessment earn scores that differ from students who took a hybrid assessment in the same synchronous e-learning environment during the COVID-19 Pandemic, and second, the change to assessment delivery method, from fully online to the hybrid assessment, is reflected in students' learning results on the assessment targets and academic integrity.

2.2. Student's gender

In recent decades it has been noted that female students receive better performance in a range of indicators, the most important of which are grades, wherein female students outperform male students in learning results not only in the higher education environment but also in the school education environment (e.g., Voyer, & Voyer, 2014; Workman, & Heyder, 2020). The female advantage in learning outcomes is pronounced with a comparison between online and traditional learning modes. For instance, female students earn higher grades than their male peers in online learning mode versus conventional learning mode (Harvey et al., 2017; Hsiao, 2021; Idrizi et al., 2021; Noroozi et al., 2020). A review of the related literature before the period 2010 reveals no difference between males and females in their grades in e-learning environments (e.g., Astleitner, & Steinberg, 2005; Cuadrado-García et al., 2010; James et al., 2016), but conventional views of comparison in gender may not be in keeping with the digital era of learning, which involves a wide use of E-learning and online sources, and other multimedia tools to enhance learning abilities.

Overall, findings on gender's impact on student outcomes are mixed, whether in the regular classroom or online. Given these inconsistent findings, this study proposed an alternative hypothesis that students' scores differ by gender, which is attributable to the difference in assessment delivery methods in the same e-learning environment.

3. MATERIAL AND METHOD

3.1. Procedure

The focus of the current study was mainly on assessment activities delivered in both the form of online and hybrid assessments (a mix of online and traditional pen-and-paper assessments) during two semesters. Ethical approval to conduct this study was obtained from the Research Ethics Committee (Ethics Number: MUREC-jun.5/com-2022/7-3). Student's grades for the Internal Audit (IAC) and Financial Reports Analysis (FRAC) courses were obtained from the Edugate system. The measure of the final course grade used in this study, as seen by Tucker (2000) and Soffer and Nachmias (2018), is a better indicator to determine whether there is a significant difference in final course grades between groups in the education system.

These two courses were selected because they covered two different assessment activity delivery methods (a fully online and a hybrid assessment). In the first method, the fully online assessment activities accounted for the total course grade (100%) over the summer semester of 2019/20. The online assessment activities comprised: 1) The online final exam at the end of the course (20% of course score), which is composed of multiple-choice, true/false questions, and matching questions created from the questions in the

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question bank, and 2) Multi-asynchronous activities over the semester (80% of course score), which are composed of discussion forums, assignments, quizzes that also created from the questions in the question bank, student exhibits, and lecturer observation. In all cases, students were required to take the uncensored testing online within the Blackboard Figure 1 presents a sample screenshot of the online quizzes.

In the second method, the hybrid assessment mainly depended on the traditional proctored face-to-face final exams (paper-based test) at the mid-term and end of the course (80% of course score). The rest of the assessment (20% of course score) is composed of online assessment activities over the second semester of 2020/21. Figure 2 presents a sample screenshot of assessment activities page of Internal Audit course. All online assessment activities are asynchronous, that is, students complete activities within specified time frames and deadlines, but are not required to be online at any specific time.

Thus, the final course grade is the dependent variable of the study. The independent variable is the assessment delivery method. Also, gender is considered as the moderator variable that may affect the relationship between independent and dependent variables.

FIGURE 1. A sample screenshot of the online quizzes.
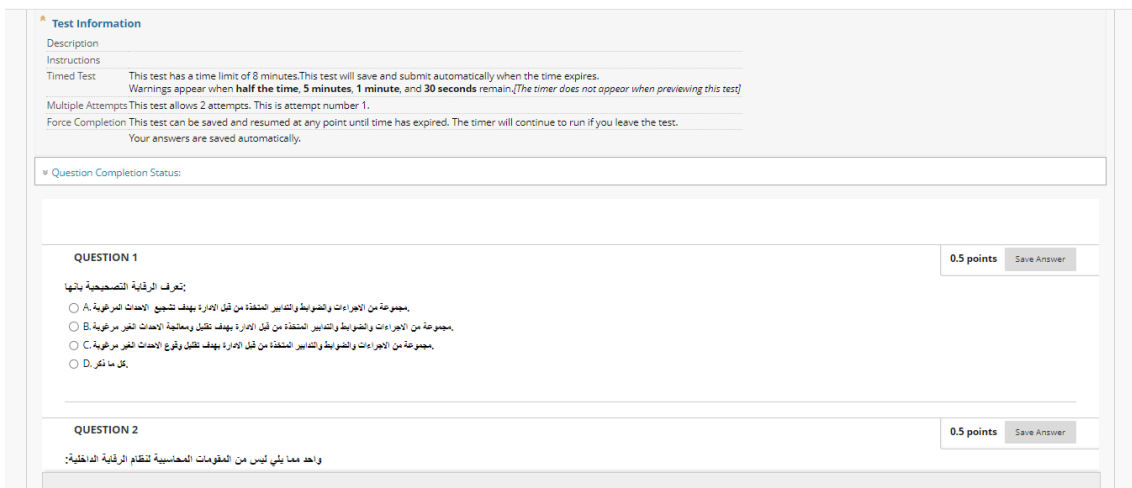
FIGURE 2. A sample screenshot of assessment activities page of Internal Audit course.

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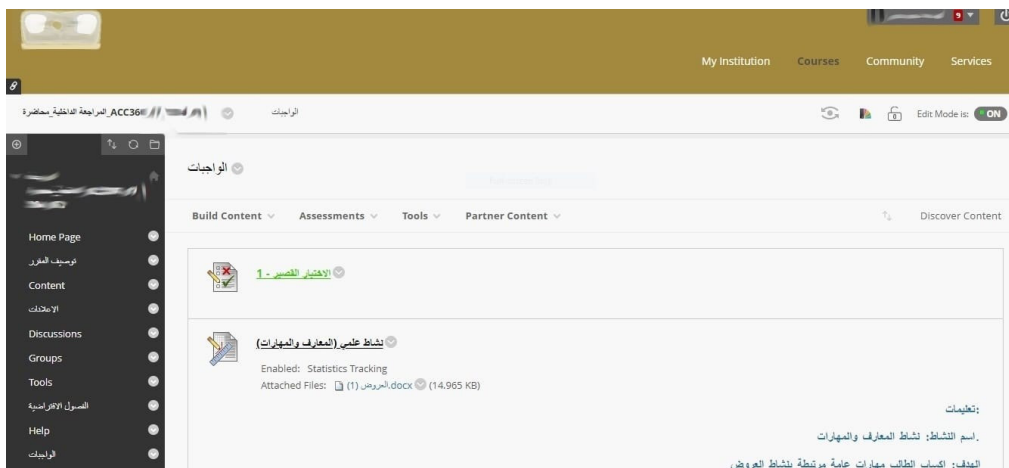
3.2. Data collection

The grades data from 473 students enrolled in the two courses, the Internal Audit course and the Financial Reports Analysis course in the accounting program, were collected when the COVID-19 pandemic required a sudden change to online distance learning. The data collection was across two semesters for both courses (summer semester 2019/20 and second semester 20/21). The first category of data is based on 224 students' scores earned from the fully online assessment activities (47.4%) during the summer semester of 2019/20. The second category is based on 249 students' second-semester scores in 2020/21 earned from the hybrid assessment (52.6%), as shown in Table 1.

3.3. Data analysis

The data was analyzed statistically by using SPSS 24.0. First, the t-test analysis and the chi-square test were performed at a significance level of 0.05 to examine if any statistically significant differences existed between the fully online and the hybrid assessments on the final mean score. The assessment method delivery and students' learning grades were used as independent and dependent variables, respectively. Second, a two-way ANOVA at a significance level of 0.05 was used to determine whether any statistically significant differences existed between the two variables of the method of assessment delivery and gender with quantitative final grade and the effect of the difference in gender on mean scores. The difference in gender and assessment delivery method was the independent variable, and the final course score was the dependent variable.

TABLE 1. Descriptive statistics sample characterization.

Characteristic	N	%	Minimum	Maximum	Mean	SD
Online Course						
Internal Audit	258	54.5	10.00	98.00	76.20	12.63
Financial Reports analysis	215	45.5	16.00	99.00	79.27	14.11
Type of Assessment						
Fully Online Assessment (summer 19/20)	224	47.4	16.00	98.00	81.81	10.87
Hybrid Assessment (2ed semester 20/21)	249	52.6	10.00	99.00	73.80	14.31
Gender						
Male	320	67.7	10.00	98.00	74.27	13.66
Female	153	32.3	56.00	99.00	84.55	9.68

SD. Standard Deviation

4. RESULTS

The final grades were, firstly, examined based on descriptive statistics to determine if there is a statistically significant difference between groups, as shown in Table 1. The descriptive statistics findings showed that

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the mean scores of both two methods are significantly different. The mean scores for students via full online assessment (M = 81.81, N = 224, SD = 10.87) were higher than the mean scores via the hybrid assessment (M = 73.80, N = 249, SD = 14.31). Both methods had different SDs. For differences in gender, female students had a higher mean score (M = 74.27, N = 320, SD = 13.66) than male students (M = 84.55, N = 153, SD = 9.68). The SD for both groups was differential. Moreover, a smaller difference was observed between the mean scores attained in terms of the internal audit course (M = 76.20, N = 258, SD = 12.63) and the financial reports analysis course (M = 79.27, N = 215, SD = 14.11), but it was not significantly different when compared with the assessment delivering method, as will be noted later in this section.

4.1. The effect of assessment delivery methods on student's final course grade

First, The independent sample T-test was performed to determine if there was a statistically significant difference between the students' final grades who were assessed entirely online and hybrid (a mix of online and pen-and-paper assessments) for both the Internal Audit course (IA course) and the Financial Reports Analysis course (FRA course). The results indicated that students' each course grades were significantly higher with full online than with hybrid assessment. For the IA course, the difference was statistically significant (t = 4.72, p<.05), indicating that the mean scores for those who were assessed via the fully online (M = 79.73) were significantly higher than for those who were assessed via the hybrid assessment (M=72.57). Regarding the FRA course, students receiving full online assessment had significantly higher course scores than those receiving hybrid assessment (t = 5.47, p<.05), indicating that the average grade for those who were assessed via the fully online (M = 84.74) was also significantly higher than those who were assessed by the hybrid assessment (M = 75.09). Overall, all of those students who received fully online assessment activities tend to perform success rates well above those who received a hybrid assessment (see Table 2).

Table 2 also shows the effect size corresponding to each T-test value. Cohen (1992, 157) provided rough guidelines for effect size, wherein values of 0.20 represent the small effects, 0.50 for medium effects, and 0.80 for large effects. The effect size was exclusively in the small category for all comparisons, Cohen's d = .081 and .115, respectively. The effect's significance was small for each course (according to Cohen, 1992).

TABLE 2. T-test results and the effect size results.

Course	Fully-Online Assist	Hybrid Assist	*t* Value	*p* Value	Diff (online- hybrid)*	Cohen's *d*	Effect Size
Internal Audit	79.73 ± 10.24	72.57 ± 13.82	4.72	.000	Sig. diff.	.081	Small
Financial Reports Analysis	84.74 ± 11.11	75.09 ± 14.75	5.47	.000	Sig. diff.	.115	Small

* Differences between groups are significant at a 5% level (p<0.05)

Table 3 also displays grade distribution according to the delivery of the assessment method. The results of chi-square testing indicated that there are statistically significant differences in students' grades for each course due to the two modalities' differences. The difference in student grade for each course was

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statistically significant, $\chi2$ (41, N = 258) = 67.726, p=.005 <0.05 and $\chi2$ (51, N = 215) = 107.364, p=.000 <0.05, respectively. The correlation was smaller than our significance level of 0.05. We, therefore, had to accept the alternative hypothesis.

TABLE 3. Chi-square results.

Course	Chi-Square value	Df	P Value*	Diff (online- hybrid)
Internal Audit	67.726	41	.005	Sig. diff.
Financial Reports Analysis	107.364	51	.000	Sig. diff.

*Significant difference at 0.05 level

4.2. The effect of gender on student's grade

Second, ANOVA was conducted to investigate whether the difference in assessment delivery methods (on-line/hybrid assessment) has an effect on the student's grade is attributable to the difference in gender (male/female). The ANOVA statistical test showed a significant difference in the variation of assessment method delivery towards students' grades for gender differences (see Table 4). The difference was significantly higher among male students in the financial reports analysis course (F = 44.35, p <.000). Table 4 also shows the effect size (Cohen's d) corresponding to each F value. Cohen (1992, 157) provided rough guidelines for effect size, where values of 0.01 represent small effects, 0.06 for medium effects, and 0.14 for large effects. The effect sizes were exclusively in the medium and large categories for all comparisons (for IA course, p <.000, $\eta2$ = 0.073, while FRA course, p <.000, $\eta2$ = 0.172), as the $\eta2$ index was 0.073, indicating a medium effect size concerning the internal audit course, and was 0.172, indicating a large effect size concerning the financial reports analysis course.

TABLE 4. ANOVA and Eta tests (the difference in gender)/ final grade depending on gender.

Course	Gender	fully Online Assist	Hybrid Assist	*f* Value	*p* Value*	Result	Cohen's *d*	Effect size
Internal Audit	Male	77.553 ± 9.77	70.75 ± 14.09	20.197	.000	Sig. diff.	.073	Medium
	Female	87.714 ± 7.75	77.76 ± 11.74					
Financial Reports Analysis	Male	82.582 ± 13.37	67.44 ± 5.39	44.35	.000	Sig. diff.	.172	Large
	Female	87.868 ± 13.61	84.72 ± 9.64					

*Statistically is significant at p < 0.05

5. DISCUSSION

This study aimed to investigate whether the type of assessment method delivery has an effect on students' academic achievement. In this study, the final course grades on two accounting courses were used to identify the impact of the difference in the delivery of assessment methods on academic achievement in an e-learning environment (an LMS in the form of Blackboard) during the COVID-19 Pandemic period.

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Results indicate that both the average grade on online assessments and the average grade on hybrid assessments were found to be a significant difference. Students' final course scores through fully online assessment (comprising of 20% final online examination and synchronous or asynchronous activities throughout the course 80%) were higher than those of the hybrid assessment method delivery (consisting of 80% pen and paper assessment in the form of mid-term and final-term exam and synchronous or asynchronous activities throughout the course 20%). This finding was consistent with previous studies that have demonstrated that students receive higher grades through online assessment activities in an e-learning environment versus any other form of assessment, whether face-to-face or traditional pen-and-paper assessment (Da Silva et al., 2015; Gomaa et al., 2021; Hew et al., 2020; Soffer, & Nachmias, 2018). In most cases, online assessments have been considered effective in an e-learning environment in developed countries where there is a high level of sophisticated internet services, sophisticated assessment tools, and proctored functions (White, 2021).

Due to the closure of educational institutions, Universities have observed that there is uncertainty about conducting online assessments in an uncontrolled environment during the COVID-19 period, especially in the semester of the first year of the pandemic, which has been reflected in its effect on student's grades by scoring high success grades. Noroozi et al. (2020) showed that all students benefited from online assignments during this period which fostered learning outcomes in students. There were discussions on the importance of changing the assessment delivery approach in the second year of the pandemic through ideal assessment adoption in the form of a mix of online and pen-and-paper assessment activities toward a more objective assessment. The finding in the present study has shown the positive effect of the hybrid assessment delivery method on student achievement outcomes. Further, the students scored significantly lower than expected in the online assessment activities. The study by Ladyshewsky (2015) suggests that unsupervised online assessment can be a viable tool for assessing knowledge in students, provided they meet best practice standards for online assessment. Concerns about increased cheating in unsupervised online testing are not supported. This change may require Saudi universities to invest a lot of available technological resources to improve the quality of assessment processes.

On the other hand, the findings in the present study have shown the effect of the online assessment delivery method on increasing student achievement outcomes. With the online assessment method, students are more comfortable and less stressed however during in-campus assessment they have pressure, that's why this can be one differentiator between both the assessment methods. This effect may also be mainly due to offering the variety of asynchronous and/or synchronous assessment aspects of assessing course grades within the summer semester, with the entirety of student achievement outcomes not only based on exams and quizzes but also based on the awarding of some proportion of the scores on effort and participation, completing assigned tasks on time (For example, case studies, presentations, discussion forums, and other take-home assignments) and engaging with the subjects in synchronized online learning. Ward and Lindshield (2020) observed a positive correlation between the performance of synchronous assessment tools and final grades; students who did better on this type of assessment did better in the course. Further, synchronous and asynchronous online learning environments play a positive role in achieving better final grades in an online accounting course (Duncan et al., 2012).

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Concerning the effect of the gender difference, the results showed a significant difference in the variation of assessment delivery method towards students' grades by gender differences, which female students score considerably better than male students. The assessment delivery methods for both male and female students were uniform that's why the reasons for the differences need to be identified as a future scope of this study. They generally are in line with the studies regarding the gender difference in student achievement outcomes in online learning by Idrizi et al. (2021) and Hsiao (2021), as female students scored highly better. This difference may be due to female students relying more on course subjects to learn autonomously compared to male students (Harvey et al., 2017), wherein the female students' study is more prominent to self-learning, providing better academic achievements (Moore et al., 2011), as well as the involvement of female students in the e-learning environment often is more than male students' engagement and thus, they're scored better final grades in comparison to male students (Cuadrado-García et al., 2010). Pasion et al. (2021) indicated that the COVID-19 pandemic had a different impact on females and males in terms of engagement. Results of the study by Eltahir et al. (2022) confirmed that female students demonstrated more acceptance of the implementation of online assessment during the spread of the COVID-19 pandemic than male students. Furthermore, female students have generally been more successful in tertiary education than their male counterparts worldwide, especially in recent decades (Verbree et al., 2022).

Online assessment techniques are an indispensable solution for educational institutions during the COVID-19 pandemic. Therefore, from a closer look at this research finding, it is evident that the adoption of a hybrid assessment approach would help in providing a unique educational environment. Moreover, this approach of varied assessment proved to be more effective than the use of online assessment alone. It is expected that this study will contribute evidence to support the use of both online and face-to-face assessment approaches in the online learning to find out student abilities in accounting courses and maintain academic integrity.

6. CONCLUSIONS

The sudden shift to distance education is an interesting experience, providing new delivery and assessment experiences distinct from the planned online assessment. Online assessment is promising to reproduce traditional assessment through e-tools. Technology and an online learning system enable online assessment tools to be used more extensively to support traditional assessment activities delivery methods such as pen-and-paper tasks and written homework assignments, especially formative assessment tasks. Additionally, these tools can provide a variety of online assessment practices to evaluate student performance (formative assessment) (Al-Maqbali, & Al-Shamsi, 2023; Thathsarani et al., 2023).

In this study, online assessments (such as discussion forums, quizzes, and take-home assignments) together with traditional pen-and-paper assessments have been referred to as a hybrid assessment approach. On the other hand, a purely online assessment approach is not as effective an assessment activities delivery option as those that use face-to-face assessment. This study concludes that perhaps a hybrid assessment delivery approach is efficient, even as universities return to regular classes. Therefore, this research recommends that the use of a hybrid assessment approach would help in providing a unique educational environment, and this approach of varied assessment can enable lecturers to find out student abilities in

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accounting courses and maintain academic integrity. The type of assessment can influence ethical considerations, particularly in accounting, where honesty and accuracy are crucial. Encouraging ethical behavior in assessments can have a positive impact on the culture of honesty and integrity within the academic community, setting the foundation for responsible professional practices in the future.

A shift towards a combination of both online and traditional assessment (hybrid assessment) may present a solution with many benefits as it provides a gradual transition toward technology-enabled assessment. Perhaps the most benefit provided by online forms of assessment (compared with traditional pen and paper modes of delivery) is the lecturer's precious time savings because of automated delivery, especially summative assessments in mid-term, with a shift in focus to activities of learning and teaching in the class — especially as tertiary education in Saudi will be in a three-semester system instead of two semesters, with each semester consisting of 13 weeks instead of 17 weeks — and enhancing validity because of automation of the marking process that can reduce the scope for human error. Therefore, it considers these findings useful for expanding the knowledge of the better assessments that enrich the learning experience and enhance learning effectiveness when they are strongly supported by e-tools, especially in subjects requiring a high analytical and numerical capacity, such as accounting.

Although this research offers valuable findings regarding the effect of the difference in the method of assessment delivery on the learning outcomes of online classes' environment at the tertiary level during the COVID-19 pandemic, it has certain limitations. First, these findings are limited to two semesters at one university in Saudi. Second, the findings are specific to the context in which this study was conducted. Hence, generalizing the results to broader contexts may not be appropriate. Following this study, future research can be conducted to measure assessment activities that will have an effect on academic achievement in tertiary education.

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Digital organizational culture and online digital educational coaching: A meta-analysis study in the field of Social Sciences

Cultura organizativa digital y coaching educativo digital en línea: un estudio de metaanálisis en el ámbito de las Ciencias Sociales

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ABSTRACT

This research is framed in the field of Organizational Culture and educational coaching. Organisational culture is becoming increasingly embedded in different settings. Linked to the school, it helps to improve the personal and academic development of students and teachers. The objective is to analyze the trends in practices for improving educators' performance, effectiveness, and well-being and how they enhance students' learning and development. The bibliometric review of the data was carried out based on the keywords Organizational Culture OR Educational Coaching AND Education, limiting the records to those publications categorized in Social Sciences. The search was conducted in English, and the following dimensions were analyzed: topic, types of publication, subject area, country, publication, author, and year, which were treated using descriptive statistics. The results reflect a total of 893 indexed documents in Social Sciences. Finally, the thematic concurrence of keywords was analyzed using VosViewer software, which we grouped into six main categories (organization, organizational culture, education, leadership, interprofessional relations, and interpersonal communication). According to current research, the relationship between organisational culture and educational coaching improves effectiveness, well-being and leadership in educational institutions. Among the main conclusions was the need to explore new avenues of collaboration at the international level.

KEYWORDS Bibliometric Study; Digital organizational culture; Education; Network Analysis; Online educational coaching.

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RESUMEN

Esta investigación se enmarca en el campo de la Cultura Organizacional y el coaching educativo. La cultura organizativa se instaura cada vez más en los distintos ámbitos. Vinculada a la escuela, favorece la mejora del desarrollo personal y académico de los estudiantes y docentes. El objetivo es analizar las tendencias sobre las prácticas para la mejora del rendimiento, la eficacia y el bienestar de los educadores, y cómo está mejorando el aprendizaje y el desarrollo de los estudiantes. La revisión bibliométrica de los datos se realizó a partir de las palabras clave: Organizational Culture OR Educational Coaching AND Education, limitando los registros a aquellas publicaciones categorizadas en el campo de las Ciencias Sociales. La búsqueda se realizó en inglés y se analizaron las siguientes dimensiones: tema, tipos de publicación, área temática, país, publicación, autor y año, ambas tratadas mediante estadística descriptiva. Los resultados reflejan un total de 893 documentos indexados en Ciencias Sociales. Por último, se analizó la concurrencia temática de las palabras clave mediante el software VosViewer, que agrupamos en 6 categorías principales (organización, cultura organizacional, educación, liderazgo, relaciones interprofesionales y comunicación interpersonal). Según las investigaciones actuales, la relación entre cultura organizativa y coaching educativo mejora la eficacia, bienestar y liderazgo en instituciones educativas. Entre las principales conclusiones cabe destacar la necesidad de explorar nuevas vías de colaboración a escala internacional.

PALABRAS CLAVE Estudio bibliométrico; Cultura organizativa digital; Educación; Análisis de redes; Coaching educativo online.

1. INTRODUCTION

Throughout its history, humanity has never had as many Information and Communication Technologies at its disposal as it does today, technologies that are rapidly multiplying due to digitization (Cabero-Almenara, & Ruiz-Palmero, 2018). Currently, technological advances, combined with the Artificial Intelligence of our modern era, constitute fundamental support in all aspects of human life (Chicaiza-Vinueza et al., 2022; Montenegro-Rueda et al., 2023; Vázquez-Cano et al., 2020). They are increasing at an exponential rate, integrating into our lifestyles each day (Yarin, & Gamarra, 2022). Moreover, this digital integration in research tasks will allow for updating and expanding knowledge more rapidly and accessibly than in previous years (Guillén-Gámez et al., 2024).

Simultaneously, the global Covid-19 pandemic has highlighted the significant role of technology in society and the teaching-learning process in general (Delgado-Rodríguez et al., 2023). These technologies have become resources that demand new types of learning and ways of learning from citizens, necessary both for active participation in various interaction contexts that have emerged and for responding to the labor and productivity demands within today's society (López-Meneses et al., 2020).

In the context of the globalized techno-social era, organizations urgently need to consider new cultural aspects to address digitization, requiring adjustments in their structures, values, and assumptions within the context of digital transformation. This goal can be achieved through the implementation of a Digital Organizational Culture, as emphasized by Kocak and Pawlowski (2023). This culture is defined as the set of shared assumptions and common understandings of organizational practices in the digital context (Deshpande, & Webster, 1989). It is distinguished by various specific characteristics, such as the acceptance of innovation, the ability to collaborate, skill in processing large volumes of data and information agilely,

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competence in navigating complex environments, and willingness to take risks (Davison, & Ou, 2017; Serpa et al., 2022). In summary, Digital Organizational Culture, understood as a product in constant evolution and a dynamic process, emerges in an environment marked by indeterminacy and uncertainty, permeated by the continuous presence of digital technology (Zhen et al., 2021).

On the other hand, coaching in the organizational context has emerged in the last two decades not only as a popular but also effective intervention for human resource development that can have beneficial outcomes at both individual and organizational levels (DeHaan, & Nilsson, 2023; Grover, & Furnham, 2016; Passmore et al., 2023). It consists of a synchronous intervention to train clients to achieve their self-rated goals in a self-determined manner using conversation management techniques such as open-ended questions or active listening, aimed at stimulating client self-awareness and self-determination (Díaz, 2016; Passmore, & Fillery-Travis, 2011; Passmore, & Lai, 2019; Diller et al., 2020). The core of coaching is its facilitating nature (Passmore, & Lai, 2019). Additionally, in line with King et al. (2020), coaching examines how to apply knowledge and skills to a given situation, enabling individuals to work on their actions in response to challenges within their current context.

The executive coach must consider the social context in which the individuals they advise are immersed (Revilla-Castro et al., 2021). In this sense, Kombarakaran et al. (2008) emphasize the importance of organizational commitment by the executive coach, while Gray et al. (2011) highlight the need for knowledge of strategy, management skills, communication, and organizational ethics as essential competencies for the coach to effectively progress in the relationship. In other words, it is crucial for the coach to carry out their work considering and being linked to the knowledge of the organizational culture in which the individuals they guide and advise operate.

In the international context, coaching is a fundamental tool for improving an organization's personnel because it helps mitigate resistance to change and facilitates personal and organizational goals through contextual analysis of change, resistance, and methodology. Therefore, coaching is a technical procedure of change and progress that focuses on human talent, promoting greater motivation and personal satisfaction (Álvarez et al., 2017). Various authors (Kombarakaran et al., 2008; Passmore, 2010) affirm that organizational culture is critical to coaching development. The coach must study the organizational culture and environment to support its development so that the benefits are seen in both the individual and the entire organization. In this sense, Whitmore (2013) indicates that coaching can be understood as a unique and different technique for discovering talents and benefiting each member of an organization or work team, and above all, everyone collectively.

Finally, if we link organizational culture with educational institutions, educational coaching emerges as a practice that seeks to improve the personal and academic development of students through guidance, stimulation, and goal-setting to provide more meaningful and student-centered educational experiences. Rejas (2023) points out that coaching is an effective tool for improving performance in various contexts, including the educational field, leading to professional success by strengthening motivation. It involves unleashing the latent potential in each individual; at the educational level, this conception implies working with students to identify and achieve their academic goals and develop soft skills essential for success in life. Likewise, in line with Sánchez-Anguita and Pulido-López (2022), it is a guided learning process for

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improvement and a formative tool for professionals to help students bring out the best in themselves, as well as being a strategy to enhance leadership (Veliz, & Paravic, 2012). Similarly, educational coaching can have a significant impact on the emotional well-being of teachers (Vasques, 2023), changing their perception of public institutions by aiming to achieve their goals, improve their leadership skills, and manage school culture. From this perspective, we must start with individualization as a fundamental principle, recognizing the diversity of learning styles and individual needs, thus addressing the consideration that a one-size-fits-all educational approach is ineffective for all students.

On the other hand, when implemented effectively, educational coaching can align educators and students with the values and goals of organizational culture. In this sense, the connection between organizational culture and educational coaching is evident when considering the relevance of both elements in the educational field. However, it is essential that they have a dynamic and adaptive character, capable of adjusting to various transformations, modifying their cultures to meet emerging techno-educational needs.

Currently, there is a widespread consensus in considering that digital technology encompasses a combination of these, such as information technology, connectivity, communication, computing, among others (Pradana et al., 2022). In this sense, various authors (Brandenburg; & Ellinger, 2023; International Coaching Federation, 2021; Passmore, 2021) point to the growing trend towards the use of digital technology in coaching, and the pandemic has promoted and accelerated this process, increasing the adoption of digital technology in the coaching context. In this regard, coaching conducted through digital means, 'digital coaching' can be defined as a personal and synchronous conversation that uses audio and/or video communication channels enabled by digital technologies between a human coach and a human client to empower and capacitate the coachee/client in their self-development (Diller, & Passmore, 2023).

Therefore, at this moment of technological expansion, it is necessary to investigate the scientific production in Scopus related to the impact of digital organizational culture in symbiosis with digital educational coaching. For this purpose, the following research questions were formulated:

1. What is the overall state of research on Digital Organizational Culture and digital educational coaching?
2. Which countries are most productive in publications on these topics?
3. What are the most used languages in published works?

Organizational culture refers to shared values, beliefs, and practices that characterize an organization; it is an essential component that influences how employees interact, make decisions, and face daily challenges. Its importance lies in its ability to shape the identity and direction of a company. It is a dynamic force that, according to Hofstede (1991), impacts an organization's internal efficiency and overall performance. The culture influences how professionals perceive their roles, interact with each other, and address issues. For it to gain internal strength, it requires the promotion of cohesion, loyalty, and productivity, preventing conflicts, lack of motivation, or high turnover rates. It affects the internal dynamics and performance of an organization and plays a crucial role in its long-term success and its ability to attract and retain talent. Furthermore, by fostering an organizational culture grounded in a profound respect for individuals, one that actively promotes personal, professional, familial, and social development in tandem with engagement with the broader environment, the goal is to ensure that such a culture has a tangible impact on the performance and overall effectiveness of the constituents within an organization (Rincón-Rodríguez, & Aldana-Bautista, 2021).

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In synthesis, organizational culture constitutes the confluence of norms, habits, and values actively embraced by individuals within an organizational framework, thereby defining the collective behavioral modality (González, & Fernández, 2000). This approach strengthens the idea that organizational culture not only influences internal dynamics and production, but constrains the day-to-day interaction of employees, highlighting its integral impact on the organization.

Coaching has experienced substantial development as a discipline that fosters change and well-being in individuals and organizations globally (González et al., 2018). At the core of coaching, as emphasized by various coaching authors, is its facilitative nature (Passmore, & Lai, 2019). Diaz (2016) defines coaching as a method that involves accompanying, instructing, and training a manager to achieve their goals and enhance specific skills related to effectiveness, efficiency, and performance optimization within the organization. This is achieved by addressing challenges and commitments.

Additionally, King et al. (2020) assert that coaching examines how to apply knowledge and skills to the given situation, enabling individuals to work on their actions in response to the challenges they face within their current context. Furthermore, coaching motivates the effort, allowing individuals to translate theory into practice because they possess the necessary communication tools.

In the international context, coaching is a fundamental tool in improving an organization's personnel because it will help mitigate resistance to change and facilitate personal and organizational objectives through contextual analysis of change, resistance, and methodology. Therefore, coaching is a technical procedure for change and progress that focuses on human talent, favoring increased motivation and personal satisfaction (Álvarez et al., 2017). Various authors (Kombarakaran et al., 2008; Passmore, 2010; Tooth et al., 2013), affirm that organizational culture is critical to coaching development. The coach must study the organizational culture and environment to support its development so that the benefits are seen in the individual and throughout the entire organization. In this sense, Whitmore (2013) indicates that coaching can be understood as a unique and different technique to discover talents and benefit each member of an organization or work team and, above all, everyone together. Finally, educational coaching, as noted by Sánchez-Anguita and Pulido (2022), is a guided learning process for improvement and a formative tool for a professional to help students bring out the best in themselves, in addition to being a strategy to enhance leadership (Veliz, & Paravic, 2012).

If we link organizational culture and schools, educational coaching emerges as a practice that seeks to enhance student's personal and academic development through guidance, stimulation, and goal setting to provide more meaningful and student-centered educational experiences. Rejas (2023) pointed out that coaching is an effective tool for improving performance in various contexts, including the educational field, leading to professional success by strengthening motivation. It is about unleashing the latent potential in each individual; at the educational level, this conception involves working with students to identify and achieve their academic goals and developing soft skills essential for success in life.

Moreover, educational coaching can significantly impact the emotional well-being of teachers (Vasques, 2023), changing their perception of public institutions by aiming for the achievement of their goals, enhancing their leadership skills, and managing school culture. From this perspective, we must start from individualization as a fundamental principle, recognizing the diversity of learning styles and individual needs, thus addressing the consideration that a one-size-fits-all approach to education is ineffective for all students.

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The connection between organizational culture and educational coaching becomes evident when considering the importance of both elements in the educational field. However, they must have a dynamic and adaptive character to adapt to the multiple changes, adjusting their cultures to meet new emerging needs.

The organizational culture of an educational institution sets the tone, defines the fundamental values, and affects how educators and students interact within the educational community. Specifically, Goleman et al. (2002) highlight the influence of emotional intelligence on effective leadership, considering that an educational leader who understands and embraces organizational culture can positively influence the learning environment and promote collaboration and motivation among staff members and students.

When implemented effectively, educational coaching can align educators and students with the values and goals of organizational culture. For example, if the institution's culture prioritizes innovation and collaboration, an educational coaching program can focus on developing critical thinking skills, problem-solving, and teamwork among students. Additionally, educators can receive training to improve their teaching methods and foster a collaborative learning environment. If the culture promotes continuous improvement and professional development, educators will be more open to participating in such activities to strengthen their skills and contribute to the educational institution's success.

2. MATERIAL AND METHODS

This bibliometric study has been carried out in the Scopus database, offering researchers a wide collection of peer-reviewed publications (indexed and full text). Furthermore, it is one of the most significant repositories of scientific publications, providing a diversity of scientific resources as well as the opportunity to access high-quality scientific literature (Abad-Segura et al., 2023; Esteve-Mon et al., 2014; Madanipour, & Cohrssen, 2019). The purpose of the present bibliometric research was to examine scientific production related to Organizational Culture and Coaching in the educational domain through the Scopus database.

The data review used the keywords Organizational Culture OR Educational Coaching AND Education, limiting the results to those publications categorized in Social Sciences. The search was conducted in English in order to cover a more significant number of publications. The analysis tools available in the database were used for topic, types of publication, thematic area, country, publication, author, and year, whose data have been treated both through descriptive statistics according to frequencies and percentage data, as well as statisticians analyzing the correlation coefficient to determine the importance of the theme in the social research over the years. Subsequently, the data was submitted to a study by concurrence using the VosViewer software, delimiting the concepts related to the indicated keywords. On the other hand, a content analysis

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of the publications in Spanish has been carried out, analyzing the proposed approach, considering the abstracts of the published articles as a reference.

VOSviewer is mighty software for performing bibliometric analysis and offers several advantages. For example, it presents an attractive interface, can handle large datasets, integrates network visualization and clustering techniques, and allows the researcher to identify and visualize the relationships between different dataset elements, such as authors, keywords, or publications. Moreover, it is free to use. These advantages make VOSviewer a valuable tool for bibliometric analysis (Van Eck, & Waltman, 2010), especially in visualizing and interpreting complex research landscapes.

3. RESULTS

The results reflect a total of 893 documents indexed in Social Sciences, which, in their keywords, integrate the concepts of "Organizational Culture" and/or "Educational Training" and "Education." The theme of organizational culture in education finds the first document that can be considered as a precursor in 1964 by Blunberg and Edmund, from Philadelphia (USA), who carried out a study on the school as an organizational entity and the multiplicity of factors that interact and that they can explain the particular culture of each school.

TABLE 1. Published documents grouped by decade.

.Period	Published Documents
1980/1989	3
1990/1999	61
2000/2009	243
2010/2019	477
2020/-	109

Note: By author from Scopus database

It was not until the 1980s when interest in social research in this area began to be resumed, and the concept of educational training was also addressed, which acquired significant relevance from the 1990s, as can be seen in Table 1 and graphs 1 and 2 (next page).

GRAPH 1. Historical evolution by decades of publications on Organizational Culture and/or Educational Training and education in Social Sciences.

Source: Own elaboration from Scopus database

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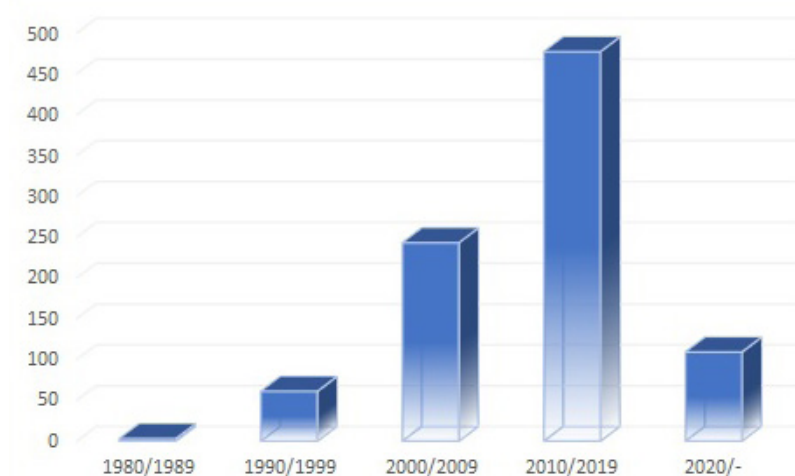
The gradual interest in this topic is evident in the strong Pearson correlation of 0.8506775 between the number of publications and year (graph 2).

GRAPH 2. Pearson's correlation coefficient shows the historical evolution by years of publications on organizational culture and/or educational training and education in the field of social sciences.

$$y = 5E-95e^{0,1097x}$$
$$R^2 = 0,7538$$
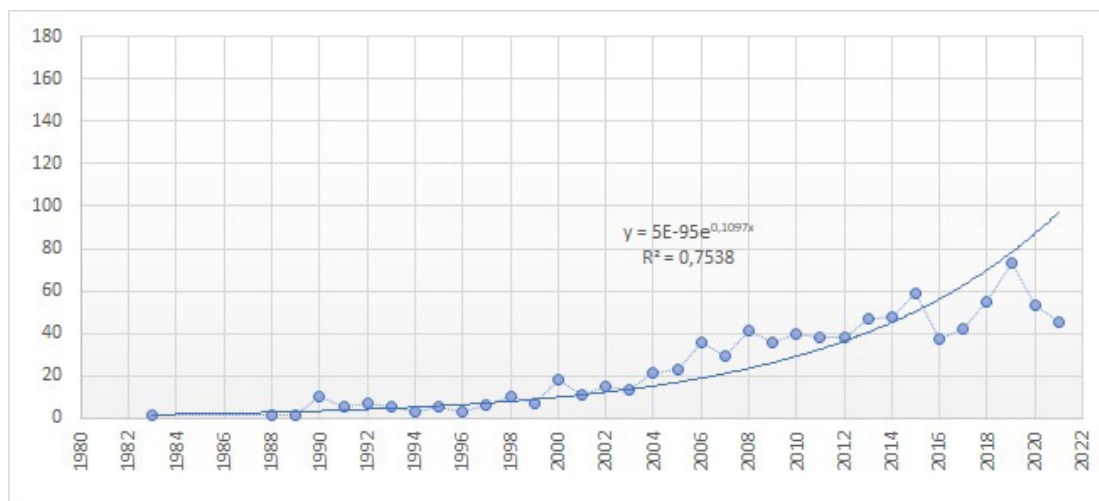
Source: Own elaboration from Scopus database

The preferred means for disseminating research results (graph 3) is mainly through indexed journals (81.19%), specifically 160 different journals, of which the ones that have published the most articles on this subject are shown in table 2. , of which 56% of them are integrated into the category of education (graph 4).

GRAPH 3. Type of documents of the publications in Organizational Culture and/or Educational Training and Education in Social Sciences.

Source: Own elaboration from Scopus database

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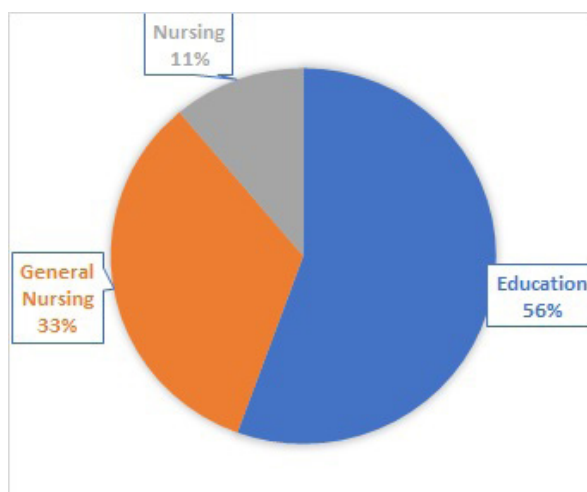
TABLE 2. List of journals with more publications and their indexing.

Revista	Documentos publicados	Ranking Scopus	Posición	Categoría
Nurse Education Today	67	95%	5/123	General Nursing
Journal Of Continuing Education In Nursing	40	54%	57/123	General Nursing
Medical Teacher	34	90%	141/1406	Education
Journal Of Nursing Education	34	22%	23/29	Nursing
Nurse Educator	33	61%	545/1406	Education
Journal Of Dental Education	32	80%	277/1406	Education
Academic Medicine	31	95%	62/1406	Education
Nurse Education In Practice	22	89%	14/123	General Nursing
Medical Education	20	94%	74/1406	Education

Note: By author from Scopus database

GRAPH 4. Indexing category of the journals with the most publications on Organizational Culture and/or Educational Training and education in Social Sciences.
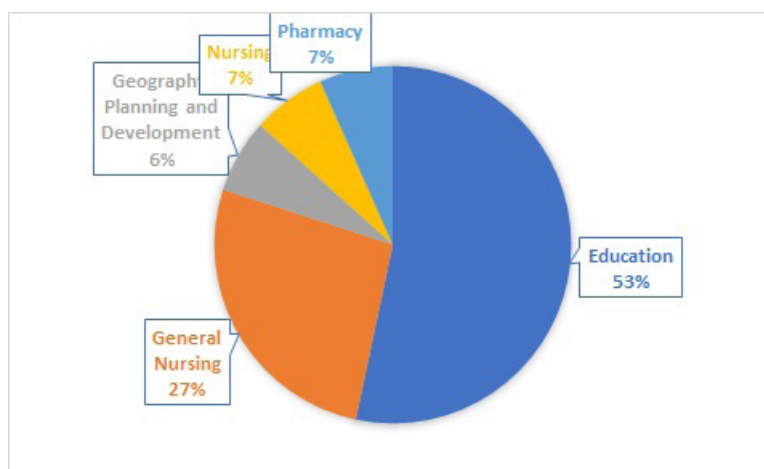
Source: Own elaboration from Scopus database

Regarding the origin of its production, contributions have been made by 159 authors from different institutions from 64 different countries (83 publications without defining the country of origin). However, the USA (41% with 491 publications) and the United Kingdom (10% with 117 publications) can be seen in Figures 1 and 2. Regarding language, 98% of the publications have been made in English.

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FIGURE 1. Frequency of publications by continents and countries in Organizational Culture and/or Educational Training and education in Social Sciences.

Source: Own elaboration from Scopus database

FIGURE 2. Map of publications by country in Organizational Culture and/or Educational Training and education in Social Sciences.

Source: Own elaboration from Scopus database

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Considering the number of citations (at least 150 citations) and the impact index of the principal author (Table 3), we can highlight the following works as the most relevant:

TABLE 3. Most relevant publications by number of citations.

Document title	Authors	Year	Source	Cited by
Ambient Belonging: How Stereotypical Cues Impact Gender Participation in Computer Science	Cheryan, Plaut, V.C., Davies, P. G., Teele, C.M.	2009	Journal of Personality and Social Psychology 97(6), pp. 1045-1060	639
Unseen disadvantage: How American universities' focus on independence undermines the academic performance of first-generation college students	Stephens, N. M., Fryberg, A., Markus, H. R., Johnson, C., Covarrubias, R.	2012	Journal of Personality and 102(6), pp. 1178-1197	511
Community coalitions for prevention and health promotion	Butterfoss, F.D., Goodman, R. M., Wandersman, A.	1993	Health Education Research 8(3), pp. 315-330	468
Developing inclusive education systems: The role of organisational cultures and leadership	Ainscow, M., Sandill, A.	2010	International Journal of Inclusive Education, 14(4), pp. 401-416	257
Teaching professionalism: General principles	Cruess, R.L., Cruess,	2006	Medical Teacher 28(3), pp. 205-208	202
Culture in the cockpit: Do Hofstede's dimensions replicate?	Merritt, A.	2000	Journal of Cross-Cultural Psychology, 31(3), pp. 283-301	194

Source: Own elaboration from Scopus database

The concurrence analysis (Figure 3) gives us the following results from a qualitative analysis. We have grouped around 6 main categories (organization, organizational culture, education, leadership, interprofessional relations, and interpersonal communication) that encompass 53 codes.

FIGURE 3. Cloud of concurrence of the main categories and codes in publications on Organizational Culture and/or Educational Training and education in Social Sciences.

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Ultimately, if we focus on the 13 documents written in Spanish (Table 4), it is identified that their themes have been the following:

TABLE 4. Analysis of the approaches given to Organizational Culture and/or Educational Training and education concerning education by the authors who have published in Spanish.

AUTORES / ENFOQUE	AÑO
Caudillo, D., Encinas-Grijalva, S., Martínez-Rocha, R.F., Lau, J. • Analiza cómo los flujos de información pueden optimizar los procesos de comunicación en la organización de las instituciones educativas.	2022
Babb, S. • Identifica, compara y contrasta las culturas organizativas actuales	2020
Pedraja-Rejas, L.M., Marchioni-Choque, I.A., Espinoza-Marchant, C.J., Muñoz-Fritis, C.P. • Realiza una revisión bibliográfica sobre el liderazgo, la cultura organizativa y la calidad en las instituciones de educación superior	2020
Pujol-Cols, L.J., Foutel, M. • Se atiende a la cultura, la identidad y la imagen organizativa como elementos que definen la gestión universitaria	2018
Escudero, M.C. • Se analiza el conjunto de conglomerados jerárquico y discriminante para identificar la distribución de los proyectos del FOMEC entre las unidades académicas argentinas	2018
Montero, L., Gewerc, A. • Realiza una aproximación a los desafíos de la profesión docente en las nuevas condiciones sociales, económicas, culturales y tecnológicas del siglo XXI.	2018
De La Fuente-Anuncibay, R., De Diego-Vallejo, R., Saiz, J.A.A., Caggiano, V. • Analiza los aspectos de la construcción de la cultura organizativa en la percepción de los profesores de los centros educativos españoles	2016
Gewerc, A., Montero, L. • Analizan los factores implicados en los proyectos de innovación educativa relacionada con los nuevos entornos de enseñanza aprendizaje	2013

4. DISCUSSION

In educational research, knowledge of organizational culture and its relationship with educational coaching is becoming increasingly important (Alatorre, 2013). It influences how employees interact, make decisions, and face daily challenges. Moreover, it is a dynamic force that influences internal effectiveness and overall performance. Therefore, when applied to the world of education, it allows us to understand the dynamics present in schools better. Its analysis should be more present in educational research, especially in its qualitative dimension, which should be better value for all that it contributes to the improvement of teaching (Bernad et al., 2022; Ponce et al., 2022).

Educational coaching, on the other hand, has undergone substantial development as a discipline aimed at promoting change and the well-being of individuals and organizations worldwide (Serey, & Zúñiga, 2021).

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It is defined as a method that accompanies, instructs, and trains a manager to achieve his or her objectives and enhance specific skills related to effectiveness, efficiency, and performance optimization within the organization (Loreto, 2021). Coaching is a fundamental tool in improving an organization's personnel because it helps mitigate resistance to change and facilitates personal and organizational goals through contextual analysis of change, resistance, and methodology (Alias et al., 2020). Some elements, such as emotions, remain in the realm of individual experience and are natural and spontaneous qualities. There is no clear indication of what they are, when they arise, what they depend on, and how best to manage them (Pawłowska, 2020), but contemplating methods to improve the well-being of those involved in educational processes is essential. Recent studies show that there are multiple areas in which educational coaching could improve the capacities and relationship climate of education and training centers (Ramos et al., 2019). The emotional aspect is determinant in the quality of education, regardless of level and age, as contemplated in the UN Sustainable Development Goals, and we must take into account its importance, especially in the most sensitive and comprehensive elements of education, including bullying or harassment (Eselyn, 2021; Munuera et al., 2023; Rubio-Gonzales, & del Rosario Pérez-Uribe, 2016), but also in the usual day-to-day educational scenarios.

In addition, many lines of research concerning educational coaching are currently open. For example, those related to emotional intelligence and well-being: given the growing recognition of the importance of this topic in education, it is essential to determine the role of emotional intelligence in educational coaching (Olay, 2018; Santamaría et al., 2021). Another research area of interest is the role of educational coaching in developing effective leadership within educational institutions, i.e., the relationship between leadership and educational coaching (Gross, 2004; Wise, 2010). It explores how educational coaching can be used to develop the leadership skills of educators and administrators and how this can contribute to the overall success of educational institutions. The relationship between coaching and ICT is also of interest. With the increasing use of technology in education, some studies focus on exploring how educational coaching can be delivered effectively through digital platforms. The potential benefits and drawbacks of using technology in this area are analyzed (Domínguez Martín et al., 2018). Given the significance of diversity and inclusion in education, a line of research of much relevance is how educational coaching can be used to promote diversity and inclusion within educational institutions and to support educators in creating inclusive learning environments (Lucas, 2020), in addition to how it can be used to address issues of bias and discrimination.

Therefore, the connection between organizational culture and educational coaching becomes evident when considering the importance of both elements in the educational setting (Alatorre, 2013).In the context of education, the organizational culture of an educational institution sets the tone, defines the core values, and affects the way educators and students interact within the educational community. Educational coaching emerges as a practice that aims to enhance the personal and academic development of members of the educational community (Eide et al., 2016). It can also significantly impact teachers' emotional well-being, changing their perception of public institutions by targeting the achievement of their goals, improving their leadership skills, and managing school culture (Alias et al., 2020; Tomlinson, 2004). Furthermore, it encompasses multiple scenarios and dimensions, as the results of this study have shown. In general, the role of organizational culture in shaping the identity and leadership of educational institutions should be emphasized in dialogue with the impact of educational coaching on personal and academic development

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and the emotional well-being of the educational community. Therefore, the dynamic and adaptive nature of organizational culture and educational coaching to meet emerging needs and challenges in education should be emphasized.

5. CONCLUSIONS

Reviewing the scientific literature that relates organizational cultural studies in symbiosis with educational coaching helps configure a thrilling space for analysis and reflection in which theoretical and practical interest exists. This review reveals that many of these publications are concentrated in specialized or monographic journals and specific countries, with uneven scientific production on this subject. In this line, it is necessary to reflect on new ways of international collaboration for a more significant multicultural academic debate.

Understanding organizational culture and its correlation with educational coaching is becoming increasingly important in educational research. Organizational culture plays a fundamental role in education today. It provides a better understanding of the dynamics present in schools. The qualitative dimension of the organizational culture analysis highlights its important contributions to improving teaching. Educational coaching has also experienced remarkable development as a discipline aimed at fostering change and the well-being of individuals within educational environments. The changing nature of organizational culture and educational coaching implies further research and analysis to understand its influence on educational practices and outcomes.

Ultimately, in agreement with Burger and Van Coller-Peter (2019), the trend in recent years may be in the direction of increasing the context of coaching, including all the stakeholders involved and as Calvo de Mora et al. (2015) can help increase individual awareness and enhance personal values, as well as being an interesting opportunity to contribute socially as individuals and professionals.

5.1. Limitations and Future Lines

Despite the efforts made in this research, it is necessary to acknowledge some limitations that could impact the interpretation of the results. Firstly, the bibliometric search was conducted in English, which might have excluded relevant documents in other languages. Additionally, the categorisation of publications in Social Sciences could have omitted valuable contributions from other related disciplines. The restriction to specific keywords could also have overlooked relevant research that did not explicitly include them. Moreover, the cut-off date for the search might have excluded more recent works providing additional perspectives.

The limitations of this research nevertheless highlight areas of interest that could be explored in future studies. It would be beneficial to extend the search to several languages in order to obtain a more complete picture of the scientific production in this field. In addition, considering the inclusion of disciplines beyond the social sciences could enrich the understanding of the intersection between organisational culture and educational coaching. It is suggested to investigate how coaching practices can be adapted to different cultural and educational contexts, as well as to delve into the impact of coaching on the emotional well-being of educators. Furthermore, researching the relationship between organizational culture and coaching in

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specific educational environments could provide more detailed insights into the effectiveness of these practices in different educational institutions.

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Digital Natives' Mobile Learning Adoption in terms of UTAUT-2 Model: a Structural Equation Model

Adopción del aprendizaje móvil por parte de los nativos digitales en términos del modelo UTAUT-2: un modelo de ecuaciones estructurales

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ABSTRACT

This research investigates university students' intentions and behaviors regarding the adoption of mobile learning tools in higher education, with a focus on the Unified Theory of Acceptance and Use of Technology (UTAUT-2) model. A sample of 541 university students from a state university in the Southeastern Anatolia Region of Turkey participated in this study. Structural equation modeling was employed to assess students' mobile learning adoption levels, and statistical analyses were conducted accordingly. The findings indicate a moderate level of mobile learning adoption among the students. The study reveals that students employ various strategies while using mobile tools for learning. Notably, among digital natives, intention to use mobile devices is significantly influenced by habit, hedonic motivation and effort expectancy. Additionally, the study identifies a significant relationship between the use behavior variable and facilitating conditions. The research also examines regulatory effects within the model, demonstrating that age moderates the relationship between habit and use behavior. Furthermore, gender has a moderating effect on the relationship between facilitating conditions and behavioral intention, as well as between hedonic motivation and behavioral intention. Finally, experience moderates the relationship between habit and use behavior, as well as between behavioral intention and use behavior.

KEYWORDS Mobile Learning Adoption; Unified Theory of Acceptance and Use of Technology 2; UTAUT2; Structural Equation Model; Digital Natives.

RESUMEN

Este estudio investiga las intenciones y comportamientos de los estudiantes universitarios respecto a la adopción de herramientas de aprendizaje móvil en la educación superior, con enfoque en el modelo de la Teoría Unificada de Aceptación y Uso de la Tecnología (UTAUT-2). En este estudio participó una muestra de 541 estudiantes de una universidad estatal de

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la región sudoriental de Anatolia en Turquía. Se empleó un modelo de ecuaciones estructurales para evaluar los niveles de adopción del aprendizaje móvil de los estudiantes y se realizaron análisis estadísticos en consecuencia. Los hallazgos indican un nivel moderado de adopción del aprendizaje móvil entre los estudiantes. El estudio revela que los estudiantes emplean diversas estrategias mientras utilizan herramientas móviles para aprender. En particular, entre los nativos digitales, la intención de utilizar dispositivos móviles está significativamente influenciada por el hábito, la motivación hedónica y la expectativa de esfuerzo. Además, el estudio identifica una relación significativa entre la variable conducta de uso y las condiciones facilitadoras. La investigación también examina los efectos regulatorios dentro del modelo, demostrando que la edad modera la relación entre el hábito y el comportamiento de uso. Además, el género tiene un efecto moderador sobre la relación entre las condiciones facilitadoras y la intención conductual, así como entre la motivación hedónica y la intención conductual. Finalmente, la experiencia modera la relación entre hábito y conducta de uso, así como entre intención conductual y conducta de uso.

PALABRAS CLAVE Adopción del aprendizaje móvil; Teoría unificada de aceptación y uso de la tecnología 2; UTAUT2; Modelo de ecuaciones estructurales; Nativos digitales.

1. INTRODUCTION

Mobile learning (m-learning) literally denotes the utilization of mobile devices in learning environments. M-learning, which provides equal opportunities in education, is a form of learning that provides access to content independent of time and place, and allows to communicate with other learners (Bozkurt, 2015; Talan, 2020). This concept has become more important in recent years, especially with the prevalence of smart phones and tablets, and it has brought many opportunities in teaching. M-learning is the advanced form of e-learning, which is a form of utilizing information and communication technologies (Talan, 2020). M-learning is effective in enabling students to learn without being tied to time and place, and in making learning more interesting (Yuliani, 2010). M-learning, which takes place through mobile technologies or mobile environments, offers unlimited opportunities in terms of time as well as providing easy access to content (Yosiana et al., 2021). M-learning is a type of learning that allows users to interact with social interaction and content with the help of personal electronic devices with its versatile structure (Crompton, 2013). M-learning is a result of mobile technologies. Therefore, each new technology should be examined separately. With the development of technology day by day, user decisions are important in integrating technology into users' lives. In the relevant literature, it has been pointed out that the effective and successful use of m-learning in the teaching-learning process largely depends on the level of acceptance and adoption of m-learning (Açıkgül, & Diri, 2020). Thus, it is also imperative to scrutinize the acceptance of m-learning tools. In this respect, the technology acceptance model (TAM) has been included in many studies in order to reveal the reasons for the acceptance or rejection of a new technology by its users. TAM, whose foundations are based on the theory of reasoned action and theory of planned behavior, plays a key role in understanding the behavior of users to embrace or reject technology (Marangunić, & Granić, 2015).

There are various studies in the literature on technology acceptance of m-learning. For instance, the use and adoption of m-learning technologies in Saudi Arabia were examined, and as a result of the research, it was found that effort expectancy, learning expectancy and social effects were among the predictors of

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students' intention to use m-learning technologies (Alasmari, & Zhang, 2019). On the other hand, Sánchez-Prieto et al. (2015) examined students' behavioral intentions regarding mobile technology use within the framework of TAM. In another study on m-learning, it was aimed to reveal the main factors affecting university students' behavioral intentions towards m-learning and their actual use of m-learning in education. In this study based on TAM, it was revealed that perceived mobile value, academic relevance, and m-learning self-management were predictors of students' acceptance of m-learning (Al-Rahmi et al., 2022). Therefore, it is important to adopt m-learning for users to use it.

The effectiveness of m-learning also depends on student acceptance. In a study on this subject, variables on university students' behavioral intentions towards m-learning were analyzed using structural equation modeling. As a result of this study, which was based on TAM and the theory of planned behavior, it was seen that subjective norm and perceived behavioral control were effective on m-learning (Afacan Adanır, & Muhametjanova, 2021).

With the rapid developments in mobile technologies and the increasing functionality of mobile devices, the importance of mobile learning in educational settings has grown (Altunçekiç, 2020). Mobile learning tools allow students to access learning materials and participate in learning activities anytime and anywhere, providing them with independence, personalized learning, and freedom (Yağan, 2023). In the context of Turkey, there are various studies related to the concept of mobile learning. Research indicates that students' attitudes toward mobile learning should be taken into consideration in the design of mobile learning environments (Sirakaya, & Sirakaya, 2017). In the context of mobile learning, digital natives are considered an important concept. Digital natives are individuals who have grown up in the digital age and are familiar with digital technologies (Cañete Estigarribia et al., 2022; Onursoy, 2018). Kirk et al. (2015) define digital natives as a generation that accesses information especially through the use of mobile devices. Therefore, it is important to examine mobile learning from the perspective of digital natives.

In conclusion, mobile learning has transformed the delivery of education and instruction by utilizing mobile devices to provide learning materials and activities. It has gained significance in educational environments, and research has focused on various aspects such as students' attitudes toward mobile learning, the concept of digital natives, technology acceptance, and usage. Understanding these aspects can contribute to the design of effective mobile learning environments and the promotion of the integration of mobile learning into education. Additionally, while there are studies that examine mobile learning from the perspective of technology acceptance and adoption, this study attempts to explain the acceptance and adoption of mobile learning technologies in relation to the characteristics of digital natives.

1.1. Literature review

1.1.1. The UTAUT2 Model

There are many models that explain technology acceptance. One of these models is the Unified Theory of Acceptance and Use of Technology (UTAUT). The UTAUT model consists of Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), Motivational Model, the Theory of Planned Behaviour (TPB), the model of Personal Computer Utilization, the Innovation Diffusion Theory and the Social Cognitive Theory

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(Venkatesh et al., 2003). The UTAUT model uses the behavioral intention variable to explain technology usage behavior (Thomas et al., 2013). Although the UTAUT model is widely accepted (Venkatesh et al., 2012), it has been expanded with new components added to it. The UTAUT-2 model seen in Figure 1 explains behavioral intention by 74%, while the UTAUT model explains behavioral intention by 56%. Similarly, the UTAUT-2 model explains the technology use by 52%, whereas the UTAUT model explains 40% (Chang, 2012).

FIGURE 1. The UTAUT-2 Model.
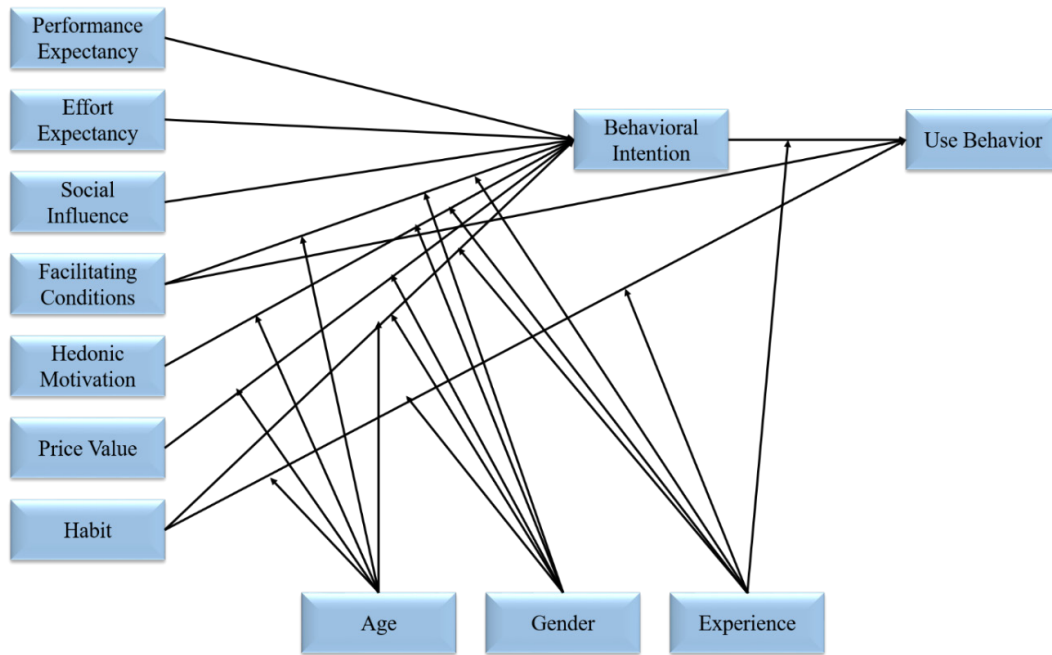
The UTAUT-2 model consists of some components as seen in Figure 1. The description of these components is as follows:

- Performance Expectancy (PE): This component denotes how much impact this technology has on the user's performance when the user uses the technology. It purports how much the user benefits when he uses the technology. In other words, this refers to the degree to which a student believes that using mobile learning will help them to achieve their learning goals. Students' beliefs about the usefulness of mobile learning for their learning needs can significantly influence their adoption of this technology. For example, students who perceive that using mobile learning will enhance their academic performance are more likely to adopt it.

- Effort Expectancy (EE): This component of the model represents how much effort the user puts into using the relevant technology. This component refers to the degree of convenience of the technology used. In other words, this construct relates to the degree of ease or difficulty a student perceives when using mobile learning. It reflects the extent to which the student believes that using mobile learning is easy or cumbersome. Students' perception of the ease of use of mobile learning can significantly

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affect their adoption. For example, students who perceive that using mobile learning is simple and user-friendly are more likely to adopt it.

- Social Influence (SI): This component refers to the relevance of the individual's use of the technology in question to their social environment. It can be expressed as an attitude of care to the use of this technology by the people that the individual considers important, his/her close environment, and the social friend environment. In other words, this construct relates to the degree to which a student perceives that significant others (such as peers, instructors, or family members) will influence their adoption of mobile learning. Students' beliefs about the attitudes of others towards mobile learning can significantly impact their adoption. For example, students who perceive that their peers and instructors have positive attitudes towards mobile learning are more likely to adopt it.

- Facilitating Conditions (FC): It is the support that the user using the technology receives to perform a behavior. The technical support and infrastructure factor that the user receives while using the relevant technology is represented by this component. In other words, this construct relates to the degree to which a student perceives that the necessary resources (such as technological infrastructure, access to the internet, and technical support) are available to support their use of mobile learning. Students' perception of the availability of necessary resources can significantly affect their adoption. For example, students who perceive that the required technological infrastructure is in place, and technical support is available, are more likely to adopt mobile learning.

- Hedonic Motivation (HM): This component in the model expresses the pleasure and delight that the individual gets while using the related technology.

- Price Value (PV): It is based on the relationship between the price the user pays for using the technology and the benefit obtained. In other words, this component means that the cost of technology affects the use of technology.

- Habit (HT): It refers to the behavior of the user automatically. It is a habit that an individual acquires based on previous learning.

- Behavioural Intention (BI): This component, which is also affected by other variables, is the tendency of the individual to perform a behavior.

When the components of the model are examined, it is seen that the behavioral intention variable is affected by the variables of habit, price value, hedonic motivation, facilitating conditions, social influence, effort expectancy and performance expectancy. Besides, usage behavior is affected by behavioral intention, habit, facilitating conditions variables. In the model, the effect of age on the interaction of facilitating conditions and behavioral intention, the interaction of hedonic motivation and behavioral intention, the interaction of price value and behavioral intention, the interaction of habit and behavioral intention, and the interaction of habit and use behavior were also investigated. Gender is affected by the interactions of habit and use behavior, habit and behavioral intention, price value and behavioral intention, hedonic motivation and behavioral intention, facilitating conditions and behavioral intention. Experience, another moderator in the model, is affected by the interactions of habit behavioral intention, facilitating conditions behavioral intention, hedonic motivation behavioral intention, behavioral intention use behavior and habit use behavior interactions.

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1.1.2. Previous Studies

M-learning tools have entered our lives more and more with the development of technology. With the use of m-learning tools, it has become important to understand how effective these tools are in education. In this context, since m-learning tools are also technologies, these technologies should be examined within the scope of the diffusion of technology. By using the UTAUT-2 model, which is a model that prioritizes the diffusion of technology, it can be fully understood whether m-learning technologies are adopted by students. Therefore, in this study, it is aimed to investigate m-learning in the context of the components included in the UTAUT-2 model.

When the studies on UTAUT-2 are examined, it is clear that the use of various technologies for educational purposes is scrutinized. For instance, in a study, students' intention to use online learning during the COVID-19 period was examined within the scope of UTAUT-2. As a result of the study conducted with university students, it was revealed that the variables of self-efficacy, effort expectancy, social influence, facilitating conditions, hedonic motivation, and price value positively affect behavioral intention (Xu et al., 2022). The adoption and use of each new technology used in education changes the effects of technology on education. Massively open online courses (MOOCs) are widely accepted as a unified platform to reduce the digital divide and make education accessible to all (Cabero Almenara, & Romero Tena, 2020).

Despite these benefits of MOOCs, their adoption and completion rates are remarkable. In a study, the main factors affecting behavioral intention to use MOOCs among university students were examined. As a result of the study, performance expectation, hedonic motivation and habit are positively effective on behavioral intention, while hedonic motivation is effective on behavioral intention in favor of men, moderated by gender effect (Mohan et al., 2020). Blended learning, which includes face-to-face and online learning, is a heterogeneous type of learning. With COVID-19 and developments in technology, the blended learning approach has come to the fore in universities. In this context, the UTAUT-2 model was used in a study to examine the acceptance and usage levels of students in blended learning at universities. As a result, it was revealed that performance expectation, effort expectancy, social influence, facilitating conditions and hedonic motivation, which are the components of the UTAUT-2 model, positively affect the behavioral intentions of university students to accept blended learning (Rudhumbu, 2022). With the increasing prevalence of technology and the internet, the way education is delivered has changed rapidly in different environments. In this respect, mobile technologies are also widely used in education. In a study on this subject, the acceptance and adoption of mobile technologies by academicians in higher education was examined. In this study, in which the UTAUT-2 model was used, it was revealed that the most important factors affecting the behavioral intentions and usage behaviors of academicians are performance expectation, facilitating conditions, hedonic motivation and habit, and gender, age, experience and discipline have moderator effects (Hu et al., 2020).

In another study on m-learning, the technology acceptance levels of university students were examined within the scope of the UTAUT-2 model. As a result of the study, it was revealed that the most important variable affecting the acceptance of mobile technologies by students is habits (Moorthy et al., 2019). Mobile technologies are attractive learning devices for education. In another study, the acceptance and use of mobile technologies by undergraduate students were examined within the scope of UTAUT-2. As a result of the study, it was seen that the variables of performance expectation, effort expectancy, social influence,

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facilitating situation, hedonistic motivation, price and habit, which are the components of the model, affect behavioral intention (Ahmed, & Kabir, 2018). Online learning, which has come to the fore due to the pandemic, is carried out with various tools (Kalinkara, & Talan, 2022). One of the tools used in online learning through internet-based learning management systems is Google Classroom. In a study, students' intention to use Google Classroom was examined. In this study, in which the UTAUT-2 model was used, students' intentions to use Google Classroom were examined. According to the results obtained, it was revealed that while facilitating conditions were associated with effort expectancy, habit, and social influence, facilitating conditions were not significantly related to behavioral intention (Bervell et al., 2022).

Factors affecting the use of mobile technologies for academic purposes, which are known to facilitate communication and information sharing among students, are important in education. In a study on this subject, the factors affecting the use of smartphones were discussed. In this study, which was based on the UTAUT-2 model, it was seen that effort expectancy, facilitating conditions and social influence had a significant effect on hedonic motivation and perceived usefulness. Habit and price value, which are the components of the model, showed that hedonic motivation and perceived usefulness have a significant effect on behavioral intention and usage behavior (Gyamfi, 2021).

1.1.3. The Present Research

Investments and breakthroughs in the use of mobile technologies in education have gained momentum in recent years. However, evaluations regarding the adoption of m-learning by both educators and students have become of secondary importance. On the other hand, when a new technology or service is offered to users, some factors affect their decisions about how and when to use it (Šumak et al., 2010). The UTAUT model stands out among the theories developed to evaluate such factors and to determine the acceptance levels of technological tools (Guillén-Gámez et al., 2024). When we look at the studies in which m-learning is examined in terms of technology acceptance, it is discernible that the technology acceptance model is generally used, while a limited number of studies have examined m-learning with the UTAUT-2 model. The UTAUT-2 model, which was put forward by Venkatesh et al. (2012) regarding students' technology acceptance and use, reveals which variables are highly dependent on students' behavioral intentions. Thus, despite the use of many models for technology acceptance and adoption, we decided to use UTAUT-2 as a powerful model, in which the elements of eight models were cross-integrated. Therefore, in this study, it is aimed to explain the behaviors and intentions of higher education students to use m-learning tools with the UTAUT-2 model.

Another purpose of the research is to analyze the acceptance level of students in terms of gender, age and experience of using mobile technologies. To this end, the effect of performance expectation, effort expectancy, social influence, and facilitating conditions were examined in order to understand students' intentions to adopt m-learning. In addition, the moderator effects of these factors, such as gender, on behavioral intention to adopt m-learning were investigated. In addition, researchers want to see the results by making additions to the UTAUT-2 model while examining the acceptance and use of certain technologies by the user. For example, Osei et al. (2022) used a synthesis of UTAUT 2, Self Determination Theory and Core Self-Evaluation Theory in their study to determine students' adoption of e-learning. In another study, the UTAUT-2 model was extended with self-efficacy, motivation to use, and mobile literacy to predict users'

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behavioral intentions to use a mobile health education website (Yu et al., 2021). In a study examining students' use of social networks for educational purposes, the UTAUT-2 model was expanded by adding instructor support and student variables (Gharrah, & Aljaafreh, 2021). The present study tried to reveal the acceptance and use of m-learning by the UTAUT-2 model.

The purpose of this research is also to examine the technology usage habits of digital natives within the scope of UTAUT-2. Studies related to digital natives indicate that this new generation, having been born in the digital age, demonstrates a positive attitude towards technology. However, this intense use of technology can weaken deep learning and productive work abilities, while becoming a distracting factor (Bauerlein, 2008). Studies conducted on university students show that there is a complex relationship between technology usage and learning among digital natives (Thompson, 2013).

Digital natives represent a generation that is naturally proficient in technology, whereas digital immigrants refer to a generation that encountered technology and digital tools later in life (Wang et al., 2013). Kirk et al. (2015) define digital natives as individuals who have grown up in highly interactive digital networks and particularly access information using mobile devices. The general consensus is that digital natives are more advanced in digital technologies. However, the concept of digital natives is not solely limited to age; it is also associated with technology access, education level, and interaction and engagement with technology (Misci Kip, & Umul Ünsal, 2020).

It is believed that the natural inclination of digital natives towards digital technologies could challenge theories like the technology acceptance model. These theories suggest that digital immigrants tend to resist new technologies or systems, while assuming that digital natives are more open to these technologies (Wang et al., 2013). However, there are studies that indicate variations in skill levels within the digital native term (Brown, & Czerniewicz, 2010). Digital natives can exhibit different approaches to technology; some may keep technology to a minimum, while others are not hesitant to fully utilize the opportunities that technology provides (Zenios, & Ioannou, 2018).

Digital natives have different characteristics compared to digital immigrants. Online technologies are central to the lives of digital natives, and they prefer to do their work mostly through online technologies. Mobile phones and instant messaging applications dominate a significant portion of the lives of digital natives (Bilgiç et al., 2011). In terms of learning habits, digital natives are not reliant on printed materials, and their information processing methods differ. Digital natives, as described by Prensky (2001) as "21st-century learners," approach learning from a different perspective. For these reasons, this research has been conducted with the aim of better understanding the perspective of digital natives towards mobile learning tools and predicting the level of usage and acceptance of these tools. This study will assist us in gaining a better understanding of the mobile learning habits of digital natives.

2. METHODOLOGY

In this part of the study, the preferred model, the hypotheses and the participants were given to examine the technology acceptance status of the students. In addition, in this section, data collection process, data collection tools and data analysis are mentioned.

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2.1. Research Model and Hypotheses

FIGURE 2. The Purposed Model.
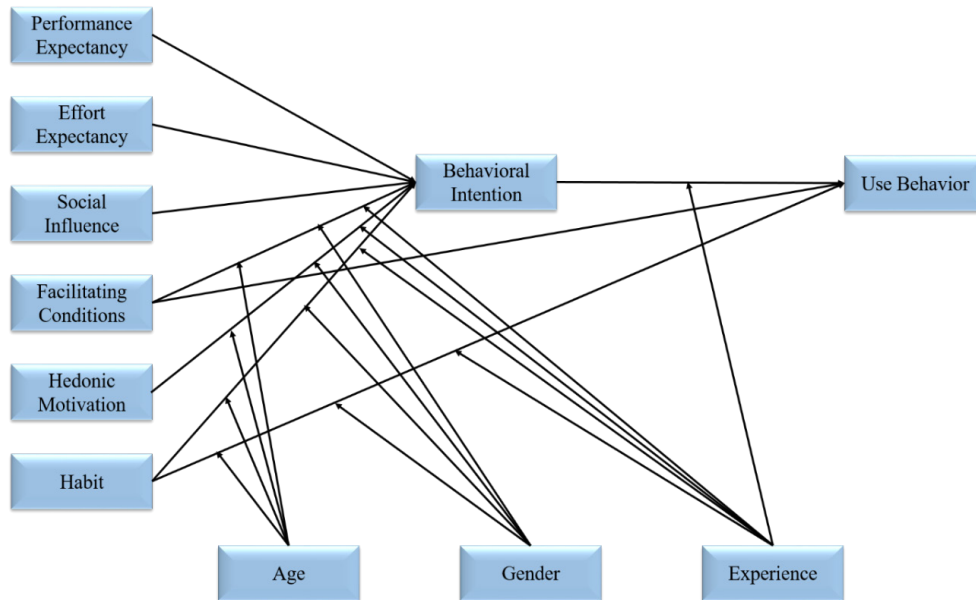
The model in Figure 2 was used within the scope of the research. This study was conducted at a state university in the Southeastern Anatolia region of Turkey. Although different results were obtained in the studies in the literature on UTAUT-2, the model in Figure 2 was tested with this study. All variables were examined with age, gender and experience moderators. The hypotheses included in the research are shown below:

- H1: Performance Expectancy is positively related to Behavioral Intention.
- H2: Effort Expectancy is positively related to Behavioral Intention.
- H3: Social Influence is positively related to Behavioral Intention.
- H4: Facilitating Conditions are positively related to Behavioral Intention.
- H5: Facilitating Conditions are positively related to Use Behavior.
- H6: Hedonic Motivation is positively related to Behavioral Intention.
- H7: Habit is positively related to Behavioral Intention.
- H8: Habit is positively related to Use Behavior.
- H9: Behavioral Intention is positively related to Use Behavior.
- H10: There is a moderating role of age in the relationship between the Habit variable and the Behavioral Intention variable.
- H11: There is a moderating role of age in the relationship between the Habit variable and the User Behavior variable.

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- H12: There is a moderating role of age in the relationship between the Hedonic Motivation variable and the Behavioral Intention variable.

- H13: There is a moderating role of age in the relationship between the Facilitating Conditions variable and the Behavioral Intention variable.

- H14: There is a moderating role of gender in the relationship between the Habit variable and the Behavioral Intention variable.

- H15: The gender has a moderating role in the relationship between the Habit variable and the user behavior variable.

- H16: Gender plays a moderating role in the relationship between the Hedonic Motivation variable and the Behavioral Intention variable.

- H17: Gender plays a moderating role in the relationship between the Facilitating Conditions variable and the Behavioral Intention variable.

- H18: Experience plays a moderating role in the relationship between the Habit variable and the Behavioral Intention variable.

- H19: Experience plays a moderating role in the relationship between the Habit variable and the User Behavior variable.

- H20: Experience plays a moderating role in the relationship between the Hedonic Motivation variable and the Behavioral Intention variable.

- H21: Experience plays a moderating role in the relationship between the Facilitating Conditions variable and the Behavioral Intention variable.

- H22: Experience plays a moderating role in the relationship between the Behavioral Intention variable and the User Behavior variable.

2.2. Research Design

In this study, which aims to determine the intentions and behaviors of university students towards adopting m-learning in higher education, the correlational survey model, which is among the general survey model types, was used. This model can be expressed as describing and analyzing the relationships between two or more variables (Karasar, 2009). Structural equation modeling with latent variables was used to analyze the obtained data. Structural equation modeling, which is used as a combination of confirmatory factor analysis and path analysis, has been used in the use of relationships between UTAUT-2 model components (Thomas et al., 2013).

2.3. Participants

This study was carried out in the fall semester of the 2022-2023 academic year. In order to test the research hypotheses, the necessary data were obtained from students studying at a state university in the Southeastern Anatolia region of Turkey by using convenience sampling method. Convenience sampling is a sampling

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method that is conducted with sample elements that the researcher can easily access. (Yener, & Abdülkadir, 2007). The data of the research was collected by online questionnaire and offline schedules. In this study, structural equation modeling was used with the partial least squares method. In such studies, when calculating the minimum sample size, it is sufficient to have at least 10 times the number of structural paths directed towards a specific structure in the structural model (Hair et al., 2017). The structural equation model successfully used with small sample groups can also be preferred for large sample groups (e.g., 250 and above) using the partial least squares method (Hair et al., 2017). Since there are 8 structural paths in the model used, it is sufficient to have a minimum of 80 samples. A total of 541 students were reached within the scope of the study. Information about the participants is as in Table 1.

TABLE 1. Demographic Data.

Variable	Category	Frequency (f)	Percentage (%)
Gender	Female	251	46.4
	Male	290	53.6
Age	≤18	107	19.8
	≥19, ≤21	328	60.6
	≥22	106	19.6
Total		**541**	**100**

In Table 1, more than half (53.6%) of the university students participating in the research are men and 46.4% are women. Again, there is an unequal distribution according to age in the study. It was observed that the participant students were generally between the ages of 19 and 21 (60.6%). In addition to the demographic characteristics of the students, the research also includes questions about the average daily phone usage time and how many years they have been using mobile phones. In addition, it was also asked in the form whether the participants used mobile communication tools for educational purposes, and if so, which mobile content types/tools they used and how often. Findings related to this are given in Table 2.

TABLE 2. Information on students' mobile phone usage.

Variable	Category	Frequency (f)	Percentage (%)
Average phone usage time per day	<1h	8	1.5
	≥1, ≤2h	87	16.1
	≥3, ≤5h	259	47.9
	≥6h	187	34.6
How many years have you been using a mobile phone?	<1y	21	3.9
	≥2, ≤4y	151	27.9
	≥5, ≤7y	260	48.1
	≥8y	109	20.1
Do you use mobile communication tools for educational purposes?	Yes	507	93.7
	No	34	6.3

According to the data in Table 2, a significant part of the participants (82.5%) use their mobile phones for 3 hours or more per day. Again, about half of the students (48.1%) who participated in the research stated

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that they used mobile phones for 5-7 years. However, it was observed that 21 (3.9 %) of the students used mobile phones for less than 1 year. On the other hand, it was concluded that a high percentage of students (93.7%) use mobile communication tools for educational purposes.

2.4. Data Collection Instrument

A questionnaire consisting of three parts was prepared in order to test the students' intentions and behaviors towards adopting m-learning. In the first part, there are six questions in accordance with the sub-objectives of the research and these questions are about the demographic information of the participants and their mobile phone usage status. In the second part, there are UTAUT-2 scale questions

2.5. UTAUT-2 Scale

This scale was developed by Venkatesh et al (2012). The Turkish adaptation of the scale was conducted by Baraz et al (2021). The scale consists of 8 factors and 30 items. The factors are performance expectancy (4), effort expectancy (4), social influence (3), facilitating conditions (4), hedonic motivation (3), habit (4), and behavioral intention (3). The scale is a likert-type seven-point scale. Items are rated from "Strongly Disagree (1)" to "Strongly Agree (7)". The Cronbach alpha internal consistency coefficient calculated for the entire scale was calculated as .91. Therefore, it was concluded that the scale was reliable.

2.6. Data Analysis

IBM SPSS Statistics v20.0 and Smart PLS 4.0.9 programs were used to analyze the data collected in the study. The SPSS Program was used to learn the descriptive statistical analyses, normality test, Cronbach Alpha and correlation status between the variables of the participants. The AMOS program, on the other hand, was used to evaluate the validity and reliability of the structural equation model to be created in the research, based on model fit index values, and to conduct hypothesis tests. Structural Equation Model (SEM) was tested for the suitability of the proposed model in the analysis of the data. SEM is a comprehensive statistical technique used to analyze the theoretical model proposed by the researcher, as well as to reveal the relationships between observed variables and latent variables (Schumacker, & Lomax, 2004).

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IBM SPSS Statistics 22 and Smart PLS 4.0.9 were used in the analysis of the data obtained as a result of the study. Within the scope of the study, data obtained from the scale were used to test the model as well as demographic data. In testing the model, the structural equation model partial least squares method was preferred.

3.1. Validity and Reliability Analyses of the Scale

Before conducting the analysis of the research model, validity and reliability studies of the constructs in the study were performed. Within the scope of validity and reliability studies, internal consistency reliability,

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convergent validity, and discriminant validity were assessed. Cronbach's Alpha and composite reliability (CR) coefficients were examined for internal consistency reliability. In determining convergent validity, the values of factor loadings and the average variance extracted (AVE) were used. It is expected that factor loadings should be ≥0.70, Cronbach's Alpha and composite reliability coefficients should be ≥0.70, and the AVE should be ≥0.50 (Fornell & Larcker, 1981; Hair et al., 2006; Hair et al., 2017). To ensure internal consistency reliability, achieve convergent validity, and establish discriminant validity, necessary modifications were made, and indicators affecting reliability and validity were removed from the model. Table 3 below presents the results of internal consistency reliability and convergent validity for the constructs included in the study.

TABLE 3. Information on students' mobile phone usage.

Variable	Expression	Factor Load	Cronbach Alpha	CR	AVE
Performance Expectancy	PE1	0,873	0,947	0,948	0,820
	PE2	0,996			
	PE3	0,824			
	PE4	0,920			
Effort Expectancy	EE1	1,000	-	-	-
Social Influence	SI1	1,000	-	-	-
Facilitating Conditions	FC1	0,940	0,904	0,908	0,769
	FC2	0,928			
	FC3	0,749			
Hedonic Motivation	HM1	0,966	0,952	0,952	0,908
	HM2	0,939			
Habit	H1	1,000	-	-	-
Behavior Intention	BI1	1,000	-	-	-
Use Behavior	UB1	0,780	0,708	0,710	0,551
	UB2	0,703			

Due to the Cronbach's Alpha coefficients of the constructs ranging from 0.708 to 0.952 and CR coefficients ranging from 0.710 to 0.952, it can be concluded that internal consistency reliability has been achieved. Upon examination of the values in the table, it can be noted that the factor loadings are between 0.703 and 1.000, and the AVE values range from 0.551 to 0.908, indicating that convergent validity has been established.

Various methods exist for assessing discriminant validity. One such method is the Fornell and Larcker (1981) criterion. However, the Fornell and Larcker criterion fails to reliably identify issues related to discriminant validity (Radomir, & Moisescu, 2019). As a better alternative for assessing discriminant validity, the Heterotrait-Monotrait Ratio (HTMT) (Henseler et al., 2015) is recommended (Hair et al., 2021). Therefore, in this study, only HTMT coefficients have been reported.

For the determination of discriminant validity, cross-loadings were assessed using the HTMT criterion proposed by Henseler et al. (2015). Following the modifications made, the PLS algorithm was rerun, and cross-loadings, and HTMT coefficients were rechecked. The control results revealed that there was no substantial overlap among the items measuring the research constructs. The outcomes HTMT coefficients are displayed in Table 4.

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TABLE 4. Results of Discriminant Validity (HTMT Coefficients)*.

	Behavioral Intention	Effort Expectancy	Facilitating Conditions	Habit	Hedonic Motivation	Performance Expectancy	Social Influence	Use Behavior
Behavioral Intention								
Effort Expectancy	0,728							
Facilitating Conditions	0,689	0,712						
Habit	0,816	0,754	0,718					
Hedonic Motivation	0,716	0,730	0,869	0,745				
Performance Expectancy	0,662	0,780	0,800	0,719	0,833			
Social Influence	0,672	0,843	0,765	0,747	0,743	0,819		
Use Behavior	0,424	0,494	0,554	0,465	0,547	0,556	0,481	

According to the criteria set by Henseler et al. (2015), the HTMT ratio expresses the ratio of the average correlations among the items belonging to different variables to the geometric mean of the correlations among the items of the same variable. The authors have stated that theoretically, the HTMT value should be below 0.90 for closely related concepts and below 0.85 for distant concepts. It can be observed in Table 3 that the HTMT values are below the threshold. Given that there is no substantial overlap among the indicators measuring the variables in the research and HTMT coefficients have been achieved within the desired limits, it can be concluded that discriminant validity has been established.

3.2. Testing of the Research Model and Results

The results of the structural equation model created to test the hypotheses of the study are presented below. Partial Least Squares Structural Equation Modeling (PLS-SEM) was employed for analyzing the research model. The data were analyzed using the SmartPLS 4.0.9.6 statistical software (Ringle et al., 2015). To assess linearity, path coefficients, R-squared (R2), and effect sizes (f2) related to the research model, the PLS algorithm was used, and Blindfolding analysis was conducted to calculate predictive power (Q2). To evaluate the significance of PLS path coefficients, t-values were calculated by resampling (bootstrapping) 5000 subsamples from the dataset. The research results, including VIF, R2, f2, and Q2 values, are presented in Table 5, and the coefficients of the research model are presented in Table 6.

When examining the Variance Inflation Factor (VIF) values between variables, it can be observed that the values are below the threshold of 5, indicating that there is no multicollinearity issue among the variables (Hair et al., 2021). Upon reviewing the obtained R-squared (R2) values for the model, it was found that the Behavioral Intention variable is explained to the extent of 71%, while the Use Behavior variable is explained to the extent of 21%.

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TABLE 5. Results of the Research Model.

Variables		VIF	R^2	f^2	Q^2
Performance Expectancy		4,807		0,003	
Effort Expectancy		4,131		0,058	
Social Influence	Behavioral Intention	4,936	0,711	0,007	0,700
Facilitating Conditions		4,816		0,008	
Hedonic Motivation		4,541		0,014	
Habit		2,975		0,357	
Behavioral Intention		3,203		0,000	
Facilitating Conditions	Use Behavior	2,195	0,315	0,135	0,207
Habit		3,457		0,010	

The coefficient of effect size (f2) is considered low if it is 0.02 or higher, moderate if it is 0.15 or higher, and high if it is 0.35 or higher (Cohen, 1988). According to Sarstedt et al. (2017), it has been stated that it is not possible to talk about an effect when the coefficient is below 0.02. When examining the effect size coefficients (f2), it can be seen that the Habit variable has a high level of effect size on the Behavioral Intention variable. According to Sarstedt et al. (2017), Performance Expectancy, Social Influence, Facilitating Conditions, and Hedonic Motivation variables have low effect size on Behavioral Intention, and Behavioral Intention and Habit variables have low effect size on the Use Behavior variable.

The calculated predictive power coefficients (Q2) for the endogenous variables being greater than zero indicate that the research model has predictive power for the endogenous variables (Hair et al., 2017). Due to the Q2 values in the table being greater than zero, it can be stated that the research model has predictive power on the Behavioral Intention and Use Behavior variables.

TABLE 6. Coefficients of the Research Model.

Variables		Standardize β	Standart Sapma	t-değeri	p
Performance Expectancy		-0,065	0,050	1,296	0,195
Effort Expectancy		0,262	0,046	5,721	0,000
Social Influence		-0,103	0,059	1,753	0,080
Facilitating Conditions	Behavioral Intention	0,104	0,059	1,756	0,079
Hedonic Motivation		0,151	0,066	2,291	0,022
Habit		0,554	0,067	8,245	0,000
Behavioral Intention		-0,010	0,073	0,139	0,889
Facilitating Conditions	Use Behavior	0,451	0,070	6,423	0,000
Habit		0,151	0,086	1,753	0,080

When examining the values in Table 6, it can be understood that there are significant effects on the Behavioral Intention variable from the Effort Expectancy variable (β=0.262; p<0.05), Hedonic Motivation variable (β=0.151; p<0.05), and Habit variable (β=0.554; p<0.05). On the Use Behavior variable, the Facilitating Conditions variable (β=0.451; p<0.05) has a significant effect. It was observed that the effects of

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Performance Expectancy, Social Influence, and Facilitating Conditions variables on Behavioral Intention, as well as the effects of Behavioral Intention and Habit variables on the Use Behavior variable, are statistically insignificant. In light of these findings, it has been concluded that hypotheses numbered 2, 5, 6, and 7 are supported, while hypotheses numbered 1, 3, 4, 8, and 9 are not supported.

The moderating role of age in the relationship between Facilitating Conditions and the Behavioral Intention variable, the relationship between Hedonic Motivation and the Behavioral Intention variable, the relationship between Habit and the Behavioral Intention variable, and the relationship between Habit and the Use Behavior variable were tested through Multi-Group Analysis. The analysis results are shown in Table 7.

TABLE 7. Results of Multi-Group Analysis (Age).

Variables		Differences in Path Coefficients	p
Facilitating Conditions		-0,056	0,339
Hedonic motivation	Behavioral Intention	-0,933	0,256
Habit		0,414	0,241
Habit	Use Behavior	0,214	0,000

When examining the analysis results, it is observed that there is a moderating effect of age in the relationship between Habit and the Use Behavior variable ($\beta=0.214$; $p<0.05$). The other moderating effects in the pathways are statistically insignificant. Therefore, hypotheses numbered 10, 12, and 13 have been rejected. Hypothesis number 11, on the other hand, has been supported. Findings related to the moderating role of gender are presented in Table 8.

TABLE 8. Results of Multi-Group Analysis (Gender).

Variables		Differences in Path Coefficients	p
Facilitating Conditions		0,078	0,015
Hedonic motivation	Behavioral Intention	-0,305	0,010
Habit		-0,114	0,303
Habit	Use Behavior	0,084	0,501

When examining the analysis results, it is observed that there is a moderating effect of gender in the relationship between Facilitating Conditions and the Behavioral Intention variable ($\beta=0.078$; $p<0.05$), as well as in the relationship between Hedonic Motivation and the Behavioral Intention variable ($\beta=-0.305$; $p<0.05$). The other moderating effects in the pathways are statistically insignificant. Based on these results, hypotheses numbered 14 and 16 are supported in relation to the moderating effect of gender, while hypotheses numbered 15 and 17 have been rejected.

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TABLE 9. Results of Multi-Group Analysis (Experience).

Variables		Differences in Path Coefficients	p
Facilitating Conditions		-0,639	0,563
Hedonic motivation	Behavioral Intention	0,549	0,399
Habit		-0,209	0,247
Habit	Use Behavior	-1,229	0,000
Behavioral Intention		0,894	0,000

In Table 9, the results of the multi-group analysis related to experience are provided. According to this, there is a moderating effect of the experience variable in the relationship between Habit and the Use Behavior variable (β=-0.588; p<0.05), as well as in the relationship between Behavioral Intention and the Use Behavior variable (β=0.894; p<0.05). The other moderating effects in the pathways are statistically insignificant. In light of these results, hypotheses numbered 18 and 19 are supported, while hypotheses numbered 20, 21, and 22 are not supported.

4. DISCUSSION AND CONCLUSION

Digital natives are individuals who are born in an environment where all kinds of technological possibilities exist and can use these technological opportunities effectively (Prensky, 2001). These individuals, who do almost all of their daily work with technology, accept technology as one of the musts of life, not as a necessity. Especially the internet, computers, instant messaging, social networks, e-mail and mobile phones, which are increasingly used, are completely integrated with the daily lives of digital natives. The one-to-one interactions of digital natives with these technologies not only affect their daily activities, but also greatly affect their learning characteristics. On the other hand, in order to meet the needs and expectations of digital natives, the level of acceptance and adoption of these technologies is gaining importance day by day.

While digital media tools are so ingrained in the lives of the new generation of digital native students, not taking into account the adoption of these technological tools by digital natives while designing learning environments may render these environments ineffective in the eyes of users. In this study, it is aimed to determine and examine the factors affecting the behavioral intention of university students who are accepted as digital natives to adopt mobile learning. Performance expectancy, effort expectancy, social influence, facilitating conditions, hedonic motivation and habit, behavioral intention and usage factors, which are the variables affecting behavioral intention of the UTAUT-2 theory, which constitutes the basic model of the study, were included in the model. The moderator effect of gender, age and experience were also investigated in the study.

As a result of the relations established with the structural equation modeling method, many results were reached and this shows how complex the formation of students' intention is at the point of adopting mobile learning. The results of the study will help institutions and practitioners to understand the factors that influence students' intention to adopt mobile learning. Therefore, it is thought that the results will guide institutions in creating and implementing appropriate policies in terms of providing a better quality and effective learning environment. In this study, the acceptance and adoption of mobile learning tools by digital natives was examined using structural equation modeling, accompanied by the UTAUT-2 model. As a

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result of the research, it was confirmed that the UTAUT-2 model was statistically significant in the adoption of mobile learning. This result shows that students' usage behaviors, perceptions and intentions about mobile learning affect their adoption.

In this study, some of the proposed hypotheses have been confirmed, while others have been rejected H2 hypothesis has been supported. It has been observed that there is a significant relationship between the Effort Expectancy variable and the Behavioral Intention variable. Students believe that the less effort they put into using mobile technology, the more beneficial it will be, and they think that this type of usage also affects their academic achievements. There is a significant relationship between the facilitating conditions variable, which is our H5 hypothesis, and the use behavior variable. Accordingly, students exhibit more usage behavior in the presence of conditions that facilitate the use of the relevant technology. According to our H6 hypothesis, there is a significant positive relationship between the Hedonic Motivation variable and the Behavioral Intention variable. This indicates that students' enjoyment and pleasure when using mobile technologies affect their behavioral intentions. According to our H7 hypothesis, when students make using a mobile technology a habit, they are more inclined to turn it into a behavioral intention. H7 hypothesis has been confirmed.

In this study, the moderating effects of age, gender, and experience on the relationships have also been examined. Accordingly, there is a moderating effect of age on the relationship between habit and use behavior variables. There is a moderating effect of gender on the relationship between hedonic motivation and behavioral intention variables, as well as between facilitating conditions and behavioral intention variables. When examining the mediating effect of experience, it has been determined that there is a moderating effect of experience on the relationship between the habit variable and use behavior variable, as well as on the relationship between behavioral intention and use behavior variables.

Within the scope of this research, it was also revealed that which variable was explained and to what extent. According to the obtained results, the behavioral intention variable can be explained by other variables to the extent of 71%, while the use behavior variable can be explained by other variables to the extent of 32%.

When reviewing the literature, it is observed that there are similar studies. In our study, it was observed that the effort expectancy variable is a significant predictor of the behavioral intention variable. In studies conducted with university students by Al-Adwan et al. (2018a) and Al-Adwan et al. (2018b), it has been demonstrated that effort expectancy has a significant impact on mobile learning. Similarly, in a study conducted in Saudi Arabia, Alasmari and Zhang (2019) found that the effort expectancy variable predicts behavioral intention. In another study examining the acceptance of mobile technologies in mathematics education, Açıkgül and Şad (2021) also observed a significant effect of effort expectancy on behavioral intention. According to Açıkgül and Şad (2021), when mobile technologies have features that require less effort, behavioral intention is higher. On the other hand, Alowayr (2022), who focused on the acceptance of mobile learning in higher education, found that effort expectancy did not have a significant impact on behavioral intention.

In our study, it was also found that facilitating conditions significantly predict behavioral intention. Alowayr (2022), in a study based on the UTAUT model, concluded that facilitating conditions do not have a significant impact on the acceptance of learning. However, in the study conducted by Açıkgül and Şad

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(2021), facilitating conditions were found to have a significant effect on behavioral intention. Açıkgül and Şad (2021) explain this by the increase in behavioral intention when students have the necessary knowledge, skills, and resources.

This study also demonstrates that hedonic motivation significantly predicts behavioral intention. Açıkgül and Şad (2021) have reached similar conclusions. This suggests that students' enjoyment while using mobile technologies for instructional purposes, both in mathematics education and other subjects, increases their behavioral intention.

The use of mobile technologies for educational purposes is related to habit. In our study, it was found that the habit variable significantly predicts behavioral intention. Similarly, Açıkgül and Şad (2021) concluded that the transformation of using a mobile technology for educational purposes into a habit affects behavioral intention.

In studies conducted using both the UTAUT and UTAUT2 models, the extent to which external variables explain internal variables has been examined. Our study indicates that the behavioral intention variable is explained by other variables to the extent of 71%, while the use behavior variable is explained by other variables to the extent of 32%. In Açıkgül and Şad's (2021) study, these percentages are 76% and 13%, respectively. In the study by Al-Adwan et al. (2018b), it is observed that behavioral intention is explained to the extent of 68%, while in Al-Adwan et al. (2018a), behavioral intention is explained to the extent of 64.8%.

This study has examined the moderating effects of age, gender, and experience within its scope, and similar studies can be found in the literature. Al-Adwan et al. (2018a) have shown that gender has a moderating effect on the relationship between certain components. Gender has been found to have a moderating effect on the relationship between the hedonic motivation variable and the behavioral intention variable, as well as between the facilitating conditions and the behavioral intention variable. However, in a study by Alasmari and Zhang (2019), gender does not have a moderating effect among the components of the UTAUT model.

When examining the moderating effect of age in our study, it was found that age has a moderating effect on the relationship between habit and use behavior variables. However, in Al-Adwan's (2018b) study, it was concluded that age does not have a moderating effect. Alasmari and Zhang (2019) also found that age does not have a moderating effect. Similarly, Alasmari and Zhang (2019) concluded that experience does not have a moderating effect. In our study, on the other hand, experience was found to have a moderating effect on the relationship between the habit variable and the use behavior variable, as well as on the relationship between behavioral intention and use behavior variables.

In light of this information, the use and acceptance of mobile technologies by digital natives can be examined based on the characteristics of digital natives. In this study, the sample group is referred to as digital natives according to the definition made by Joiner et al. (2013). Prensky (2001) described digital natives as being tech-savvy, inclined to acquire information quickly, prone to multitasking, and inclined toward active learning rather than passive learning. Digital natives, also known as Generation Y (Qingyang et al., 2018), have grown up with digital communication and use their smartphones for purposes such as connecting with the world (Smith, 2019). Digital natives create digital experiences by interacting with digital environments or technologies.

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When examining the characteristics of digital natives within the scope of the UTAUT2 model, it is seen that the relationship between technology use and learning is complex for digital natives (Thompson, 2013). Therefore, this study serves as a guide to understanding digital natives' approach to mobile technology. Digital natives, although representing a generation born during a specific period, are not considered to be homogenous within themselves. This aspect is closely related to the usage behavior and intention of digital natives concerning mobile technologies. According to Wang et al. (2013), the natural inclination of digital natives toward digital technologies challenges technology acceptance models. Additionally, the most significant distinction between digital natives and digital immigrants is the resistance of digital immigrants to technology (Wang et al., 2013). However, this assumption does not necessarily mean that digital natives do not exhibit resistance to technology. The diversity of characteristics within digital natives raises questions about whether all digital natives have the same level of acceptance and usage of mobile technologies. As a result of this study, it was observed that the relationships of the sample group classified as digital natives with technology acceptance were not equally affected by the moderating effects of age, gender, and experience. Additionally, it was found that digital natives are more likely to convert behavioral intention when they habituate to mobile technologies. Moreover, the importance of social influence in converting mobile technologies into behavioral intention was found to be less significant, which suggests a need to reevaluate the characteristics of digital natives. According to this study, being inclined to use technologies like mobile technologies does not guarantee that digital natives will have high adoption behaviors and intentions when it comes to using them for learning purposes.

4.1. Research Limitations

This study has certain limitations. The original version of the UTAUT-2 model was used in the study. Additionally, the effects of more variables on the adoption and usage of mobile learning have not been explored. The research is limited to the components of the used model. Furthermore, this study is also limited to the design features of mobile technologies and tools. Since the data was obtained from a specific sample group, it has its own limitations. Therefore, caution should be exercised when making generalizations about the acceptance and usage of mobile learning tools by digital natives.

4.2. Future Work

In future studies, the research can be replicated with different sample groups to obtain diverse results. Accessing a larger sample size may lead to different findings. Additionally, the UTAUT-2 model used in this study can be retested by incorporating various additional variables. The results obtained from this study can serve as guidance for researchers in future studies.

5. DATA AVAILABILITY

The datasets generated during and/or analysed during the current study are available from the corresponding author on reasonable request.

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Students' usage of Over-the-top (OTT) streaming platforms affecting their academic and socio-demographic profile

Uso de plataformas de streaming Over-the-top (OTT) por parte de estudiantes y su efecto en su perfil académico y sociodemográfico

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ABSTRACT

As the world is reeling under the effects of the COVID-19 pandemic, most people have faced the shift to online modes of communication in spheres like education, work from home and even entertainment. Students turned to over-the-top (OTT) platforms in order to relax and relieve stress. The present study attempts to measure the usage of OTT platforms and its effect on students' academic lives concerning academic performance, concentration and productivity, health issues, time-management, and their socio-demographic profile. The study employed explanatory descriptive research designs and sent out instruments measuring usage of OTT and other variables to 800 students across India. The study obtained 535 successful responses from the students pursuing 11th grade to post-graduation. Data analysis included descriptive statistics, parametric t-test, ANOVA and MANOVA. The study revealed that students used OTT platforms extensively for entertainment. Descriptive data gave a detailed account of their academic lives during the COVID-19 crisis. Usage of OTT affected their academic performance, concentration and productivity, health and time management. The study recommends future researchers to find the positive and negative effects of OTT usage on the youth in the post-pandemic scenario.

KEYWORDS Academic performance; Demographic-predictors; Over-the-top platform; OTT.

RESUMEN

Mientras el mundo se tambalea bajo los efectos de la pandemia COVID-19, la mayoría de las personas se han enfrentado al cambio hacia modos de comunicación en línea en esferas como la educación, el trabajo desde casa e incluso el entretenimiento. Los estudiantes recurrieron a plataformas over-the-top (OTT) para relajarse y aliviar el estrés. El presente estudio

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intenta medir el uso de plataformas OTT y su efecto en la vida académica de los estudiantes en relación con el rendimiento académico, la concentración y la productividad, los problemas de salud, la gestión del tiempo y su perfil sociodemográfico. El estudio empleó diseños de investigación descriptivos explicativos y utilizó instrumentos que miden el uso de OTT y otras variables a 800 estudiantes de toda la India. El estudio obtuvo 535 respuestas exitosas de los estudiantes que cursaban desde el 11º grado hasta el posgrado. El análisis de datos incluyó estadística descriptiva, prueba t paramétrica, ANOVA y MANOVA. El estudio reveló que los estudiantes utilizaban ampliamente las plataformas OTT para entretenerse. Los datos descriptivos dieron cuenta detallada de su vida académica durante la crisis de la COVID-19. El uso de OTT afectó a su rendimiento académico, concentración y productividad, salud y gestión del tiempo. El estudio recomienda a futuros investigadores encontrar los efectos positivos y negativos del uso de OTT en los jóvenes en el escenario pospandémico.

PALABRAS CLAVE Rendimiento académico; Predictores demográficos; Plataforma over-the-top; OTT.

1. INTRODUCTION

There have been several major behavioural and lifestyle changes for all people during the COVID-19 pandemic (Gupta, & Singharia, 2021). Society adopted online modes of communication in most spheres, such as education, workplace and even for entertainment (Potdar, & Aradhya, 2021). Educational institutions conducted classes online to maintain continuity in education (UNICEF, 2020). Students and the academic community in general were also subjected to this sudden change. In-person classes were discontinued and institutions realised that online learning should not be viewed as an option but as a necessity (Dhawan, 2020). Online learning, video-conferencing and video-streaming platforms became popular to support the crisis time (Buheji, & Ahmed, 2020). Nevertheless, platformisation of higher education faced several challenges (Garcia, 2023). "Over-the-top" platforms, abbreviated as OTT, refers to the distribution of video contents over a public network (Madhani, & Nakhate, 2020). It includes subscription-based video-on-demand (SVoD) services, such as Netflix, Hulu and Amazon Prime. Considering the increase in the usage of these services, several companies like Netflix and Amazon Prime began creating their own video content. Studies prior to the pandemic reported that the students these days are spending more time on digital devices and virtual spaces than in outdoor entertainment (Stiglic, & Viner, 2019). COVID-19 restrictions further enhanced the usage of digital entertainment. There has been a surge in consumption of digital entertainment (Mosanya, 2020). While emphasising that students should be future ready, they should be allowed to live in the present (Ben-Arieh, & Frønes, 2007), even as balancing their social, emotional and intellectual well-being is important. The COVID-19 pandemic has changed the mode of educational instruction (Potdar, & Aradhya, 2021). In-person classes were discontinued, while online classes through video conferencing platforms (Buheji, & Ahmed, 2020) became the new normal (World Economic Forum, 2020). Remote teaching and learning became common in academia across countries in the world (UNICEF, 2020). Students found themselves satisfied when they learnt from videos (Pattier, & Ferreira, 2022). Potdar and Aradhya (2021) while investigating virtual education facilities in India, found the usage of SWAYAM and educational satellite (EDUSAT) programmes supporting the students.

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1.1. Literature Review

Dhawan (2020) conducted a SWOC analysis of online learning during pandemic and reported that online learning is here to stay and we need more Ed-tech platforms for education. However, students are not positively inclined towards online teaching-learning (Ullah et al., 2017). Further, poor internet bandwidth, less peer interaction and lack of technology knowledge are the issues with online teaching (Muthuprasad et al., 2021) and both parents and students showed anxiety towards longer screen-time (Harjule et al., 2021). During lockdown, Ghode (2020) found that media consumption behaviour among students and working professionals are the same with a different purpose. Further, OTT viewership considerably increased (Gupta & Singharia, 2021; Madnani et al., 2020; Madnani, & Nakhate, 2020). Rigby et al. (2018) reported that viewers preferred using OTT in the evening 7 to 11 p.m. and students are gratifying themselves watching live streaming content. Students might get addicted to OTT platforms and end up in a vicious cycle. Systematic review of literature by Flayelle et al., (2020) revealed that there is no clear definition for binge-watching. However, Castro et al. (2021) reported that students binge-watched a minimum of two full episodes of the same TV show. Overuse of OTT platforms led students to stay isolated (Mosanya, 2020).

People subscribe to OTT platforms for either pleasurable or meaningful entertainment (Oliver, & Raney, 2011). Meaningful entertainment teaches moral virtues (Oliver et al., 2012) and provides opportunities to learn about life (Wirth et al., 2012). However, there are several drawbacks to these platforms. Meier et al., (2016) explored the phenomenon of 'Facebocrastination', leading to procrastination of academic tasks and sleep (Kroese et al., 2016) by students. Watching movies late night gives a good feeling (Nauts et al., 2019). Well-being is important for students to lead happy lives. Hope et al. (2014) revealed that students who were highly self-compassionate wanted their goals to be personally meaningful. Self-compassion comes by aligning one's priorities with their values - be it a happy hour with friends or watching Netflix (Moran, & Ming, 2020). Farrukh et al. (2021) reported negative correlation between media consumption and students' well-being and academic achievement.

The increase in OTT subscriptions and its consumption by students regularly for longer hours, ignoring academic and personal hygiene, is crucial. Therefore, the present study aims to explore the OTT platform usage on students' health, academic performance, concentration, productivity and time management.

1.1.1. Media's influence on Academic Performance

Mushtaq and Khan (2012) revealed that learning facilities at home and parental guidance positively affects the academic performance of students. Mehmood and Taswir (2013) found that social networking sites distract students and affect their academic performance while helping students' networking. Kotzé and Kleynhans (2013) found that burnout (emotional exhaustion) and resilience were significant predictors of academic performance and further revealed that students who engaged and involved with their academics achieved higher scores. Whereas Poots and Cassidy (2020) showed a negative correlation between academic stress and students' well-being. Since academics forms a major part of students' lives, it is important to understand their attitude and approach. Iskender (2011) discussed how students tend to engage in academic procrastination as a way of avoiding academic commitments. Students often turn to digital entertainment in order to relieve stress. Dandamudi and Sathiyaseelan (2018) found a negative correlation between

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binge-watching television and academic GPA. However, the effect of academic achievement on students' well-being was relatively small (Bücker et al., 2018). Thus, it is clear that academic performance was not the sole determinant of a student's happiness and satisfaction. In addition, Neff et al. (2005) emphasised the mastery of a subject rather than academic performance.

1.1.2. Media and Socio-demographic profile

The shift to online modes of learning and working has challenged the concentration and productivity of people. Students are now more vulnerable to distractions as digital media platforms like YouTube and Instagram are just a click away (Gillick & Magoulias, 2020). Factors such as lack of interest, motivation to learn and indiscipline are affecting online classes (Muthuprasad et al., 2021). However, the research carried out by Hofmann et al. (2012) reported that the effect of media as a tool to regulate students' desire and factors such as low cost and easy access to various entertainment platforms make media use appealing but lack of self-control is the reason for people remaining attached to media platforms. Rusz et al. (2020) found that platforms like Netflix avert students' attention from their academics. Interestingly, Gill et al. (2012) demonstrated how notifications and alerts are a source of distraction and thus affect one's concentration. Kubey and Csikszentmihalyi (2002) traced that students find it more difficult to concentrate on their work after watching video content. Nevertheless, Vaterlaus et al. (2019) report that some students motivate themselves to complete work quickly in order to binge-watch content afterwards as a reward.

Health is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity (Callahan, 1973). Binge-watching at night could lead to lack of sleep (Oberschmidt, 2017) and increased fatigue (Exelmans, & Van den Bulck, 2017). Headaches, eyestrain and loss of sleep are some of the many consequences of time spent in binge-watching (Gangadharbatla et al., 2019). Although watching OTT content is a way of coping with stress and negative moods, it actually makes students sleep deprived, which in turn affects their cognitive ability to deal with challenges (Sirois et al., 2019). Moran and Ming (2020) highlighted the importance of Acceptance and Commitment Theory (ACT) as well as using a Mindful Action Plan (MAP) to cope with stress amid pandemic. Neff et al. (2005) revealed that students exhibiting self-compassion have lower anxiety levels. Zhang et al. (2016) found UG students possessing better self-compassion. Research on students' time management is becoming more popular as a topic of research (Wray-Lake et al., 2020) as today's youth spend more and more of their leisure time on digital devices and virtual spaces (Best et al., 2014; Stiglic, & Viner, 2019). Feijter et al. (2016) found that time spent watching content depended on the amount of free time the youth had. Time spent watching videos plays an instrumental role on one's emotional well-being.

There are different views on the nature of OTT consumption. Castro et al. (2021) found that binge-watching is usually an individual activity that is mostly performed at night and the preferred device is a laptop. On the other hand, Vaterlaus et al. (2019) indicated that binge-watching helps students to connect with peers and partake in conversations about popular culture. This may allow students to spend more time with friends and peers by facilitating social interaction. Nevertheless, the COVID-19 pandemic has drastically altered people's media usage and consumption habits, as most people are forced to stay at home (Patel et al., 2020). Walton-Pattison et al. (2018) suggested that students should practise effective time management to ensure that they have adequate time to pursue productive goals.

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Leonhardt and Overå (2021) found that boys pursue more online gaming, a popular activity, while girls use more social media than video gaming. Students addicted to gaming spend 15 to 21 hours per week on it (Rebecca-Clark, 2023). Ali et al. (2021) indicated that boys mainly use social media for communication and interaction, while girls use it for education. Vall-Roqué et al. (2021) found a significant positive relationship between Instagram accounts that focus on appearance and low self-esteem, body dissatisfaction and a desire to be thin among young women. Attention and motivation are significant predictors of academic performance (Barton et. al., 2018). Although virtual learning is helpful and provides additional inputs, social media usage leads to lower efficiency among students in higher education (Lacka et al., 2021). Nevertheless, there is an association between smartphone addiction, poor sleep quality and low academic performance among university students (Rathakrishnan et al., 2021). Braghieri et al. (2022) revealed that usage of Facebook results in poor mental health, leading to depression and decreased academic performance, along with higher utilisation of mental health support services. Hudimova (2021) examined young users' patterns of social media usage and found that they spend more time on social media as a method to avoid bad thoughts during the pandemic. Additionally, uncontrolled use of social media leads to sleep disorders, anxiety, depression and feelings of isolation. Pavlikova et al. (2021) found social media influencing students' well-being during the pandemic with regard to their personal interest, interpersonal communication, motivation, online education and entertainment.

1.1.3. Theoretical framework

The Theory of planned behaviour (TPB), Media dependency theory (MDT) and Uses and gratification theory (UGT) have guided the present study. Planned behaviour theory guided the study in analysing how students formulate their attitude towards using OTT for their entertainment. What kind of subjective norms have they considered? What is their perceived behavioural controls while they decide to watch OTT consciously (Ajzen, 1991)? Moreover, students' OTT usage behaviour comes from their positive beliefs about the behaviour itself. Further, Media dependency theory supports the present study in understanding why students subscribe to a particular OTT channel. Is educational or entertainment content enough to satisfy them? How are their socio-emotional drives satisfied. The implication from Media dependency theory and the present study describe that if students meet their needs through any social media, they value it the most and it becomes an important part of their lives (Ball-Rokeach, & DeFleur, 1976). Thus, students started using the OTT platforms extensively during the Covid-19 pandemic, which has affected their academic lives both positively and negatively. The Uses and Gratification Theory helps researchers understand how the usage of OTT gratifies students' needs, how channels satisfy their entertainment needs and which ones satisfy their academic requirements. How could these be utilised by educators in teaching and learning? OTT platforms cater to the needs of today's youth and gratify them as and when they watch OTT content (Menon, 2022).

1.2. Research Question

From the review of literature, it is clear that the Covid-19 crisis has led students to use the media to entertain and educate themselves. Technological gadgets, Internet and media channels attracted youngsters more towards entertainment than education. In addition, restrictions imposed due to Covid-19 further affected

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students' academic lives. Therefore, the present study framed the following research question: What effect does the daily use of OTT platforms have on the academic lives of students?

1.3. Research Objectives

The pandemic context reinforced students to spend more time online, with social media and on OTT platforms, causing both positive and negative effects on their student lives and academic performance. Therefore, in order to address the questions raised above, researchers wished to inquire and report facts affecting the socio-demographic profiles and academic performance of students, thus framing the following research objectives for the present study.

- To determine the most preferred OTT channel by students and to reveal the purpose of consuming OTT platforms.
- To describe the statistical frequency and percentage of students' demographic profiles within the samples selected for the study.
- To determine whether there are any differences in dependent variables (academic performance, concentration and productivity, health issues, time management, OTT usage) between students' gender (male and female), type of family (nuclear and joint), and type of OTT platforms they use (free and paid subscription).
- To determine whether there are any main and interaction effects between dependent variables (academic performance, concentration and productivity, health issues, time management) and categorical independent variables (age, socio-economic-status (SES), education and academic performance percentage level).

2. METHOD

2.1. Study design

The present study employed explanatory descriptive research design. As a review of literature brings limited and mixed understanding of social media usage affecting students' life in the pandemic crisis time, the study addresses the research question through a descriptive quantitative approach and involved data measuring socio-demographic profile of the students.

2.2. Participants

The study employed a convenient sampling technique to collect the data due to various Covid-19 restrictions imposed by the local government. Asample of the study included 535 students, out of which 282 were boys and 253 were girls. They were pursuing their studies in pre-university college, undergraduate (UG) and postgraduate (PG) programmes across India during Covid-19, when there was a lockdown and therefore their teaching was held online.

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2.3. Data collection procedure

The study collected data in two phases. Phase-1 data collection included pilot study data on a small sample to establish the reliability of the instrument used. The section heading, 'Instrument below', presents a detailed discussion of the Phase-1 data analysis and results.

Phase-2 data collection included the final field data. Researchers sent out the survey questionnaire on a Google form to 800 students and obtained 535 successful responses, out of which 282 were from boys and 253 were from girls. The survey included informed consent, demographic details and items pertaining to students' academic lives, which had components pertaining to academic performance, health, concentration and productivity, time management and usage of OTT platforms. Researchers cleaned the excel data sheet obtained from the Google form and stored it safely in a password-protected file.

2.4. Data analysis procedure

Researchers analysed the pilot study data to find the reliability of the questionnaire. The study employed confirmatory factor analysis and Cronbach alpha reliability statistics. Further, it imported the filed data stored in an excel sheet to SPSS software (version-24). Researchers conducted descriptive analysis, independent sample t-tests, one-way ANOVA, and MANOVA tests to check each of the research objectives framed in the study.

2.5. Ethical considerations

The study sought permission from the research-conduct-ethics-committee (RCEC) from the University to carry out the present study. It took informed consent from the participants during the survey. The questionnaire had informed consent at the beginning. Only upon agreeing to the consent form can the participants respond to the survey. The minor participants had to fill in additional consent forms from their parents. Researchers ensured the anonymity of the data collected to the entire range of participants with a declaration at the beginning, including the privilege to withdraw from responding to the survey at any point of time by the participants, if they found themselves not comfortable responding to the questions. Researchers stored the data collected in a password-protected file and made it available only to the researchers to ensure data safety.

2.6. Instrument

Researchers constructed a questionnaire on the academic lives of students, which included items pertaining to their academic performance, health, concentration and productivity, time management, and usage of OTT platforms with a 5-point Likert type scale. The ratings varied from strongly disagree to strongly agree. Researchers established the face and content validity of the constructed questionnaire by taking opinions from a panel of experts in the field. Researchers administered the constructed questionnaire on a sample of 50 students to establish reliability. Exploratory factor analysis with principal axis factoring and varimax rotation provided five factors whose Eigen values were greater than one and were titled as academic performance, health, concentration and productivity, time management, and usage of OTT platforms. Table 1 below presents the factor analysis results. Cronbach's alpha test computed the internal consistency value of the questionnaire and was 0.788, which indicated that the questionnaire was highly reliable.

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TABLE 1. Showing the results of the exploratory factor analysis.

Factor	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.277	24.141	24.141	5.745	22.095	22.095	3.125	12.019	12.019
2	3.399	13.072	37.213	2.843	10.936	33.031	2.652	10.200	22.219
3	1.430	5.500	42.713	.848	3.263	36.294	2.612	10.045	32.264
4	1.363	5.242	47.955	.747	2.872	39.167	1.347	5.180	37.444
5	1.068	4.108	52.063	.458	1.762	40.929	.906	3.485	40.929
6	.996	3.830	55.892						
7	.927	3.567	59.459						
8	.882	3.391	62.850						
9	.794	3.053	65.903						
10	.761	2.928	68.831						
11	.698	2.684	71.515						
12	.689	2.652	74.166						
13	.673	2.590	76.756						
14	.634	2.438	79.194						
15	.603	2.318	81.513						
16	.571	2.198	83.711						
17	.528	2.033	85.743						
18	.498	1.916	87.659						
19	.487	1.875	89.533						
20	.455	1.752	91.285						
21	.449	1.727	93.012						
22	.426	1.637	94.649						
23	.396	1.521	96.170						
24	.357	1.374	97.544						
25	.331	1.272	98.816						
26	.308	1.184	100.000						

Extraction Method: Principal Axis Factoring

3. RESULTS

In order to address the research questions raised and the subsequent research objectives framed for the study, researchers conducted descriptive analysis, independent sample t-test, one-way ANOVA and MANOVA tests on the collected data. The following paragraphs present the results of these statistical analyses.

Figure 1 below shows the percentage of students using different OTT platforms. As per the figure, Hotstar (71.80%) is the most used platform followed by Amazon prime (53.60%), Netflix (44%) and Hotstar (32%).

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FIGURE 1. Percentage of users of OTT platforms.
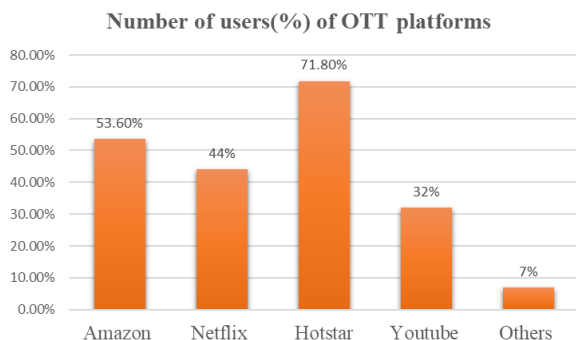
FIGURE 2. Reason for watching OTT platforms.
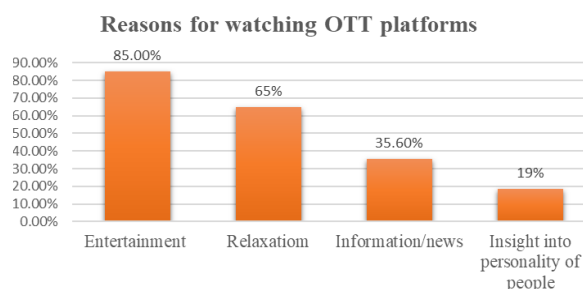
Figure 2 shows the reasons for students watching OTT platforms. It shows that most of the students were watching for the sake of Entertainment (85%) followed by Relaxation (65%), Information/News (35.6%) and Insight into the personality of people (18.5%).

3.1. Descriptive statistics

TABLE 2. Frequencies of demographic variables of the study.

Gender	Male	282	52.7%
	Female	253	47.3%
Age	16-20	264	49.3%
	21-25	213	39.8%
	>25	58	10.8%
Family type	Nuclear family	408	76.3%
	Joint Family	127	23.7%
Socio-Economic Status	Upper class	45	8.4%
	middle class	427	79.8%
	lower middle class	63	11.8%
Education	Pre-university college/11/12	150	28.0%
	UG	264	49.3%
	PG	85	15.9%
	Professional Certification	36	6.7%
Aggregate Academic Percentage	<60%	20	3.7%
	60% -70%	105	19.6%
	70% - 80%	193	36.1%
	>80%	217	40.6%
Type of OTT used	Free	212	39.6%
	Subscribe	323	60.4%
Hrs of usage of OTT /day	<1hr	83	15.5%
	1-3hr	291	54.4%
	4-6hrs	126	23.6%
	>6hrs	35	6.5%

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From the Table 2 above, it was clear that most of the respondents who took part in the survey were from nuclear families and 80% of students were from middle class families. The participants' gender representation was almost equal, with their ages ranging from 16 to 28 years with almost 50% below 21 years. About 49% of the respondents were studying in undergraduation and most of the students secured an average of 60% to 70% in their academics. Many of the respondents preferred subscription-based OTT platforms over free OTT platforms. With regard to the duration of use, more than half the respondents (54.4%) indicated that they used OTT platforms for 1-3 hours per day.

3.2. Independent sample t-test

Researchers conducted independent sample t-tests to check whether there were any statistically significant differences in dependent variables (academic performance, concentration and productivity, health issues, time management, OTT usage) between students' gender (male and female), type of family (nuclear and joint) and the type of OTT platforms they used (free and paid subscription). Table 3 below presents the results of independent sample t-tests.

TABLE 3. Results of independent sample t-tests for all dependent and three independent variables.

	Academic performance		Concentration & productivity		Health issues		Time management		OTT usage	
	t value	.Sig	*t* value	.Sig	*t* value	.Sig	*t* value	.Sig	*t* value	.Sig
Gender	0.414	0.679	1.548	0.122	2.734	0.006	1.679	0.094	5.323	0.000
Type of Family	-0.709	0.479	0.915	0.361	1.081	0.280	0.937	0.349	0.713	0.476
Type of OTT use	-0.020	0.984	0.195	0.845	0.167	0.867	0.817	0.414	-2.454	0.014

From Table 3, it is clear that there is a significant difference in the health issues and OTT usage between boys and girls. Boys' health issues are more in number than the girls' (M boys 15.19 > M girls 14.37) and similarly, Boys' OTT usage is more than girls' (M boys 20.80 > M girls 19.30). The type of family did not show any differences in any of the dependent variables. The type of OTT subscription also did not show any significant differences in any of the dependent variables, except the usage in OTT. The paid subscribers' OTT usage is more than the free subscribers' (M Paid 20.37 > M Free 19.66).

3.3. One-way ANOVA

Researchers conducted one-way ANOVA statistical tests to check whether there were any statistically significant main effects and interaction effects between dependent variables (academic performance, concentration and productivity, health issues, time management) and categorical independent variables (age, socio-economic-status (SES), education and academic performance percentage level), which had 3 sub-groups. Table 4 below presents the results of the one-way ANOVA.

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TABLE 4. One-way ANOVA result for four dependent variables and four independent variables.

	Academic performance		Concentration and productivity		Health issues		Time management	
	F value	Sig.	F value	Sig.	F value	Sig.	F value	Sig.
Age	1.528	0.218	1.791	0.168	1.942	0.144	0.042	0.959
Socio-economic status	2.070	0.127	4.060	0.018	0.633	0.531	3.342	0.360
Education level	0.398	0.754	0.226	0.879	0.968	0.407	1.018	0.384
Academic performance level	3.495	0.016	0.883	0.449	0.588	0.623	1.048	0.371

From Table 4, there exists a significant main effect on concentration and productivity of students based on different SES groups (F = 4.060, p = 0.018). Similarly, there exists a significant main effect on academic performance of students based on different academic performance percentage levels (F = 3.495, p = 0.016). Further, there are no main effects on any of the remaining variables.

3.4. Multivariate analysis

Researchers conducted multivariate statistical tests to check whether there are any statistically significant main effects and interaction effects between dependent variables (academic performance, concentration and productivity, health issues, and time management) and an independent variable (levels of OTT usage as low, average and high). Table 5 below presents the results of multivariate analysis.

TABLE 5. Tests of between-subject effects of levels of OTT usage and dependent variables.

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	Academic performance	27.745[a]	2	13.873	34.648	.000
	Concentration and productivity	12.293[b]	2	6.146	15.479	.000
	Health issues	43.063[c]	2	21.532	33.055	.000
	Time management	53.582[d]	2	26.791	38.339	.000
Intercept	Academic performance	4606.434	1	4606.434	11504.890	.000
	Concentration and productivity	4366.361	1	4366.361	10996.524	.000
	Health issues	4065.219	1	4065.219	6240.969	.000
	Time management	4245.976	1	4245.976	6076.144	.000
OTT	Academic performance	27.745	2	13.873	34.648	.000
	Concentration and productivity	12.293	2	6.146	15.479	.000
	Health issues	43.063	2	21.532	33.055	.000
	Time management	53.582	2	26.791	38.339	.000
Error	Academic performance	213.007	532	.400		
	Concentration and productivity	211.240	532	.397		
	Health issues	346.532	532	.651		
	Time management	371.759	532	.699		
Total	Academic performance	6311.640	535			
	Concentration and productivity	5885.200	535			
	Health issues	5587.520	535			
	Time management	5883.280	535			
Corrected Total	Academic performance	240.752	534			
	Concentration and productivity	223.532	534			
	Health issues	389.595	534			
	Time management	425.341	534			

a. R Squared = .115 (Adjusted R Squared = .112), b. R Squared = .055 (Adjusted R Squared = .051)
c. R Squared = .111 (Adjusted R Squared = .107), d. R Squared = .126 (Adjusted R Squared = .123)

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The study found Wilk's Lambda value equal to 0.033 for multivariate analysis that was almost close to zero. It meant that the independent categorical variable (levels of OTT usage) contributed more to the discriminant function. From the Table 5 it was clear that levels of OTT usage significantly accounted for variations in (all dependent variables) the academic performance, concentration and productivity, health issues and time management ($p < 0.05$).

4. DISCUSSION

The study revealed that there had been an extensive use of OTT by student groups studying in various levels of education for entertainment purposes. Demographic characteristics of students revealed some interesting facts. Most of them were from middle class families, had paid OTT connections and watched OTT from 1 to 3 hours a day. This may be due to Covid-19 lockdown restrictions and online classes. Further, boys' OTT usage was more than girls'. In India, boys are relatively freer from household work than girls and talking to their peer groups about what they watched is prevalent. Popular culture reinforces them to watch OTT regularly. Girls in India usually indulged more in household work, irrespective of their educational level. Further, girls were traditionally backed up by their choices on episodes broadcast from OTT platform channels. Today, parents and teachers must make an effort to engage boys in many other curricular and co-curricular activities to reduce their OTT usage. In addition, OTT usage is more among paid subscribers than free ones, as the paid OTT platforms show the youths' favourite channels and aids them in maintaining their popular culture.

The study found that levels of socio-economic status affected their productivity and concentration. Perceived employment ambiguity among the people due to the pandemic and attritions from various employers disturbed their livelihood. The students could not concentrate on their studies and found themselves unproductive at the end of the day. The analysis of the present study revealed that students' productivity and concentration declined as their usage of OTT platforms increased. Students found themselves distracted by notifications, which disturbed their concentration (Gill et al., 2012). Further, the desire to use platforms like Netflix averted their attention from their studies, leading to low productivity in their learning (Rusz et al., 2020). Similar to the findings of Kubey and Csikszentmihalyi (2002), students found it difficult to maintain the same level of concentration and productivity after watching OTT content. In agreement with the findings by Vaterlaus et al. (2019), the students also admitted that they were motivated to complete their work quickly, in order to reward themselves with time to use OTT platforms. This recommends the introduction of systems that alert viewers when they have spent excessive time on the platform. Further, parents and teachers may find useful programmes on OTT, such as yoga, meditation, physical exercise and educational channels and could have encouraged the children to watch those, rather than leaving it to their choice.

The study observes that there is variation in obtained academic percentage among students and one of the reasons could be introduction of online assessments and examinations, which both teachers and students are not so familiar with. This implies the importance of providing appropriate training and support to educators in adapting to online learning environments. Increased usage of OTT platforms led to a decrease in students' academic performance. Watching video content on these platforms made students less interested in their academics and led to a decline in their marks scored. These results were in line with the findings

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of Dandamudi and Sathiyaseelan (2018), who found that there were negative consequences on academics due to excessive watching of television. Contradicting this, Farrukh et al. (2021) found a positive correlation between entertainment media and academic achievement. This was evident, as recent research studies reported a learning loss.

Overall, OTT usage among students contributed to variations in their academic performance, concentration and productivity, health issues, and time management. However, a recent study revealed students' positive attitude towards online learning (Eseadi, 2023). As students sat for online classes for the first time for longer hours, screen time created fatigue and stress. They found it difficult to manage their time for online classes, assignments, study time and entertainment. Contradicting this, there is a positive relationship between digitised content in a distance-learning programme (Onyekwere, & Hoque, 2023). Additionally, the results pointed out that due to usage of OTT, students were not able to manage time in such a way that allowed them to develop skills, pursue hobbies and socialise with friends. This implied sheer negligence on the increased usage and lack of control over the time spent on social media and OTT platforms. It is suggested that platforms introduced a system that alerted viewers when they have spent too much time on the platform. As watching OTT content was an individual activity, students found themselves spending more time alone and not socialising with friends. This contradicted the results of Vaterlaus et al. (2019), who found that binge-watching allowed young people to connect over pop culture topics and thus facilitated social interaction. Routine, restricted lifestyles led to frustration and mental ill-health. Thus, we needed to develop awareness campaigns targeting students, parents and educational institutions, about the potential effects of excessive OTT platform usage on academic performance, concentration, productivity and health. However, a recent study revealed a positive correlation between virtual education and health-oriented lifestyles (Sabet et al., 2022).

Findings from the multivariate analysis also indicated that students' health deteriorated because of increased time spent on these platforms. In alignment with the findings of Gangadharbatla et al., (2019), students experienced headaches, eyestrain and loss of sleep because of more time spent watching OTT videos. A recent study also reported that online learning and online meetings negatively affected the students' online learning experiences (Amboy et al., 2023).

However, a study of the present paper also found that students chose to watch OTT content as a way of relieving stress. This coincided with Mosanya (2020), who identified Netflix and other streaming services as supportive factors that helped students deal with the anxiety posed by COVID-19. Due to the pandemic restrictions, students were unable to engage in outdoor activities. This might have turned them to OTT platforms as a way of relieving stress and boredom. The effect of independent variables (levels of OTT usage) was categorised under three clusters: namely, low, average and high. OTT usage's effect on dependent variables in the present study were: almost 14% of the students showed a low effect, 38% had a moderate effect and 48% had a high effect. In other words, OTT usage had moderate to high effects on the dependent variables from the majority of students (86%).

Thus, there is a need to maintain appropriate balance for all activities in a student's life. Too much emphasis on academic performance may come at the cost of health and mental well-being. Students can manage their time more effectively by following a schedule. Thus, in addition to completing their

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responsibilities, they can also set aside time for all the things they would like to do, including hobbies, watching movies and meditating. In order to up-skill themselves and use time productively, students are recommended to engage in courses (whether online or offline) on a variety of skills. Finally, the statistical analysis revealed that there is an effect of the usage of OTT platforms on students' academic performance, concentration and productivity, health issues and time management.

4.1. Limitations and Recommendations for Further Research

The study identified only the negative effects of excessive OTT usage among students and did not look at the positive effects. The study did not explore potential positive effects or consider other relevant factors that could influence their academic performance and well-being. Further, the study did not explore concrete intervention strategies or recommendations to address the issues and only reported those related to academic performance, concentration and productivity, health and time management. The study did not address the role of individual differences, coping strategies, or social support to understand the excessive OTT usage by students. It included only OTT platform usage, rather than any other social media or internet devices. The study reported the demographic profiles of only a limited number of participants, due to lack of access amid pandemic. The study employed quantitative methods to answer the research question. The sample included a wide range of students from 16 to 25 years. Therefore, age did not determine any variation in the usage of OTT platforms.

Future studies should explore potential interventions that could help students balance their online activities and academic responsibilities effectively. Future studies can include the impact of OTT platforms, social media and internet addiction on the academic performance of students. In addition, smartphone addiction because of the usage of excessive social media apps, such as Snapchat, shorts and Instagram-reels might disturb the psychosocial development of youths, which warrants in-depth qualitative and quantitative research studies to channelise them in the right direction and shape them into productive citizens.

4.2. Pedagogical implications

As studies have found an excessive use of OTT platforms by students of all ages, demographic profiles and educational levels, educators and practitioners in the field must reflect on these newer trends and bring in modifications in their approach to teaching, learning and administration, without affecting students' expected educational outcomes and productivity. This could include integrating short media clips relevant to the teaching point for better learning engagement, introducing media literacy to make students understand their positive and negative effects, orienting students on time-management and self-regulation skills, introducing OTT-style formats to provide educational content such as gamified content, modular lessons and interactive content. They could also involve organising socio-emotional well-being classes, including blended or hybrid learning, providing co-curricular and extra-curricular opportunities to discuss their popular culture, assigning media-integrated learning tasks or project works, educating parents on how to handhold their wards at home, utilising authentic assessment methods, evidence-based classroom practices and adopting culturally responsive pedagogies to cater to students from varied demographic profiles.

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5. CONCLUSIONS

The present research was able to find responses to the objectives of the study as intended. The most preferred OTT channel by students is Hotstar and their purpose of consuming OTT platforms is mainly for entertainment and relaxation, rather than education. The demographic profiles of students within the selected sample was quiet heterogeneous. Although students turned to OTT platforms to get rid of stress and isolation during the pandemic, their usage of OTT platforms affected them negatively. The study used critical paradigms to carry out the present research. Thus, they did not look into the positive aspects of OTT usage for students. The study clearly establishes that cultural context and situational factors influence media usage and makes an impact on students' academic lives. Overall, the analysis indicated that there is an effect of the usage of OTT platforms on students' academic performance, concentration and productivity, health and effective management of their time.

6. CONFLICT OF INTEREST

Authors have no competing interest. All authors have made equal contributions to the research work.

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APPENDIX

Academic life (SDA-Strongly disagree, DA-Disagree, N-Neutral, A-Agree, SA-Strongly agree)					
Academic Performance	SDA	SA	N	A	SA
There is no change in my academic performance as such because of using the OTT					
I am able to balance my academic work and watching OTT content					
My marks in exams have decreased because I spent more time on watching OTT					
I am more interested in OTT platforms than my online classes and assignments					
Usage of OTT platforms has improved my general knowledge					
Health					
I feel tiered or experience eyestrain/ headache/ migraine more frequently due to increased screen time on TV/computer/tabs/smart phone devices					
I do less physical exercise as I spend more time on OTT platforms					
My stress levels have significantly increased due to usage of OTT platforms					
Watching Videos or movies on OTT platforms helps me to reduce stress					
I sleep less because I spend more time on OTT					
Concentration and Productivity					
Usage of OTT platforms has improved my general knowledge					
My concentration levels have declined due to usage of OTT platforms					
Good internet connections and a computer/tab/smartphone encourage me to use OTT					
My productivity has reduced due to usage of OTT platforms					
I complete my work quickly to get more time to watch movies/ videos on OTT					
Time management					
I spend less time with my family because I watch OTT content alone for a long time					
I Watch OTT videos/movies with my family members					
I get less time or no time to work on my daily routines					
I get less time or no time to pursue my personal hobbies (reading, cooking, play, etc.)					
I get less time to socialize with friends					

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Usage of OTT
OTT video contents and characters inspired me to develop my personal skills
Due to usage of OTT platforms, I tend to procrastinate my academic work
Usage of OTT platforms helps me stimulate my creativity
Usage of OTT platforms has made me a more knowledgeable
Exposure to OTT content has increased my global awareness

Higher Tertiary Education Perspectives: Evaluating the Electronic Assessment Techniques of the Blackboard Platform for Fairness and Reliability

Perspectivas de la educación terciaria superior: evaluación de las técnicas de evaluación electrónica de la plataforma Blackboard para lograr equidad y confiabilidad

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ABSTRACT

The rapid digital transformation in the educational sector has prompted a shift towards online evaluation methods, raising questions about their efficacy, acceptance, and fairness. This study explored students' perceptions regarding electronic evaluation techniques facilitated by the Blackboard Learning Management System. Utilizing a descriptive quantitative research design, 400 participants were randomly selected from a tertiary institution to ensure varied representation. Data was methodically gathered through a bespoke questionnaire comprising 20 items, divided into three main factors, to capture nuanced insights on multiple facets of electronic assessment. The analysis revealed that weekly assignments were the preferred method for digital assessments among students, closely followed by real-time in-lecture questions. Other techniques, such as short tests and group discussion forums, were less prevalent, and traditional final examinations were the least preferred. Furthermore, there was a general high receptivity towards the electronic assessment methods, with a moderate trust in their fairness and reliability. These perceptions remained remarkably consistent regardless of gender or academic discipline. Such findings emphasize the pivotal role of electronic assessment platforms in shaping the academic landscape, hinting at their sustained significance in future educational paradigms. Drawing from these findings, several pedagogical implications have been put forth, accompanied by a delineation of study limitations and subsequent recommendations for future research.

KEYWORDS Assessment Techniques; Blackboard Learning Management System; Electronic Techniques; Reliability and Fairness; Student Perceptions; Tertiary Education.

RESUMEN

La rápida transformación digital en el sector educativo ha impulsado un cambio hacia métodos de evaluación en línea, planteando preguntas sobre su eficacia, aceptación y equidad. Este estudio exploró las percepciones de los estudiantes con respecto a las técnicas de evaluación electrónica facilitadas por el Sistema de Gestión de Aprendizaje Blackboard. Utilizando un diseño de investigación cuantitativa descriptiva, se seleccionaron aleatoriamente 400 participantes de una institución terciaria para asegurar una representación variada. Los datos se recopilaron metódicamente a través de un cuestionario personalizado compuesto por 20 ítems, divididos en tres factores principales, para capturar percepciones

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detalladas sobre múltiples facetas de la evaluación electrónica. El análisis reveló que las tareas semanales eran el método preferido para las evaluaciones digitales entre los estudiantes, seguido de cerca por preguntas en tiempo real durante las clases. Otras técnicas, como exámenes cortos y foros de discusión en grupo, fueron menos prevalentes, y los exámenes finales tradicionales fueron los menos preferidos. Además, hubo una alta receptividad general hacia los métodos de evaluación electrónica, con una confianza moderada en su equidad y fiabilidad. Estas percepciones permanecieron notablemente consistentes independientemente del género o la disciplina académica. Tales hallazgos enfatizan el papel pivotal de las plataformas de evaluación electrónica en la configuración del panorama académico, insinuando su significado sostenido en futuros paradigmas educativos. A partir de estos hallazgos, se han presentado varias implicaciones pedagógicas, acompañadas de una delimitación de las limitaciones del estudio y recomendaciones subsiguientes para investigaciones futuras.

PALABRAS CLAVE Técnicas de Evaluación; Sistema de Gestión de Aprendizaje Blackboard; Técnicas Electrónicas; Fiabilidad y Equidad; Percepciones Estudiantiles; Educación Terciaria.

1. INTRODUCTION

Amidst a backdrop of rapidly evolving technological paradigms, the global educational milieu has witnessed a transformative reorientation. In order to optimize processes and improve the quality of their offerings, academic institutions have increasingly anchored their operations in digital innovations. The Corona pandemic accelerated this technological trajectory, which was already in motion. The crisis rendered conventional educational architectures insufficient, necessitating a rapid transition to virtual pedagogic platforms (Ahmed et al., 2023; Iqbal et al., 2022). Previously viewed as a supplement to traditional education, E-learning has become crucial in maintaining the continuity of academic pursuits (Therisa Beena, & Sony, 2022).

Electronic assessment is a central component of this digital education revolution. E-learning solutions, exemplified by platforms like the Blackboard system, have assumed a central role in assessing student aptitude and performance (Hezam, & Mahyoub, 2022). Nonetheless, despite these digital tools' unrivalled flexibility and convenience, there has been an explosion of discussion regarding their efficacy, dependability, and objectivity. How do the primary stakeholders, the students, interpret and place their trust in these digital assessment techniques?

The significance of this study is substantial. The trajectory of contemporary education depends on the symbiotic convergence of technology and pedagogical principles. Should electronic assessment mechanisms, which are fundamental to this convergence, be perceived as compromized or biased, the structural integrity of contemporary pedagogical paradigms could be jeopardized. In recognition of this significance, the present study seeks to examine the dependability and impartiality of electronic assessment modalities, with a particular emphasis on the Blackboard ecosystem, through the lens of its most affected demographic: students.

This study aims to elucidate university students' perceptions regarding electronic assessment techniques within the Blackboard Learning Management System. This study is intended to focus on broader

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concerns regarding the veracity and fairness of such digital evaluation techniques in a constantly evolving educational environment. Given this, the subsequent research questions are scrutinized:

1. How do students perceive the electronic assessment techniques employed by faculty within the Blackboard platform at tertiary institutions?

2. What is the level of student receptivity towards the electronic assessment approaches utilized within the Blackboard platform?

3. What are students' views on the fairness and reliability of the electronic assessment strategies facilitated through the Blackboard platform?

4. How do variables such as gender and academic discipline influence students' perceptions of the reliability and fairness of electronic evaluations conducted within the Blackboard system?

2. LITERATURE REVIEW

2.1. Evolution of E-learning and Digital Pedagogy

The digital era brought about profound changes in numerous fields, but perhaps none more so than in education. Late in the 20th century, primitive computer-based training systems laid the groundwork for what we now refer to as 'e-learning' (Martin, & Bolliger, 2018; Padilla-Hernández et al., 2019). Although limited in scope and interactivity, these early systems departed from traditional educational methods by providing self-paced learning modules primarily utilizing digital technology as a content delivery mechanism (Agung et al., 2020). As the years progressed, the convergence of advancing technologies, particularly the introduction of the 'World Wide Web', propelled e-learning from these fundamental computer-mediated instructions to the dynamic, immersive, and collaborative virtual classrooms we are familiar with today (Al-khresheh, 2022a; Azizan et al., 2020). This shift did not merely reflect technological advancement and highlighted a complex tango between pedagogical innovations and technological affordances, constantly reshaping digital education's contours (Gonzales Tito et al., 2023; Meirbekov et al., 2022). Initially, e-learning was predominantly tied to specific locations, such as computer laboratories, where students interacted with static content. Modern e-learning environments are characterized by their emphasis on collaboration (Munir et al., 2022). The emphasis was primarily placed on self-directed, individualized learning. With the advent of the Internet in the late 1990s and early 2000s, e-learning began to realize its full potential. 'Web-based platforms' enabled dynamic content delivery, interactive multimedia, and, most significantly, real-time communication between students and instructors (Alenezi, 2023).

With the widespread adoption of Learning Management Systems (LMS), e-learning underwent a period of transformation. At the turn of the 21st century, platforms such as Moodle, Canvas, and Blackboard rose to prominence, presenting themselves as unified centres that combined curriculum design, content dissemination, student evaluation, and collaboration facilitation (Veluvali, & Surisetti, 2021). Among them, Blackboard, distinguished by its user-friendly interface and robust structure, has solidified its position as a top-tier option for educational institutions, demonstrating its adaptability to various educational strategies (Al-khresheh, 2021; Almoeather, 2020). However, these platforms' effects extended beyond the confines of

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content organization. They played a pivotal role in making education more accessible, removing geographical barriers, and ensuring all learners had access to high-quality content (Saadati et al., 2023). In addition, LMSs introduced a novel level of personalized learning experiences. Informed by data-driven insights, academic institutions began designing courses that resonated with the profiles of individual students, departing from the historically prevalent generic pedagogical models (Guoyan et al., 2023). This paradigm shift, ushered in by the capabilities of LMSs, exemplified the promise of technology: a force capable of not only replicating but also amplifying and redefining conventional educational pathways.

Alongside the rapid advances in technological innovation, educational theories and pedagogical practices adapted to exploit the full potential of these digital platforms evolved. The constructivist and connectivist educational paradigms stood out among these. Constructivism, which is rooted in the notion that learning is an active, constructive process, emphasizes the role of learners as the primary architects of their knowledge (Bizami et al., 2022; Ratten, 2023). Similarly, connectivism, introduced in the digital era, asserts that learning occurs within networks, advocating for technology integration and acknowledging the significance of social and cultural contexts in knowledge acquisition (Dziubaniuk et al., 2023). These theories highlighted the significance of learner autonomy, peer collaboration, and the establishment of dynamic knowledge ecosystems, particularly in the digital domain (Mampota et al., 2023). This pedagogical transformation was crucial. It ensured that emerging technological tools and platforms did not simply imitate traditional teaching paradigms. Instead, they ushered in a new era of education that emphasized a holistic, interconnected, and student-centred learning environment. By combining technology and these evolved teaching philosophies, a more engaging and responsive educational environment was created that was better suited to the requirements and opportunities of the digital age.

The landscape of digital education has witnessed a paradigmatic shift with the emergence of m-learning (mobile learning), a natural progression from e-learning spurred by the ubiquity of mobile technologies and pervasive Internet connectivity. This transition has revolutionized the educational sphere, placing learning resources directly at students' fingertips, and effectively dissolving the traditional constraints of geography and time. Such a transformation necessitates learning methodologies that are not only flexible and adaptable but also aligned with the dynamic digital context (Alenezi, 2023; Onyekwere, & Enamul Hoque, 2023).

However, alongside the myriad advantages of e-learning, it also introduces complex challenges, particularly in assessing learner performance within these digital realms. The diversification in content delivery modes, coupled with the trend towards individualized learning trajectories, has highlighted the limitations and inadequacies of conventional assessment methods. These traditional approaches often fail to address the unique needs and goals of e-learning environments, prompting a reevaluation of assessment strategies (Davidova, 2023). The expansion of e-learning platforms has, in turn, amplified the demand for innovative assessment methodologies. These methodologies need to be dependable and fair and tailored to the nuances of digital learning environments. Such assessment strategies are pivotal in validating the effectiveness of digital pedagogy and have garnered significant attention in recent scholarly discourse. The subsequent section aims to explore this critical area, scrutinizing the evolution, current challenges, and prospective advancements in electronic assessment techniques within the e-learning ecosystem.

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2.2. Electronic Assessment in E-Learning: Advancements and Challenges

Electronic assessment, also known as e-assessment, has become integral to modern e-learning, reshaping how institutions evaluate students' comprehension, skills, and competencies. Both technological capabilities and changing pedagogical approaches have contributed to this transformation.

The digital revolution of the past two decades has been instrumental in advancing and diversifying e-assessment methods. The voyage commenced with digitizing traditional paper-based tests, such as multiple-choice quizzes, transforming them into platforms that provide immediate feedback and automated grading (Bender, 2023). In the wake of technological advancements, electronic assessments have evolved in complexity. The introduction of adaptive testing systems allows for questions to be adjusted dynamically based on a student's real-time performance, fostering a more tailored assessment experience (Malik et al., 2019). Moreover, incorporating artificial intelligence (AI) into these systems has ushered in an era of timely and detailed feedback, guiding students to areas for improvement while reinforcing their understanding of well-understood topics (Huang et al., 2021).

Incorporating multimedia elements into e-assessments has markedly broadened their scope and application. Integrating video resources, sophisticated simulations, and immersive virtual reality environments is increasingly becoming a staple in modern assessment methodologies (AL-Qadri, & Zhao, 2021; Challa et al., 2010). These cutting-edge tools offer a replication of real-life scenarios, thereby providing a platform for students to exhibit not just their theoretical knowledge but also their practical skills, analytical prowess, and decision-making capabilities within complex, real-world contexts (Liu et al., 2020).

For example, in medical education, virtual surgery simulations have been instrumental in assessing the competencies of medical students, allowing them to navigate intricate surgical procedures in a controlled, risk-free environment (Lai, & Bower, 2019). Similarly, in architectural education, advanced 3D modelling tools enable aspiring architects to design and present their spatial concepts in detailed virtual environments. These immersive assessment tools not only evaluate the students' technical skills but also their creativity and problem-solving abilities in a more holistic manner. Such advancements underscore the evolution of assessment strategies, moving beyond traditional pen-and-paper tests to encompass dynamic, interactive, and highly engaging evaluation methods.

Increasingly, e-assessments have incorporated universal design principles in line with the global effort to promote inclusivity in the educational domain. This commitment ensures that assessment platforms remain accessible to learners with physical, cognitive, and sensory disabilities (Kiryakova, 2021). Modern e-assessment tools now include resizable text, image descriptors, voice-over explanations, and compatibility with screen-reading technologies, ensuring each student receives a fair assessment experience (Tang et al., 2022). This shift towards inclusivity not only exemplifies the moral imperatives of today's educational ethos but also highlights the capacity of technology to overcome traditional educational barriers (Al-Azawei et al., 2019).

Even though the road to wholly digitalized assessments has been paved with innovations, there have been obstacles. The issue of academic integrity ranks first among these concerns. The rise of remote e-assessments has brought to light issues such as plagiarism, student impersonation, and unauthorized assistance during online evaluations, raising concerns about the reliability of digital examination formats (Guangul

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et al., 2020). In addition, the persistent problem of the 'digital divide' adds complexity. Despite being adaptable and dynamic, E-assessments rely on dependable internet connections and functional devices. Nonetheless, equitable access to these technological amenities remains inequitable, potentially generating disparities in student experiences and outcomes (Al-Maqbali & Raha Hussain, 2022; Kashyap et al., 2021).

Educational assessment is undergoing a significant transformation with AI and machine learning innovations. This notable shift is acutely observed in educational digital platforms, such as Blackboard, which progressively integrate AI-enhanced tools to innovate traditional assessment methods (Al-khresheh, 2021). The ability of AI to process and analyze extensive data sets facilitates the creation of tailored and adaptive assessment frameworks, thus accommodating diverse learning trajectories (Guangul et al., 2020). Furthermore, AI-powered algorithms are pivotal in streamlining the grading process, delivering immediate feedback to learners, and pinpointing improvement areas (Kiryakova, 2021). Despite these advancements, the employment of AI in assessments brings crucial ethical concerns and questions of fairness to the fore. Issues such as the risk of algorithmic bias, the safeguarding of data privacy, and the imperative for human intervention in AI-driven assessments are central themes in recent academic discourse (Fauzani et al., 2021).

The shift towards digital assessments represents both an opportunity and a challenge for teachers. While e-assessments provide opportunities for innovative teaching and testing methods, they also require teachers to be proficient in both the nuances of pedagogy and the technicalities of digital platforms (Fauzani et al., 2021; Rajesh, & Sethuraman, 2020). Such multifaceted knowledge necessitates consistent training and skill development, highlighting the intertwined nature of pedagogical insight and technological proficiency in the modern education sector (Garg, & Goel, 2022). In addition, as institutions navigate this digital transition, it is imperative that the fundamental principles of assessment, such as impartiality, transparency, and validity, remain intact, emphasising the delicate balance that must be achieved in the digital age of education.

In conclusion, electronic assessment in e-learning offers numerous advancements that align with contemporary pedagogical approaches and provide greater flexibility and adaptability. Nonetheless, educational institutions must confront inherent challenges. As we transition to investigating the role of LMSs such as Blackboard in e-assessment, these broader trends and challenges provide the context for a more in-depth examination of student perceptions and experiences within these platforms.

2.3. Student Perceptions and Experiences with E-learning Platforms: A Focus on Blackboard

The world of e-assessments, catalyzed by technological advancements, hinges significantly on the acceptance and trust of its primary stakeholders-students. Their perceptions and comfort levels are crucial in determining the durability and success of these evaluation instruments. The quality and immediacy of feedback from digital platforms have contributed significantly to these perceptions. The ability of educational systems to provide immediate feedback has always been a significant factor in their popularity. The research of Habib et al. (2020) confirms this, demonstrating how real-time feedback not only accelerates the understanding of concepts but also revitalizes student motivation and enhances confidence. Based on the principles of formative assessment, this immediate feedback creates an interactive cycle that enables students to identify their strengths and improvement areas quickly. Enriched by technological advancements,

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the breadth and quality of this feedback provide students with a comprehensive analysis of their performance, frequently coupled with additional resources to clarify concepts further (Rakha, 2023). Nonetheless, this digital boon comes with a caveat. The speed must be accompanied by pedagogical rigour. If a swift response is devoid of educational content, it can inadvertently result in student misunderstandings and a decline in motivation (Haleem et al., 2022).

Despite these technological marvels, e-assessments are not without their detractors. The impersonal nature of digital evaluations is one of the student concerns most frequently voiced. As articulated by Al-Maqbali and Raha Hussain (2022), while algorithms may evaluate responses quickly, they may overlook the depth and nuances that a human assessor would capture. This is amplified in high-stakes exams, where the inflexibility of digital systems and the fear of potential technical glitches can substantially heighten student anxiety (Aburumman, 2021; Fauzani et al., 2021; Marevci, & Salihu, 2023).). As we transition to the topic of e-assessment impartiality, there is an inevitable overlap with potential biases. The underlying assumption — that every student is on an equal digital footing — often fails to account for the realities of diverse socioeconomic backgrounds, technological literacy levels, and infrastructural disparities (García-Morales et al., 2021; Hosseini et al., 2021). Addressing these disparities requires recognizing and acting on the diverse requirements of students, particularly those with disabilities (Dahlstrom-Hakki et al., 2020).

The rise of Blackboard as a leading platform in e-assessment has catalyzed a plethora of scholarly investigations, delving into its multifaceted characteristics and implications in digital education (Baron, 2023). Over recent years, the academic focus has increasingly turned towards evaluating Blackboard's user experience, seamless integration capabilities, and adaptability, especially in the rapidly changing landscape of online education. This scrutiny has become particularly pertinent in the wake of global crises, such as the COVID-19 pandemic, which have necessitated a swift and comprehensive shift to digital learning modalities (Alam et al., 2023; Alblaihed, 2023; Al-khresheh, 2022a; Rakha, 2023).

Significant research has explored how Blackboard facilitates a user-friendly interface that enhances teaching and learning experiences. Studies have emphasized its role in simplifying the transition to online platforms for educators and students, mitigating potential disruptions in educational continuity (Alam et al., 2023). Moreover, Blackboard's capacity for integrating various digital tools and resources has been a subject of considerable interest, illustrating its effectiveness in creating a cohesive and interactive learning environment (Al-khresheh, 2022a). The platform's adaptability, particularly in rapidly evolving scenarios like the pandemic, has also been extensively examined. Researchers have noted how Blackboard has evolved to meet educational institutions' diverse and changing needs, ensuring uninterrupted learning processes and facilitating the implementation of innovative pedagogical strategies (Alblaihed, 2023; Rakha, 2023).

Nonetheless, a nuanced and largely unexplored area of interest remains beneath the breadth of general assessments. Specifically, while numerous studies have cast light on the overall user experience with Blackboard (Almufarreh et al., 2021; AlTameemy et al., 2020; Alyadumi & Falcioglu, 2023; Baig et al., 2020), little attention has been paid to student perceptions of the platform's e-assessment techniques, particularly regarding their fairness and dependability. Although broad feedback may indicate overall platform contentment, it is essential to dig deeper. Students may have reservations about certain e-assessment features, querying whether or not they provide an accurate reflection of their competencies or whether or

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not they can reliably assess their knowledge. Some preliminary research, such as the insights provided by Tseng (2020), has hinted at these complexities, suggesting that students' perceptions may vary based on demographic or technological factors. However, these preliminary analyses leave vast areas of this topic largely unexplored. As academic institutions rely more and more on platforms like Blackboard for comprehensive assessment, it becomes crucial to understand these complex student perspectives. In addition to having academic ramifications, it is essential to ensure that the evolution of digital education remains equitable and comprehensive. This noticeable research gap necessitates a more in-depth and targeted investigation into student experiences' nuances and e-assessment techniques' evaluations on platforms such as Blackboard.

3. MATERIAL AND METHOD

3.1. Research design

The study employs a descriptive quantitative design that has been carefully chosen for its capacity to capture and quantify the depth and breadth of students' perspectives on the electronic assessment techniques of the Blackboard platform, particularly concerning impartiality and reliability. This method utilizes the power of numerical data to provide precise, quantifiable insights, thereby assuring both precision and clarity (Slattery et al., 2011). When dealing with larger sample sizes, such as the 400 undergraduates in this study, the richness of this design is further accentuated, as it provides statistical robustness and meaningful insights across a diverse student population. The non-interventionist nature of this design is one of its chief advantages. Not manipulating variables guarantees genuine, unadulterated responses that accurately reflect the respondents' sentiments. This guarantees the integrity of the collected data, rendering it a representative snapshot of prevalent perceptions and attitudes, thereby enhancing the overall dependability and credibility of the research.

3.2. Participants

The study involved a diverse group of 400 undergraduate university students, selected using a random sampling technique to ensure a representative sample of the entire student body. The gender distribution was reasonably balanced, with 215 females representing 53.8% of the population and 185 males representing 46.3%. In addition, the participants' academic backgrounds were almost evenly distributed between the two main faculties. 48%, or 192 participants, were students from scientific faculties, which typically emphasize systematic and data-driven learning approaches. On the other hand, students from Humanistic faculties, known for cultivating interpretive and critical thinking skills, comprised a slight majority of 52% (208 participants) of the sample. This balanced academic and gender distribution guarantees a comprehensive and holistic reflection of diverse student perspectives, thereby enhancing the validity of the research outcomes. Table 1 below displays their characteristics:

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TABLE 1. Characteristics of the study participants.

Variables		Frequency	Percentage
Gender	Female	215	53.8%
	Male	185	46.3%
Faculty	Scientific	192	48.0%
	Humanistic	208	52.0%

3.3. Instrumentation

Questionnaires stand as one of the quintessential tools in research, especially when delving into percep-tions, attitudes, and experiences (Ball, 2019). Their structured format and ability to reach a broad audience make them an invaluable asset for obtaining reliable and scalable data. In line with this rationale, a compre-hensive questionnaire was crafted for this study to probe into the university students' perceptions concer-ning the reliability and fairness of Blackboard's electronic evaluation mechanisms.

Drawing inspiration from an exhaustive review of related literature and relevant studies (Almufarreh et al., 2021; AlTameemy et al., 2020; Baig et al., 2020), this instrument encompassed a total of 20 insightful items strategically delineated across three pivotal dimensions:

1. Exploration of the electronic evaluation techniques via Blackboard that faculty members deploy, with responses anchored to a straightforward binary scale (yes or no). This dimension includes seven items.

2. The degree of students' receptivity towards these electronic assessment paradigms, measured through a nuanced five-point Likert scale from 5 (signifying strong agreement) to 1 (indicating strong disagreement). Seven items are comprised in this dimension.

3. In-depth assessment of students' perceptions of the robustness (reliability) and equity (fairness) of the Blackboard's electronic evaluations, solicited via a similarly structured five-point Likert scale. Six items are involved.

3.4. Data Collection and Analysis

Utilizing the availability and pervasiveness of online platforms, the survey was distributed via Google Forms. This platform was chosen due to its popularity among students and its streamlined design, which ensures usability and quick response acquisition. Moreover, for the academic year 2022-2023, it was essential to capture data digitally to maintain efficiency and ensure a broad reach.

After collecting the data, a comprehensive analysis was conducted using the advanced capabilities of SPSS version 26, the industry standard for social research analytics. This dependable software provided the instruments required for a comprehensive dataset evaluation. Frequency and percentage analyses illumi-nated general trends, while arithmetic means and standard deviations delved into the fundamental cha-racteristics and dispersion of the responses. A two-way ANOVA was used to enhance the profundity of the analysis. This method identified significant differences or overlaps between categories, such as gender and

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faculty type. Using this layered analytic approach, the research intended to provide stakeholders with actionable insights regarding students' perceptions of the Blackboard platform.

3.5. Instrumentation Validity and Reliability

To ensure the instrument's validity and resonance with academic standards, a panel of academicians specializing in education and psychology subjected the preliminary version of the questionnaire to rigorous scrutiny. Their invaluable feedback served as a linchpin for refinement. Items garnered an agreement rate of 90% or more were retained, while others were fine-tuned or jettisoned based on the panel's recommendations. After an exhaustive review, the initial questionnaire containing 23 items was refined to produce a final instrument consisting of 20 pertinent items.

Ensuring that the instrument was not just valid but also reliable was of paramount importance. An in-depth examination of its internal consistency was conducted by determining the correlation coefficients for each dimension. The values for the first dimension ranged between 0.57 and 0.79, the second dimension between 0.64 and 0.82, and the third dimension from 0.61 to 0.85. The overall correlation of the dimensions with the questionnaire's total score further accentuated the instrument's reliability, with values of 0.92, 0.88, and 0.93 for the first, second, and third dimensions, respectively. All correlation coefficients were significant at 0.001, indicating strong internal consistency and affirming the items' alignment with their respective dimensions.

To ascertain the factorial validity of the instrument, an exploratory factor analysis (EFA) was conducted using the Principal Components extraction method. The Varimax rotation method was orthogonal to isolate factors by prioritizing items demonstrating the highest degree of saturation post-rotation. Items manifesting saturations over 0.4 were selectively categorized based on the factor where maximal saturation was exhibited. It was observed that several items demonstrated saturation across multiple factors. The EFA delineated three distinct factors, collectively accounting for 20 saturated items. The cumulative variance elucidated by these factors amounted to 59.94%. The inaugural factor encapsulated seven items and had an eigenvalue of 4.20, elucidating 25.51% of the aggregate variance. The subsequent factor enveloped seven distinct items, registering an eigenvalue of 4.15 and expounding 18.27% of the aggregate variance. The tertiary factor incorporated six items, with an eigenvalue of 3.88, illuminating 16.16% of the overarching variance.

To rigorously assess the hypothesized item-factor loadings, a Confirmatory Factor Analysis (CFA) was executed employing the Maximum Likelihood Method, facilitated by the LISREL software suite. This analysis unambiguously validated the tri-factorial construct of the instrument. Empirical outcomes revealed path coefficients for the constituent items of the scale oscillating between 0.46 and 0.93, all manifesting pronounced statistical significance at the $P \leq 0.01$ threshold. The chi-square ($\chi2$) diagnostic registered a value of 618.43 with an associated 149 degrees of freedom and a significance level anchored at $P \leq 0.001$. This translates to a ($\chi2/df$) ratio of 4.15, signifying an optimal fit of the conceptual model to the collated data. Table 2 enumerates the goodness-of-fit indices (RMSEA, GFI, AGFI, NFI), with each metric aligning within its ideal range. This corroborates the robustness of the model's alignment with the empirical dataset and attests to the instrument's factorial integrity. Figure 1 provides a graphical representation of the scale's confirmatory factor structure, whereas Figure 2 delineates the second-tier confirmatory factor analysis related to the instrument.

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TABLE 2. Goodness-of-Fit Indices for the Model.

	χ2(df), p-value	χ2/df	CFI	GFI	NFI	PGFI	RMSEA
CFA Model	618.43 (149), p < 0.001	4.15	0.93	0.90	0.91	0.68	0.043

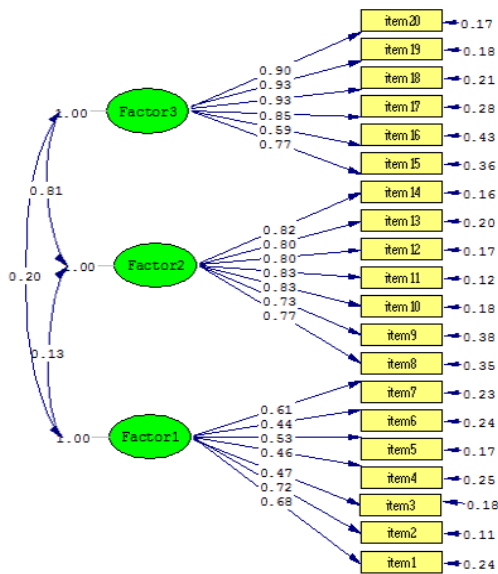**Figure 1.** Confirmatory Factor Analysis Model.

Figure 2. Second-Order Latent Factor Model.
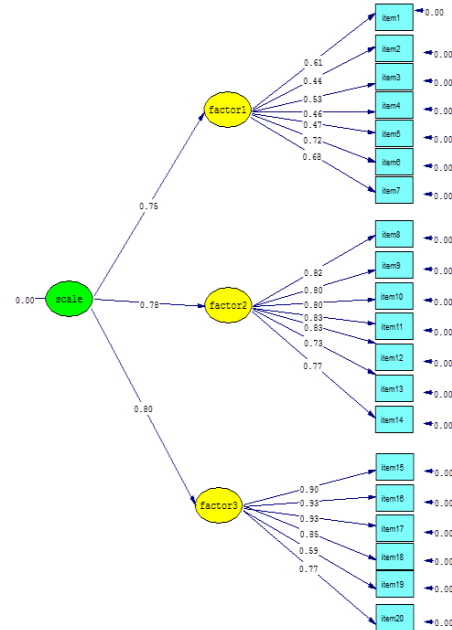
The scale's dimensions' internal consistency was ascertained using Cronbach's Alpha. The coefficients yielded were 0.77 for the primary dimension, 0.81 for the secondary dimension, 0.80 for the tertiary dimension, and an overarching 0.89 for the cumulative score of the scale. These metrics are deemed statistically robust and are within acceptable thresholds.

3.6. Ethical Considerations

Central to this research was a steadfast commitment to the highest ethical standards. To ensure transparency, the study's primary purpose was conspicuously displayed on the first page of the questionnaire so that participants had a clear understanding of the purpose of the research. Participants' anonymity and confidentiality were guarded with the utmost care, and their identities remained concealed. Each student was apprised of the study's objectives, and their participation was emphasized as voluntary. In addition, they were informed of their rights, including the ability to withdraw at any time. The study maintained a neutral stance, averting bias or undue influence, thereby protecting the results' veracity and credibility.

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4. RESULTS

Upon comprehensive collation and examination of the participants' responses, insights emerged concerning the first dimension, which focused on the predominant electronic evaluation methods employed by university faculty members. As illustrated in Figure 3, the weekly assignment technique emerged as the most frequently utilized approach. This was closely followed by real-time in-lecture queries. Subsequent methods in decreasing order of prevalence included short tests, group discussion forums, individual discussion panels, and video conferencing sessions between teachers and students, culminating with final examinations.

FIGURE 3. Electronic evaluation techniques most commonly employed by teaching staff.
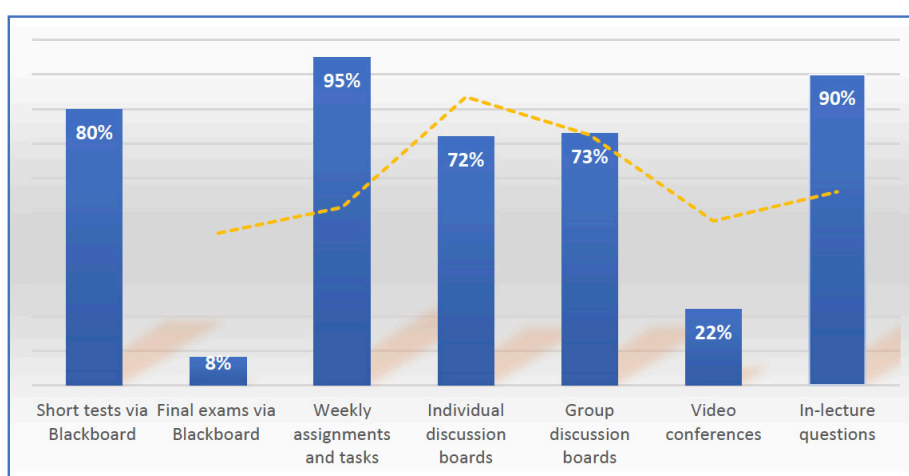
Table 3 provides an exhaustive overview of the mean perceptions of students concerning the acceptability of Blackboard's electronic assessment methods. The data reflects students' opinions regarding electronic assessments on the Blackboard platform. Overall, the results indicate that students prefer electronic assessment methods on Blackboard, as indicated by the mean of 3.42 and the standard deviation of 0.71. This demonstrates both a positive aggregate response and consistency among student opinions. Examining specific elements, the statement with the highest mean (3.54) indicates students' preference for Blackboard-based electronic performance evaluations. This implies their adaptability to digital platforms and an appreciation for their efficiency and immediacy benefits. Other highly rated items highlight the coherence of electronic evaluations with instructional content, the faculty's initiative in online assessments, and the promptness of feedback – all of which are integral to the educational process. In contrast, the items with slightly lower mean scores concern the faculty's use of Blackboard to moderate discussions and administer assignments. This may indicate a nuanced predilection on the part of students, in which they place assessment techniques slightly above course management capabilities.

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TABLE 3. Students' Perceptions on Accepting Blackboard's Electronic Assessment Methods.

No	Item	Mean	SD	Acceptance level
item12	My preference leans towards undergoing performance evaluations utilizing electronic assessment modalities within the Blackboard platform.	3.54	0.82	High
item13	I contend that electronic assessment methods on Blackboard align seamlessly with the course's instructional content.	3.49	0.90	High
item10	The initiative academic staff took to administer electronic examinations on the Blackboard platform meets with my approval.	3.47	0.90	High
item14	Timely feedback on electronic assessment outcomes, as provided by faculty via Blackboard, garners my appreciation.	3.42	0.92	High
item11	The prompt dissemination of our semesterly academic achievements on the Blackboard system by faculty members is commendable.	3.40	0.87	High
item9	Faculty use of the Blackboard platform for curating course-related discussion forums and panels resonates positively with me.	3.34	0.93	Moderate
item8	I value the faculty's diligence in employing the Blackboard platform to submit and rectify course-centric assignments.	3.30	0.94	Moderate
TOTAL		**3.42**	**0.77**	**High**

Students' perspectives regarding electronic assessment methods enabled by the Blackboard platform are presented in descending order of mean values in Table 4. The overall trend demonstrates that students have a moderately positive attitude towards these methods, as evidenced by a mean of 3.23 and a standard deviation of 0.75. This indicates that opinions continue to vary despite a consensus regarding the moderate favourability of Blackboard's electronic assessments. The sentiment regarding the dependability of video conference evaluations has the highest mean, 3.40, among these perceptions. This emphasizes the students' confidence in real-time, interactive assessment methods. The subsequent items emphasize the significance of equity and impartiality, with a mean score of 3.31 for prompt assessment feedback, demonstrating the students' appreciation for timely communication. However, as we move towards the bottom of the table, the mean values decrease slightly. 2.96 is the lowest score representing the congruence between electronic evaluation scores and students' competencies. This may imply scepticism regarding the veracity of online assessment results. The scores for the other items concerning impartiality, equity, and diverse assessment methods indicate that Blackboard's efforts in these areas are generally acknowledged but suggest improvement.

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TABLE 4. Students' Perceptions on Electronic Assessment via Blackboard in Descending Order.

No	Item	Mean	SD	Acceptance level
item16	The electronic evaluation conducted through video conferences between instructors and students exhibits significant reliability.	3.40	0.87	High
item20	Prompt feedback on electronic assessment outcomes via the Blackboard system is deemed to uphold the principle of equity among students.	3.31	0.97	Moderate
item19	The varied assessment methodologies implemented on the Blackboard system are believed to accommodate individual student variances.	3.25	0.98	Moderate
item17	Evaluation techniques utilized within the Blackboard system are thought to epitomize the essence of fairness for all students.	3.23	0.98	Moderate
item18	The adherence to stringent control measures in electronic evaluations via the Blackboard system is instrumental in ensuring student equity.	3.20	1.02	Moderate
item15	Scores attained by students in electronic evaluations through the Blackboard system are believed to mirror their actual proficiency authentically.	2.96	0.99	Moderate
TOTAL		**3.23**	**0.81**	**Moderate**

To rigorously analyze the disparities in students' perceptions concerning the reliability and fairness of electronic assessment approaches facilitated through the Blackboard platform, arithmetic means were computed, and categorized by the specific dimensions of gender and academic discipline, as presented in Table 5.

TABLE 5. Arithmetic Averages Based on Each Tier of the Study Variables.

Faculty	Gender	Mean	N	Std. Deviation
Scientific	Female	3.3044	98	.73803
	male	3.1578	94	.92888
	Total	3.2326	192	.83794
Humanistic	Female	3.2550	117	.75954
	male	3.1722	91	.79755
	Total	3.2187	208	.77559
Total	Female	3.2775	215	.74847
	male	3.1649	185	.86445
	Total	3.2254	400	.80513

Table 5 provides the mean perception scores and standard deviations by faculty type and gender. Females had a mean score of 3.3044 in the Scientific faculty, while males earned a score of 3.1578. The overall mean for the Scientific faculty is 3.2326 when both genders are considered. Females averaged 3.2554, and males averaged 3.1722, a total mean of 3.2187 for the Humanistic faculty. Overall, female participants had a mean score of 3.2775, while males had a mean of 3.1649, with a total mean of 3.2254 for all 400 respondents. There are subtle differences in perceptions between genders and faculties, but the overall sentiment is consistent. To discern the statistical implications of these evident disparities as per the categories (gender and academic department) and their ensuing interactions, a Bivariate Analysis of Variance (Two-Way ANOVA) was applied, as expounded in Table 6.

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TABLE 6. Bivariate ANOVA Results on Students' Perceptions of Electronic Assessment via Blackboard (Gender & Department).

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Gender	1.304	1	1.304	2.007	.157
Faculty	.030	1	.030	.047	.829
Gender * Faculty	.101	1	.101	.155	.694
Error	257.245	396	.650		
Total	4419.972	400			
Corrected Total	258.647	399			

Table 6 shows the ANOVA findings for gender and faculty on students' perceptions of electronic assessment via Blackboard. The p-value for gender is.157, showing that gender has no significant influence on students' viewpoints, as it is above the conventional significance level of.05. Similarly, the faculty has a p-value of 0.829, indicating that it has no significant influence on students' opinions. The interaction effect of gender and faculty, labeled "Gender * faculty" in the table, has a p-value of.694, indicating that this combined factor is not a significant predictor of students' perceptions. In summary, the ANOVA results in Table 5 show that gender, faculty, and their interaction had no significant impact on participants' perceptions of Blackboard's electronic assessment.

5. DISCUSSION

The data indicated a diverse assessment environment to answer the first research question about how students evaluate the electronic assessment techniques used by teachers within the Blackboard Learning Management System at tertiary institutions. Weekly assignments are prominent because faculty members value constant, ongoing contact with students. This technology not only allows teachers to track students' academic progress in real-time, but also allows them to fine-tune their educational techniques based on rapid feedback. The second most popular strategy was real-time in-lecture questioning, emphasizing the importance of live student interaction and understanding checks during online lectures. Such real-time interactions are invaluable in a virtual classroom environment, where typical indications of student perplexity or attention may go unnoticed.

Surprisingly, the study discovered a lower reliance on final exams in the digital format. This tendency may reflect an emerging educational perspective shifting away from high-stakes, end-of-term evaluations, particularly in an online format. This could be due to various factors, including logistical issues, potential academic integrity concerns in remote settings, or the inherent limits of online exam administration. Instead, there is a clear shift towards more formative, consistent examinations that give students continuous feedback and opportunities for progress.

These findings are consistent with recognized educational ideas and research compared to previous studies. Bender (2023) has emphasized the increased support for learning provided by continuous input instead of episodic feedback. The shift towards active learning approaches, supported by scholars such as Ahmed et al. (2023), enhances student participation, which is especially important in virtual classrooms.

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Furthermore, the difficulties in preserving academic integrity in online examinations, as investigated by Al-Maqbali and Raja Hussain (2022), may have accelerated the migration to other assessment forms judged less prone to academic misconduct.

To answer the second research question on students' receptivity towards the electronic assessment techniques within the Blackboard system, the insights obtained from the data are insightful. The overall mean score of 3.42 indicates that students have a high preference for electronic assessment procedures. This is emphasized further by the mean score of item (12), which demonstrates students' preference for computerized performance evaluations on the Blackboard platform. A closer look at the students' responses indicates a variety of explanations for their selection. The efficiency provided by computerized assessments is at the heart of this attitude. The simplified form of online exams, from electronic submission to automated grading for specific question types, and the speedy transmission of findings, contrasts sharply with older approaches. Because of the increased efficiency, students can immediately determine their academic standing, allowing them to fine-tune their study habits in real-time. Furthermore, the near-instant feedback that platforms like Blackboard can provide is crucial. Unlike traditional approaches, which require students to wait weeks for feedback on their performance, electronic evaluations encourage a proactive learning environment by enabling students to identify areas for growth and engage with the material more thoroughly.

Furthermore, the adaptability inherent in computerized examinations is critical. They can effortlessly include various question types, such as multiple-choice and short-answer questions, interactive quizzes and forum-based debates. This range of evaluation systems guarantees that different learning styles are accommodated, fostering a more inclusive academic atmosphere. Such an approach can resonate strongly with kids, giving them numerous opportunities to demonstrate their understanding and skill sets. In a broader context, it is clear that digital integration in modern life has conditioned students to not only adapt to but also demand technology in their educational experiences. Growing up in a digitally dominated environment suggests that the current tertiary education cohort is well-versed in online tools. This comfort and familiarity with digital platforms may be the key to their overwhelming acceptance and favourable reception of Blackboard for academic exams.

When these data are contextualized with previous literature, it is clear that there is an increasing acceptance of digital learning platforms across student groups. For example, Ahmed et al. (2023) found that students perceive online learning environments as engaging and beneficial to their learning objectives. These platforms frequently give individualized and rapid feedback, which has been identified as an essential aspect of improving learning experiences. Furthermore, as Al-khresheh (2022b) emphasizes, the demand for electronic exams on platforms such as Blackboard reflects the trend towards using assessment as a learning tool rather than just a measurement tool. Given these widespread tendencies and supporting data, the current study's favourable student response coincides with broader worldwide educational changes.

In addressing the third research question associated with students' views on the fairness and reliability of the electronic assessment strategies within the Blackboard platform, the privilege of findings offers several layers of understanding. The statistics show that students have a reasonable level of trust in these electronic evaluation approaches. The overall mean number indicates a moderate level of dependability. This implies that while students generally trust electronic evaluations, there may be areas of scepticism

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or concern. A closer look at individual questions indicates, for example, that students have a median level of confidence in the accuracy of ratings from electronic exams representing their genuine proficiency. This indicates a balance in student perceptions: they see the benefits of electronic evaluation. However, they may also be concerned about its drawbacks, such as potential technology glitches or a lack of personal involvement in the assessment process.

Previous research, drawing on existing literature, discovered mixed student opinions towards online exams. Many students appreciate the flexibility and immediacy of online evaluations (Garg, & Goel, 2022). However, there are legitimate worries regarding the depersonalization of these evaluations, the risk of technological challenges, and the difficulty of guaranteeing equality and fairness in a remote testing context (Guangul et al., 2022; Kashyap et al., 2021). As a result, the study's moderate degree of confidence is consistent with previous academic findings, showing the ongoing dialogue between the benefits of digital innovation and the intricacies of human connection in educational evaluation procedures.

A deep exploration of the segmented data was done to address the final study question addressing the influence of characteristics such as gender and academic discipline on students' opinions of the trustworthiness and fairness of electronic evaluations within the Blackboard system. There are no statistically significant changes in perceptions depending on gender or faculty type, according to the data. Male and female students, regardless of whether they were affiliated with scientific or humanistic faculties, expressed comparable feelings about electronic assessment systems. This could indicate that the Blackboard platform provides a consistent user experience, or it could reflect a broader cultural or institutional environment that fosters shared perspectives across various demographic groups. Notably, the lack of substantial interaction between gender and academic discipline shows that these variables do not strongly influence students' perceptions when combined.

Drawing on previous research, the similarity in perceptions across genders is consistent with studies demonstrating the impact of technology on learning for both male and female students (Al-khresheh, 2022). Furthermore, while some research has found differences in perceptions depending on academic disciplines in traditional learning contexts (Almoeather, 2020; Azizan et al., 2020), the findings indicate that such distinctions may be less prominent in an online environment. This could highlight the potential of digital learning platforms to provide more consistent access and experiences than traditional classroom settings.

5.1. Implications

This study's findings provide significant insights for institutions and teachers employing or seeking to implement electronic evaluation methodologies, particularly within the Blackboard Learning Management System. The preference for weekly assignments demonstrates the importance of continuous assessment in contemporary educational settings. This continuous monitoring provides immediate feedback and can significantly improve student retention and engagement. Moreover, the positive reception of real-time in-lecture questions and discussions demonstrates the effectiveness of blended learning. Educational institutions must prioritize faculty training in seamlessly integrating these real-time interactions with traditional and online teaching methods.

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The prevailing sentiment regarding the impartiality and dependability of electronic examinations on Blackboard indicates room for improvement. Institutions of higher education should focus on refining their online assessment protocols, possibly through sophisticated monitoring tools or the creation of assessments explicitly designed for the digital environment, to ensure integrity and fairness. Similarly, the consistent perception across gender and academic disciplines demonstrates the universal applicability of Blackboard. Such consistency suggests that platform enhancements or modifications would benefit many students, obviating the need for demographically targeted interventions.

The positive trend towards electronic evaluations within Blackboard allows curriculum designers to investigate this technological direction further. Continuous research and monitoring are required to ensure these innovations remain effective and equitable. As the platform's primary stakeholders, the high acceptance rate among students makes their feedback invaluable. Institutions should actively engage with students, using their feedback to refine practices to ensure that educational strategies remain adaptable and in sync with students' changing needs and preferences.

6. CONCLUSIONS

This research explored student perceptions regarding electronic assessment techniques within the Blackboard Learning Management System. The main findings revealed a strong preference among students for digital assessment strategies, particularly ongoing assessment mechanisms such as weekly assignments. In addition, students exhibited a high level of receptivity towards the diverse electronic assessment modalities made available through Blackboard, demonstrating the efficiency and adaptability of these assessment tools. Concerning the impartiality and dependability of these digital tools, students' confidence in the system's methods was moderate. Intriguingly, when evaluating perceptions based on gender and academic discipline, the results demonstrated uniformity, indicating a unified viewpoint among diverse student demographics. This study highlights a prevalent trend in which digital assessment tools, mainly via Blackboard, are highly regarded and integral, indicating a promising future for continued incorporation into higher education paradigms.

6.1. Limitations and future lines of research

This study, conducted at a single university, makes several noteworthy observations regarding students' perceptions of Blackboard electronic assessments. However, its extent is limited. The pedagogical approach, technological infrastructure, and demographic nuances of this institution may differ significantly from those of other academic institutions, reducing the universal applicability of the findings. Moreover, the self-reported nature of the data collection may introduce biases, either due to respondents' propensity to provide socially desirable responses or potential misinterpretations. The study's granularity did not extend to examining differences between faculties or courses, which may employ distinct electronic evaluation strategies.

Given these constraints, future research would benefit significantly from a broader, perhaps inter-institutional or international perspective. This broader scope could provide a more complete comprehension,

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highlighting best practices and subtle differences in students' perceptions across diverse educational environments. Incorporating mixed-method research designs combining quantitative and qualitative approaches may yield more profound and nuanced insights. In addition, as educational technologies continue to advance, with the incorporation of tools such as artificial intelligence, virtual reality, and sophisticated analytics, a forward-looking research strategy should be employed to investigate their potential symbiosis with established platforms such as Blackboard, ensuring that evaluations remain relevant and optimized in a rapidly evolving digital educational ecosystem.

7. FUNDING

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Kyrgyz Students' Acceptance of QR Code Use in Organic Chemistry Course

Aceptación de Estudiantes Kirguís del Uso de Códigos QR en un Curso de Química Orgánica

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ABSTRACT

Science disciplines require a deeper study of theoretical material by performing laboratory work, which includes performing experiments. In this regard, it will be useful to actively introduce new technologies into the educational process. In this study, QR codes were integrated into the Organic Chemistry Course textbook to direct university and high school students to the appropriate videos about the experiments. In this respect, this study aimed to analyze university and high school students` acceptance of the QR code technology used in the "Organic Chemistry" course. This research model is based on the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology2 (UTAUT2). Hence, the study included perceived playfulness, social influence, facilitating conditions, hedonic motivation, perceived ease of use, perceived usefulness, behavioral intention, and attitude as the major antecedents of students' acceptance of QR codes. In total, 204 Kyrgyz students in university and high school level participated in this study. Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis was applied to analyze the effects of factors on students' acceptance of QR codes. The study revealed that facilitating conditions, hedonic motivation, social influence, perceived ease of use, and perceived usefulness are the significant factors towards students' acceptance of QR code use in Organic Chemistry course.

KEYWORDS Instructional videos; Organic chemistry; QR code; Technology acceptance.

RESUMEN

Las disciplinas científicas requieren un estudio más profundo del material teórico mediante la realización de trabajos de laboratorio, que incluyen la realización de experimentos. En este sentido, será útil introducir activamente nuevas tecnologías en el proceso educativo. En este estudio, se integraron códigos QR en el libro de texto del Curso de Química Orgánica

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para dirigir a los estudiantes universitarios y de secundaria a los videos apropiados sobre los experimentos. En este senti-do, este estudio tuvo como objetivo analizar la aceptación de la tecnología de códigos QR utilizada en el curso de "Química Orgánica" por parte de estudiantes universitarios y de secundaria. Este modelo de investigación se basa en el Modelo de Aceptación de Tecnología (TAM) y la Teoría Unificada de Aceptación y Uso de Tecnología2 (UTAUT2). Por lo tanto, el estudio incluyó la alegría percibida, la influencia social, las condiciones facilitadoras, la motivación hedónica, la facilidad de uso percibida, la utilidad percibida, la intención conductual y la actitud como los principales antecedentes de la aceptación de los códigos QR por parte de los estudiantes. En total, participaron en este estudio 204 estudiantes kirguís de nivel universitario y secundario. Se aplicó el análisis de modelos de ecuaciones estructurales de mínimos cuadrados parciales (PLS-SEM) para analizar los efectos de los factores en la aceptación de los códigos QR por parte de los estudiantes. El es-tudio reveló que las condiciones facilitadoras, la motivación hedónica, la influencia social, la facilidad de uso percibida y la utilidad percibida son factores importantes para la aceptación del uso de códigos QR por parte de los estudiantes en el curso de Química Orgánica.

PALABRAS CLAVE Videos instructivos; Química orgánica; Código QR; Aceptación de tecnología.

1. INTRODUCTION

QR codes can be used in education as a tool that arouses attention and intellectual activity of students, and enhances their enthusiasm in learning (Mileva, & Stoyanova, 2017). In education, QR codes can be used for sharing content, engaging learners having various needs and facilitating learning (Abdul Rabu et al., 2019). The utilization of QR codes gives fast access to the essential materials for the study of this topic and allows the student not to spend time searching for the necessary information (Uçak, 2019).

The literature review revealed that there are existing studies that analyzed teacher and student percep-tions related to the use of QR codes in education. For instance, Ali et al. (2017) showed that teachers perceive QR codes as simple and effective tools to support educational activities. Moreover, learners are also satisfied about the use of this technology, as it is quite easy to use.

Karahan and Bilici (2017) examined the opinion of middle school science teachers on the use of QR code technology in learning. The results showed that the use of QR code in science classes has a positive effect on the interest, motivation and active participation of students. Situmoranga et al. (2019) revealed that the use of QR code gives students quick access to the essential learning resources for the development of the topic and allows them to study independently. Uçak (2019) analyzed the opinions of future science teachers about the use of QR codes in a course. The participants of the study indicated that QR codes can enrich and support the teaching process.

The literature confirms the positive perception towards the use of QR codes in education by both tea-chers and students. QR codes are seen as effective tools, with studies revealing benefits such as increased student interest and academic performance. The findings highlight the potential of QR codes to enhance teaching and learning experiences, particularly in science education (e.g., Artemova et al., 2021; González-Rosende et al., 2020). However, further research is recommended to determine optimal strategies for inte-grating QR codes and improving their effectiveness (Uçak, 2019).

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1.1. Statement of the problem

There is a little number of studies devoted to the study of attitudes towards the use of QR code in the instructional area from teacher and student perspectives (Abdul Rabu et al., 2019). The attitude towards the use of QR code in the educational process in a number of studies of the countries of the distant and near abroad is very positive, a number of publications have demonstrated this. However, the authors of this paper found no information about the use of QR codes in the educational process in Kyrgyzstan. To close this gap, this study attempts to examine the attitude of university and high school level Kyrgyz students towards the use of QR codes in the Organic Chemistry course and presents the results. The authors of this article believe that the evaluation of the perception of the QR code use in natural sciences teaching will be interesting. Thus, for the successful implementation of QR code in natural sciences teaching it is necessary to study the factors that influence it.
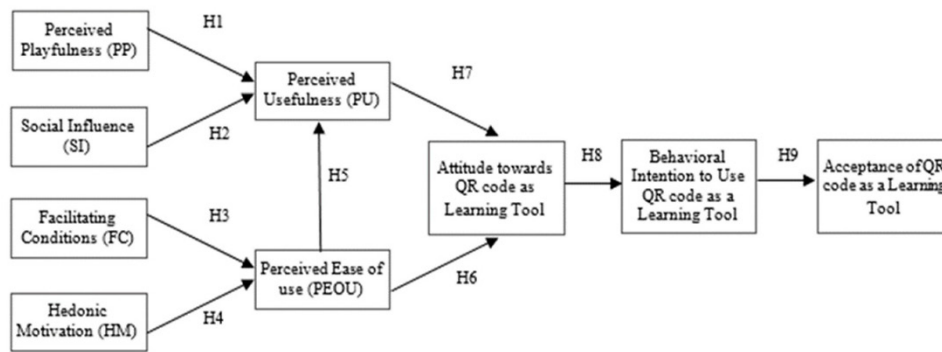
1.2. Theoretical background and hypotheses

In order to investigate the acceptance of a technology, researchers generally employ Technology Acceptance Model (TAM) and Unified Theory of Acceptance and Use of Technology (UTAUT) models (Afacan, & Çinar, 2021). TAM investigates users' perceptions related to a new technology through two main criteria (Davis, 1989). According to TAM, perceived usefulness and perceived ease of use are important factors in the acceptance or rejection of new information technology. UTAUT was designed to explain the user' intentions to use an information system through four factors: performance expectancy, effort expectancy, social influence, and facilitating conditions (Venkatesh et al., 2003). Then, in 2012, UTAUT2 was proposed with the integration of three additional constructs: hedonic motivation, price value and habit (Venkatesh et al., 2012).

This study aimed to investigate the university and high school level Kyrgyz students' perceptions related to the use of QR codes in textbooks for the demonstration of experimental works in Organic Chemistry course. The study proposed a research model based on two existing models: TAM and UTAUT2. Although the combination of these models was mostly employed in the context of mobile learning, their combined use towards the acceptance of QR codes is limited (Abdul Rabu et al., 2018). Applying these models in a combined way makes it possible to study students' perception of the use of QR codes in Organic Chemistry textbook.

The research model of the study considered factors of the TAM and UTAUT2, and based on the study of Abdul Rabu et al. (2018). The study covers the constructs of TAM such as perceived usefulness, perceived ease of use, attitude, and behavioral intention to use QR codes. In addition, the study involves social influence, facilitating conditions, and hedonic motivation constructs of the UTAUT2. The overall research model was provided in Figure 1.

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FIGURE 1. Structure of the Research Model.

The constructs of the research model and the corresponding hypotheses are provided as follows:

1.2.1. Effects of perceived playfulness (PP) and social influence (SI) on perceived usefulness (PU)

Playfulness is considered as a factor influencing perceived usefulness of a new technology. Abdul Rabu et al. (2018) considers that while students view the use of this exact technology like a game, they have the perception that the tool is valuable for concurrent instructional and playing aims.

Tan and Chou (2008) aimed to investigate perceived playfulness according to services related to mobile information and entertainment. They analyzed a number of studies that have demonstrated the importance of playfulness in the wider Internet context, online shopping, and mobile Internet services. Based on results of these studies, they stated that perceived playfulness takes an important role in above mentioned technologies' acceptance. Similarly, Abdul Rabu et al. (2018) studied the link between perceived playfulness and perceived usefulness in QR code acceptance at the Universiti Sains Malaysia. Our research puts forward this hypothesis within the Kyrgyz context.

Social influence also has an impact on the usefulness perception of the new technology. Gao (2023) offered that the feelings of individual users are influenced by the opinion of authoritative people for them. These people's opinions may encourage their use of a new technology.

According to Al Mansoori et al. (2018), social influence can also be defined as the degree of peer influence on the use of a particular system. Yang and Choi (2001) found that the direct or indirect impact of social influences on technology perception varied across technologies. The results may vary depending on the nature of the technology. The proposed hypotheses (i.e., H1 and H2) will allow investigation of the influence of factors such as perceived playfulness and social influence on the perceived usefulness of QR code use:

- H1: Perceived playfulness of QR codes has a positive impact on students' perceived usefulness of QR codes in learning.
- H2: Social influence has a positive impact on students' perceived usefulness of QR codes in learning.

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1.2.2. Effects of facilitating conditions (FC) and hedonic motivation (MV) on perceived ease of use (PEOU)

Facilitating conditions refer to the existing organizational and technical infrastructure supporting people to use the system (Venkatesh et al., 2003). Triandis (1980) states that if objective conditions in the environment prevent any behavior, it will not occur. For instance, in the context of computer use, user support is considered as one important facilitating condition that can influence the system utilization (Thompson et al., 1991). The existence and accessibility of physical equipment or supportive facilities has an important role for the use of new technologies (Abdul Rabu et al., 2018). In this study, the authors aimed to investigate students' perceptions of QR code. This technology is easy to apply and learn. Therefore, students expected to accept it positively.

Hedonic motivation is defined as "the fun or pleasure derived from using technology" (Tamilmani, 2019). According to the authors' opinion, hedonic motivation is an important determinant of consumer's technology acceptance and use. Al-Azawei and Alowayr (2020) offered the hedonic motivation as the fun and engagement hence leads to enhancing overall performance. Per the above, the study hypothesizes that:

- H3: Facilitating conditions have a positive impact on students' perceived ease of use of QR codes for learning.
- H4: Students' hedonic motivation in using QR codes have a positive impact on their perceived ease of use of QR codes in learning.

1.2.3. Relationship between perceived ease of use (PEOU) and perceived usefulness (PU)

Perceived usefulness was defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p.320), and perceived ease of use was defined as "the degree to which a person believes that using a particular system would be free of effort" (Davis, 1989, p.320). According to the TAM, the perceived usefulness and perceived ease of use affect the person's attitude toward the system. These factors influence his intention to use the system. Thus, they determine the actual use of the system (Davis, 1989).

It is also proposed that perceived ease of use is affecting perceived usefulness. It assumed that the easier to use the system, the more useful it would be perceived. Sometimes the system is perceived by users as not useful and not easy to use. In such a case, the acceptability of the system to users is reduced (Carter, & Bélanger, 2005). Similarly, usefulness and ease of use factors are expected to affect students' perceptions of QR code use. Accordingly, the study proposes that:

- H5: Students' perceived ease of use of QR codes has a positive impact on their perceived usefulness of QR codes for learning.

1.2.4. Relationship between attitude (ATT) and Behavioural intention (BI)

Some studies consider the attitude of people towards the use of a system. El-Gayar et al. (2011) confirmed that students' beliefs about productivity and easy-to-use features of systems will positively affect their

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attitudes towards a new technology. Hence, the authors stated that technologies aiming positive influence on students' attitudes (and thus acceptance) should consider performance and effort expectancy issues.

Ifenthaler and Schweinbenz (2016) assumed that the degree to which a student believes that using the new technology will help to improve his or her performance will have a positive effect on his or her attitude toward the new technology.

Nair and Das (2012) considered the hypotheses related to fundamental constructs of TAM. According to their study, perceived ease of use was expected to have an influence on perceived usefulness. In turn, perceived ease of use and perceived usefulness can both together influence attitudes toward use.

Abdul Rabu et al. (2018) assumed that students' emotional reaction related to QR code is related to their usage intentions, which are affected by both their perceived ease of use and perceived usefulness. Hence, we propose that:

- H6: Students' perceived ease of use of QR codes have a positive impact on their attitude towards usage for learning.
- H7: Students' perceived usefulness of QR codes have a positive impact on their attitude towards usage for learning.
- H8: Students' attitudes towards QR codes have a positive impact on their behavioural intentions to use for learning.

1.2.5. Relationship between Behavioural intention (BI) and Actual Use (AU)

The studies of Chang et al. (2017), Iskandar et al. (2020), Jameel et al. (2020), Shanmugam et al. (2014) and Venkatesh et al. (2012) supposed that there is a positive relationship between behavioral intention and actual use behaviour. Behavioral intention can positively influence students' acceptance of QR code as a learning tool (Abdul Rabu et al., 2018). Based on the above point of view, our study proposes the following hypotheses:

- H9: Students' behavioural intention towards QR codes has a positive impact on their actual use of QR codes for learning.

2. MATERIAL AND METHOD

2.1. Research methodology

This study aimed to analyze university and high school students` acceptance of the QR code technology with the use of the Partial Least Squares Structural Equation Modeling (PLS-SEM). The research model of the study is based on the TAM and UTAUT2, related to students' attitude, facilitating condition, hedonic motivation, perceived ease of use, perceived playfulness, perceived usefulness, social influence, and behavioral intention for the acceptance of QR code use in the Organic Chemistry course.

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In this study, correlational research design was employed to explore the relation among factors of the research model. For the identification of the participants, the study employed the purposive sampling method, which is suitable for acquiring data from particular group of participants or events (Taherdoost, 2016).

2.2. Participants

The technology of teaching the discipline "Organic Chemistry" using the QR code began to be applied in the spring semester of 2020-2021 academic year. It was actively applied during 4 semesters. This made it possible to conduct a survey among the students who used this textbook during the "Organic Chemistry" course. The survey was mainly completed by students of three Kyrgyz universities and by students in one high school. Demographic data of participants are provided in Table 1.

TABLE 1. Demographic Data of Participants.

	Variables	Frequency (f)	Percentage (%)
Gender	Female	118	57.8
	Male	85	41.7
Age	15-17	19	9.3
	18-20	106	52.0
	21-23	60	29.4
	23 +	13	6.4
Level of Education	High school	19	9.3
	University	185	90.7
Total		204	100

In total, 204 students participated in this study. It can be seen that female participants were 118 and male participants 85, representing 57.8% and 41.7% correspondingly. According to the demographics, female participants were more than male ones. The age distribution of participants demonstrated that the age of participants ranges between 15 and 23+ and most participants are in the age of 18-20 with 52%. This is followed by the 21-23 age group with 29.4%. The level of education results showed that participant students are mostly studying at university level.

2.3. Research setting

The Organic Chemistry textbook started to be used in 2021 at several universities in Kyrgyzstan and in one private high school. The Kyrgyz language is used in these universities and in this school as the language of education.

The Organic Chemistry course is taught to students of specialties "Chemical engineering", "Ecology", "Food engineering", "Veterinary", "Agronomy", "Biology", and "Chemist-biologist". It is also used in the high school for advanced chemistry studies. The textbook is also helpful for teachers of chemistry in preparation for classes.

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Teaching the course "Organic Chemistry" at universities is as follows. The course lasts for a 16-week semester. Students have 2 hours of lectures and 2 hours of laboratory work per week. During the lecture, theoretical material is explained to students. To perform experimental work, students are divided into small groups of 3-4 people. Further, they independently study the course of the experiment described in the textbook. Using the QR code placed in the textbook next to the description of the experiment, students can go to the video of the experiment posted on YouTube. Each video shows the required reagents, their quantity, the sequence of the experiment. Students can repeat the experiment at the laboratory of the educational institution.

The Figure 2 below shows a fragment from the textbook with a description of the experiment and a QR code for it. Figure 2 provides the following description of the experimental work: "Experiment 2. Purification of benzoic acid from the mixture. Mix 0.1-0.3 g of benzoic acid with activated carbon in a porcelain cup, cover with a glass burner, heat the porcelain cup on a sand bath slowly, and do not allow the substance to melt. After a while crystals begin to form on the surface of the burner. Stop heating and carefully collect the crystals from the burner. Weigh it and calculate the result. You can try an experiment by viewing it using the QR code provided." The video of the experiment, available via the QR code above, is located at the Youtube platform.

FIGURE 2. A fragment from the textbook with a description of the experiment and a corresponding QR code.
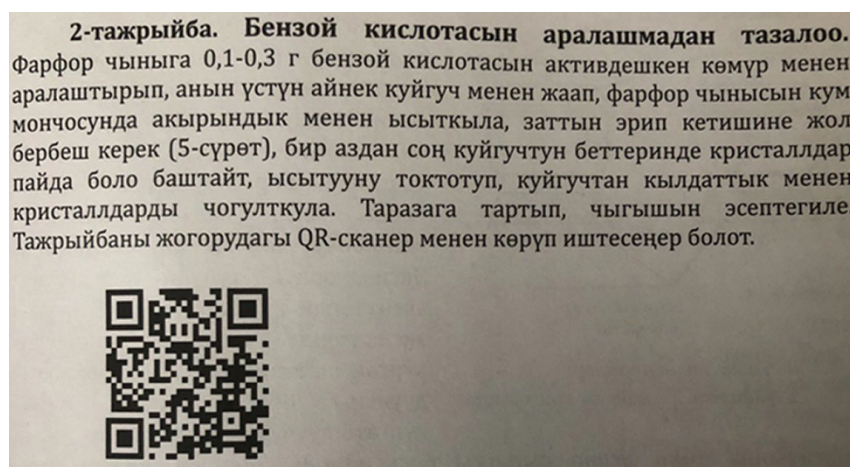
2.4. Measurements

The survey of the study allows the researchers to analyze the acceptance of QR codes by students. The survey considered factors of the TAM and UTAUT2, and based on the study of Abdul Rabu et al. (2018). Hence, the survey consists of items of attitude, facilitating condition, hedonic motivation, perceived ease of use, perceived playfulness, perceived usefulness, social influence, behavioral intention, and acceptance of QR code constructs. The original survey was translated to Kyrgyz and shared with students taking the Organic Chemistry course in three Kyrgyz universities and in one high school. For the ethical agreement, related applications were done to collect data.

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2.5. Data Analysis

Data analysis was done through SPSS (Version 28) and Smart-PLS (Version 4) software. The data analysis covers appropriate analysis for measurement model and structural model. In this respect, reliability analysis, convergent validity, discriminant validity, and Partial Least Squares Structural Equation Modeling (PLS-SEM) analysis was applied to analyze the effects of factors on students' acceptance of QR codes.

3. RESULTS

3.1. Measurement Model

For the measurement model, the initial analysis covers reliability analysis, convergent validity, composite reliability, as well as average variance extracted. These assessments were obtained as the results of PLS algorithm and confirmatory factor analysis (CFA).

3.1.1. Reliability Analysis

Initially, reliability analysis was conducted to identify whether the factors are parallel with the hypothesized results. The results in Table 2 revealed that Cronbach's Alpha values are ranging from 0.841 to 0.950. Since the values are higher than the threshold value 0.70, they were found appropriate for the reliability (Kline, 1999).

TABLE 2. Reliability Analysis Results.

Constructs	Cronbach's Alpha
Acceptance of QR Code (AQC)	0.887
Attitude (ATT)	0.950
Behavioral Intention (BI)	0.947
Facilitating Conditions (FC)	0.872
Hedonic Motivation (HM)	0.865
Perceived Ease of Use (PEOU)	0.937
Perceived Playfulness (PP)	0.841
Perceived Usefulness (PU)	0.935
Social Influence (SI)	0.909

3.1.2. Internal Consistency (Reliability and Validity)

The Figure 3 shows the outer loadings of CFA with PLS algorithm. The values among factors and their items represent the outer loading values. All of the outer loadings are higher than the threshold value 0.7 proposed by Hair et al. (2017).

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FIGURE 3. PLS Algorithm for CFA.
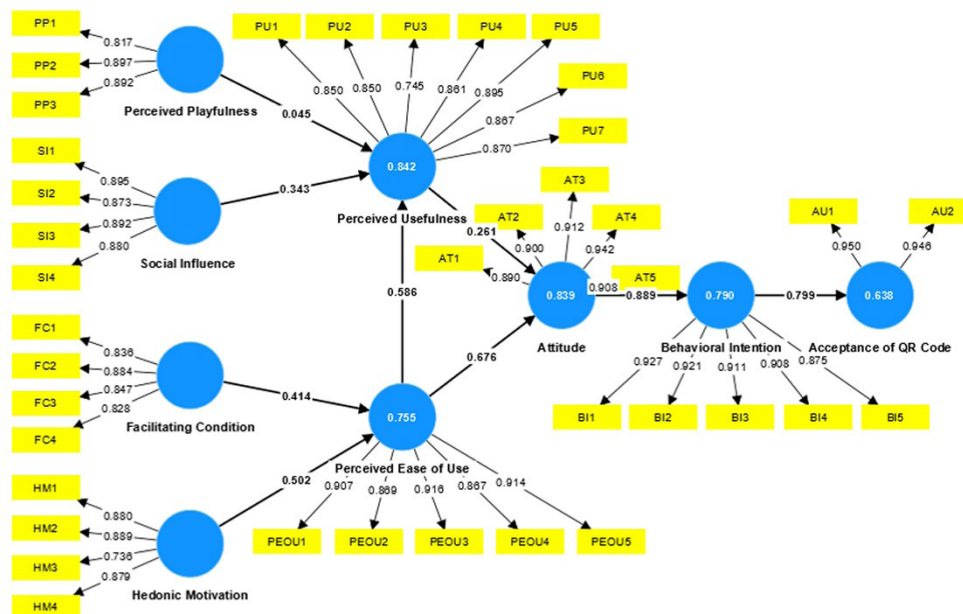
In addition, Table 3 reveals that rho_A and composite reliability values are higher than 0.7 (ranging from 0.843 to 0.949) and (ranging from 0.911 to 0.960), hence confirming the reliability of the model.

Convergent validity investigates whether the measures should relate are really related (Trochim, n.d.). Convergent validity is checked with respect to the average variance extracted (AVE) values. Each AVE value (between 0.721 and 0.898) was found to be higher than the threshold value - 0.5, so verifying the convergence (Fornell, & Larcker, 1981). Overall, the values in Table 3 resulted that the internal consistency was satisfied for the measurement model.

TABLE 3. Results for Internal Consistency.

Constructs	rho_A	Composite reliability	Average variance extracted (AVE)
AQC	0.888	0.946	0.898
ATT	0.949	0.960	0.829
BI	0.948	0.959	0.826
FC	0.875	0.912	0.721
HM	0.879	0.911	0.719
PEOU	0.939	0.953	0.801
PP	0.843	0.903	0.756
PU	0.937	0.948	0.721
SI	0.909	0.935	0.784

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3.1.3. Discriminant validity

Discriminant validity investigates whether the measures should not relate are really not related (Trochim, n.d.). Fornell and Larcker (1981) test was employed to examine discriminant validity. In Table 4, diagonal values show the square roots of AVE values and other values show the correlation between constructs. Discriminant validity is satisfied since the square root of each construct's AVE is higher than its every correlation between other constructs (Fornell, & Larcker, 1981).

TABLE 4. Results for discriminant validity.

Constructs	AQC	ATT	BI	FC	HM	PEOU	PP	PU	SI
AQC	**0.948**								
ATT	0.755	**0.911**							
BI	0.799	0.889	**0.909**						
FC	0.729	0.788	0.766	**0.849**					
HM	0.724	0.834	0.800	0.800	**0.848**				
PEOU	0.777	0.908	0.875	0.815	0.833	**0.895**			
PP	0.705	0.762	0.775	0.758	0.812	0.780	**0.870**		
PU	0.778	0.862	0.831	0.865	0.853	0.888	0.770	**0.849**	
SI	0.749	0.815	0.813	0.822	0.819	0.779	0.782	0.835	**0.885**

3.2 Structural Model

3.2.1. Path Analysis

In order to conduct the path analysis, the first bootstrapping sequence with 1000 samples were performed in PLS. Figure 4 demonstrates the corresponding graphical results related to the path analysis. The values between variables represent the t values.

FIGURE 4. Bootstrap results for path relationships.

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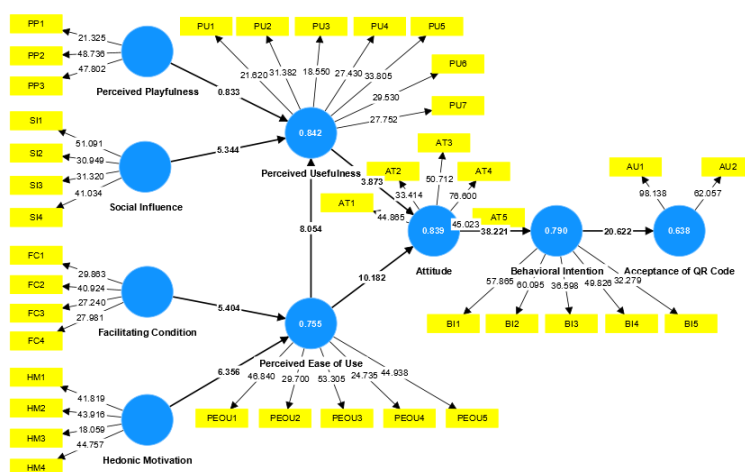
3.2.2. Path coefficients

Table 5 provides the results for the path relationships in the hypothesized model. It was explored that PEOU was significantly affected by FC (t=5.404, p<0.05) and HM (t=6.356, p<0.05). PU was significantly affected by PEOU (t=8.054, p<0.05) and SI (t=5.344, p<0.05). Yet, it was found that PP has no significant effect on PU (t=0.833, p>0.05). For the attitude (ATT) towards QR code integration, both PEOU (t=10.182, p<0.05) and PU (t=3.873, p<0.05) were found as significant predictors. ATT(t=38.221, p<0.05) was found as the significant antecedent of the BI. And, actual use of QR codes was significantly predicted by BI (t=20.622, p<0.05).

TABLE 5. Path analysis results.

			Confidence interval	
	t values	p values	LL	UL
ATT -> BI	38.221	0.000**	0.849	0.924
BI -> AQC	20.622	0.000**	0.727	0.856
FC -> PEOU	5.404	0.000**	0.297	0.547
HM -> PEOU	6.356	0.000**	0.362	0.620
PEOU -> ATT	10.182	0.000**	0.561	0.778
PEOU -> PU	8.054	0.000**	0.464	0.702
PP -> PU	0.833	0.202	-0.038	0.136
PU -> ATT	3.873	0.000**	0.161	0.378
SI -> PU	5.344	0.000**	0.237	0.444

3.2.3 Derived Model

Figure 5 provides the derived model together with the paths having significance. The values between factors represent the t values. PP was removed from the model, since its effect on PU was found non significant.

FIGURE 5. Derived model.

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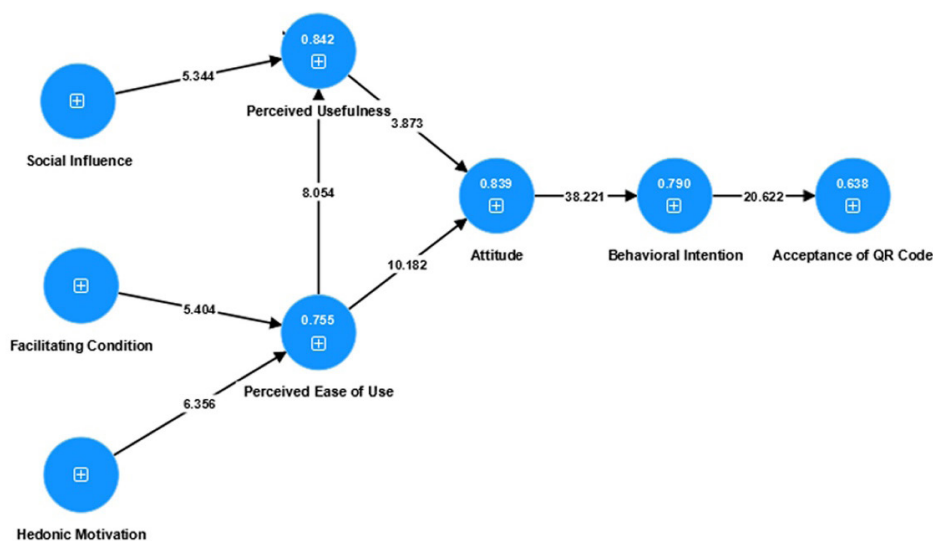
3.2.4. Coefficient of determination (R^2)

Coefficient of determination indicates the variance explained by each construct in the research model. Table 6 below provides the coefficient of determination values for the endogenous constructs in the research model of the study. The values range from 0.758 to 0.938. Since these values are higher than 0.70, the variance explained by each construct was high based on criteria of Kline (2015).

TABLE 6. Coefficient of determination values for the endogenous constructs.

Construct	R-square
Acceptance of QR Code	0.758
Attitude	0.926
Behavioral Intention	0.879
Perceived Ease of Use	0.864
Perceived Usefulness	0.938

4. DISCUSSION

This study investigated the acceptance of QR code technology in the "Organic Chemistry" course among university and high school students in Kyrgyzstan. The research model is based on the Technology Acceptance Model (TAM) and the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2). Similar research models have been successfully applied in various contexts, such as examining students' initial perceptions of QR codes (Abdul Rabu et al., 2018), analyzing the intentions of future teachers to use Web 2.0 technologies in their courses (Şimşek, & Ateş, 2022), exploring students' attitudes towards distance learning programs (Onyekwere, & Enamul Hoque, 2023), and investigating students' behavior regarding the adoption of cloud-based virtual platforms (Sayginer, 2023). The current study identified social influence, facilitating conditions, hedonic motivation, perceived usefulness, and perceived ease of use as significant factors influencing students' acceptance of QR code usage in the Organic Chemistry course.

Social influence, as defined by Mei-Ying et al. (2012), examines whether users are influenced by others to adopt a particular technology. In the context of this study, social influence was found to exert a significant positive effect on students' perceived usefulness of QR codes in the learning process. This aligns with the findings of Chooi et al. (2014) and Moorthy et al. (2014), who also observed a significant and positive impact of social influence on students' intentions to use QR codes as an instructional tool. Students' decisions to embrace QR codes are shaped by the opinions of their peers and instructors. Hence, the study suggests that when students receive support or assistance from their friends and instructors, they are more likely to perceive QR codes as useful and exhibit greater acceptance of their use in the Organic Chemistry course.

Facilitating conditions refer to the availability of organizational and technical infrastructure supporting users' acceptance of a technology (Venkatesh et al., 2012). Factors such as the lack of necessary technical devices, the need for additional software installation, and extra training may pose obstacles to the adoption of new technology. Previously, these factors acted as barriers to the widespread adoption of technology (Durak et al., 2016). The results indicated that students' perceived ease of use of QR codes was significantly influenced by facilitating conditions. Similar findings have been observed in other studies. For example, Sukendro et al. (2020) demonstrated that available facilities, an appropriate environment, and Internet access facilitate students' acceptance of e-learning. Additionally, Moorthy et al. (2014) identified a positive influence of facilitation conditions on students' behavioral intention to use QR codes in education. Before

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incorporating QR code technology into courses, instructors can provide guidance on its use. Furthermore, students can receive support when facing issues related to the use of QR codes. This approach ensures that students have the opportunity to understand QR code usage and safely integrate QR technologies into their learning experience.

Our results align with those of a study conducted by Chyou et al. (2012) that investigated the adoption of QR code services in Japan and Taiwan. The key factors influencing behavioral intention were found to be social influence and facilitating conditions, followed by perceived ease of use and perceived usefulness. The successful adoption of QR code technology in Japan was attributed to the availability of information and technical support from various companies. In contrast, in Taiwan, the lack of such support led to less awareness of QR codes among the general population, despite their widespread availability. QR code usage eliminates the need for additional device purchases, software installations, and instructional requirements, making the technology more accessible. The current prevalence of smartphones with QR code scanning programs and affordable Internet access among students and teachers in Kyrgyzstan (Sultanov, 2023) provides a solid foundation for the further development of this technology.

Hedonic motivation, defined as "the fun or pleasure derived from using a technology" (Escobar-Rodríguez et al., 2014, p. 138), was a focal point in the current study, investigating whether students perceived the use of QR codes as enjoyable, entertaining, and interesting as a learning tool. The findings revealed that hedonic motivation significantly and positively influenced the perceived ease of use. Similar results are evident in the existing literature. For instance, Twum et al. (2022) identified a significant effect of hedonic motivation on students' intention to use e-learning. Likewise, Chang et al. (2017) explored how hedonic value significantly affected the attitudes of auto-repairing students toward the use of QR codes in learning. Nikolopoulou et al. (2021) examined the influence of hedonic motivation on the intention to use new technology in the future, emphasizing the pivotal role of the initial experience. They contend that the first encounter with technology plays a significant role; a positive initial experience increases the likelihood of continued use. In the context of teaching Organic Chemistry, students' positive experiences with using QR codes were noted, encouraging their further adoption of this technology, as confirmed by the conducted analysis.

Perceived usefulness refers to users' beliefs about the positive impact on their performance when utilizing technologies (Davis, 1989). This study aimed to determine if learners perceived QR codes as useful, given their access to relevant information, faster completion of learning activities, and time-saving benefits during tasks. The study revealed that perceived usefulness significantly and positively influenced students' attitudes toward using QR codes in learning. Similarly, Durak et al. (2016) found that students acknowledged the positive effects of QR codes on learning, particularly through visuals and updated information. In a parallel study, Nazar et al. (2022) demonstrated that students found QR codes useful for learning about chemical instruments, using appropriate media, while minimizing risks of accidents in a laboratory environment. The effective use of QR codes in teaching promotes a better understanding of the material and enhances accessibility to learning resources, especially for students with special educational needs (Pastor et al., 2015). In the context of learning organic chemistry, QR codes offer quick and easy access to multimedia content such as videos and additional course-related information. This accessibility improves students' comprehension of complex chemical processes and reactions (Nazar et al., 2022). In addition, the integration of QR codes

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into educational materials allows students to engage in just-in-time training and access video materials to develop practical skills (Schulz, & Ottolini, 2023).

Perceived ease of use refers to the participants' ideas about easiness of the technology (Davis, 1989). From the perspective of this study, it is important to investigate whether learners could easily learn scanning QR codes and whether they gain expert in using QR codes for learning. It was revealed that perceived ease of use has a positive and significant influence on students' attitudes towards QR code use in learning. As one construct of TAM, it was also found important for users' acceptance of QR codes and different technologies in the current literature. For example, Del Rosario-Raymundo (2017) revealed that participants found the use of QR codes easy as a mobile learning instrument. Karia et al. (2019) suggested that QR guidelines can be provided to students for the appropriate use of the QR code technology. Despite the fact that all participating students possess a mobile device and are accustomed to using mobile systems, the current study revealed that students' attitudes are influenced by factors associated with user-friendliness. Specifically, the research revealed the significance of providing students with convenient access to the system. This finding suggests that for QR codes to gain widespread acceptance from students, it is crucial to ensure their user-friendliness with clear guides in the Organic Chemistry course.

5. CONCLUSIONS

This study revealed that social influence, facilitating conditions, hedonic motivation, perceived usefulness, and perceived ease of use are significant factors influencing students' acceptance of QR code usage in the Organic Chemistry course. Students prefer using QR codes in Organic Chemistry textbooks to access video materials when encouraged by instructors and peers. Therefore, for the successful adoption of QR code usage in learning, it is crucial for students to receive necessary support and assistance from their instructors and peers. Students' existing knowledge, along with available resources, also plays a vital role as facilitating conditions. When students acquire essential knowledge for using QR codes, they can access videos and gain insights related to the Organic Chemistry course. In this context, interactive guides can be developed to assist students in learning how to use QR codes. The integration of interactive functions into QR technologies for the Organic Chemistry course would enhance students' adoption. Fun and interesting systems can be provided through the incorporation of interactive features into QR technologies for the Organic Chemistry course.

Students' acceptance of QR codes is likely to increase when they are provided with easy-to-use and useful systems. From the students' perspective, QR codes are easily accessible through mobile devices for retrieving learning materials in the Organic Chemistry course. In terms of usefulness, students can efficiently complete learning activities and save time by using QR codes as a learning tool. When integrating QR codes into the Organic Chemistry course, attention to these aspects is essential for fostering acceptance of this technology.

5.1. Limitations and future lines of research

The sample size is one limitation in this study. The number of students who submitted responses to the questionnaire was not as high as anticipated. Therefore, in the upcoming studies it would be valuable to

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acquire data from a group with large number of students. Another limitation was that surveys were used for the collection of data. In forthcoming studies, interviews can be organized with students to understand more about their use related to QR codes. In this way, qualitative analysis can be conducted for a more comprehensive analysis of students' acceptance of QR codes in learning. Hence, it can be potential to better reveal constructs related to the acceptance of QR codes. The other limitation is the lack of moderating variables in the research model. In a future study, the effects of demographic variables such as gender, academic level can be considered for the comprehensive investigation of the research model.

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Learning and Promotion of Philippine Dances via Facebook and YouTube: The role of Enjoyment to Actual use and Dance Engagement

Aprendizaje y promoción de danzas filipinas a través de Facebook y YouTube: el papel del disfrute en el uso real y el compromiso con la danza

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ABSTRACT

Intangible Cultural Heritage such as Philippine Traditional Dances were found to be effective in terms of learning and promotion when combined with ICT such as various social media platforms like Facebook and YouTube. In this regard, this study aimed to assess the causal relationship between the actual use (by adopting Technology Acceptance Model) and dance engagement, and how enjoyment moderates the relationship between the two variables by performing Partial Least Square-Structural Equation Modelling. After obtaining data from a sample of undergraduate students from a prominent local college in the Philippines [N_{male} = 723 (37.7%), N_{female} = 1193 (62.3%)], it was found that Perceived Ease of Use is highly correlated to Perceived Usefulness; PEOU and PU influence Behavioral Intention to Use; and BI triggers Actual Use of Facebook and YouTube. However, AU negatively influences dance engagement. On the positive side, Enjoyment positively moderates the relationship between AU and DE. Based on these findings, enjoyment is key in order to motivate students to engage in dance through learning and promotion of the traditional dances of the Philippines through Facebook and YouTube. Practical interventions and future research recommendations are also presented.

KEYWORDS Actual Use; Dance Engagement; Enjoyment; Intangible Cultural Heritage; Promotion.

RESUMEN

Se descubrió que el patrimonio cultural inmaterial, como las danzas tradicionales filipinas, es eficaz en términos de aprendizaje y promoción cuando se combina con las TIC, como diversas plataformas de medios sociales como Facebook y YouTube. En este sentido, el objetivo de este estudio era evaluar la relación causal entre el uso real (mediante la adopción del Modelo de Aceptación de la Tecnología) y la participación en la danza, y cómo el disfrute modera la relación entre las dos

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variables mediante la realización de un Modelo de Ecuaciones Estructurales de Mínimos Cuadrados Parciales. Tras obtener datos de una muestra de estudiantes universitarios de una destacada universidad local de Filipinas [$N_{hombres}$ = 723(37,7%), $N_{mujeres}$ = 1193(62,3%)], se descubrió que la Facilidad de Uso Percibida está altamente correlacionada con la Utilidad Percibida; PEOU y PU influyen en la Intención de Uso Conductual; y BI desencadena el Uso Real de Facebook y YouTube. Sin embargo, AU influye negativamente en el compromiso con el baile. En el lado positivo, el disfrute modera positivamente la relación entre AU y DE. A partir de estos resultados, el disfrute es clave para motivar a los estudiantes a participar en la danza mediante el aprendizaje y la promoción de las danzas tradicionales de Filipinas a través de Facebook y YouTube. También se presentan intervenciones prácticas y recomendaciones para futuras investigaciones.

PALABRAS CLAVE Uso real; compromiso con la danza; disfrute; patrimonio cultural inmaterial; promoción.

1. INTRODUCTION

Intangible Cultural Heritage (ICH) refers to oral traditions, presentations, expressions, knowledge, and skills to produce traditional crafts and festive events (Kico et al., 2018). This particular heritage passes from generation to generation, and acquires an important role in the maintenance of quality cultural diversity in growing globalization (Zhao et al., 2022). ICH in the form of various dances and performances, either as an autonomous form of art and expression, or as a part of the music and/or sound culture, has been an object of interest for the past recent years. Along with various activities that has been a practice of people before, such as hunting, eating, and drinking together, it cannot be denied that dancing has been a vital part of people's life. Most importantly in the Philippines, these dances emerged naturally and spontaneously in line with the everyday activities and experiences of Filipino forefathers (Şuşu, 2018). Among the various sources of nation's intangible cultural heritages, folk or traditional dances are considered to be one of the best (Patterson et al., 2018). Among the hundreds of dances Philippines has, these important cultural heritages symbolize and exemplify the fusion of several cultural traditions that characterize the country. Additionally, these dances represent the dispositions and social lives of Filipino ancestors before and after the rule of colonists for hundreds of years (Acuña, 2018; Cruz, & Tullao, 2015). Most significantly, every Filipino that takes part into these dances develop a connection with one another, as well as their customs, fostering togetherness and understanding of one another (Lobo, 2023).

In this digitalization age, its rapid development has brought about a series of changes, among which the wide use of social media platforms has a profound impact on people's life (Miller, & Melton, 2015; Ríos, & Romero, 2022). Social media platforms use, such as Facebook and YouTube, influences people and provide them with opportunities to understand and learn about different cultures (Shuangyun, 2021). Some scholars have pointed out that social media could provide platform that is community-based for sustainable and holistic heritage conversation (Ginzarly et al., 2019; Liang et al., 2021). Fascinatingly, ICTs offer an open-participatory platform, in which citizens, such as students across scales, classes, races, genders, and ages, can play an active role, which is crucial for collaborative planning and conversation (Liang et al., 2021). A newly published work of Yuliati et al. (2023) revealed that the use social media platforms by Sobokartti, such as Facebook and YouTube, has been an effective tool in the preservation and dissemination of Javanese traditional performing arts aligned with the advancement of technology in the globalization era. Also,

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the study of Ma (2022) to which it investigated the use of ICTs such as media platforms in the preservation of China's intangible cultural heritages; it was found that pictures and video materials are highly effective in the preservation of the nation's ICH as part of dance instruction in the higher education. Another exemplary findings is from the study of Gratsiouni et al. (2016), it was discovered that YouTube is effective to be used in learning Greek traditional dances for individuals who has little or no experience in the art form. Ergo, it can be postulated that through the means of social media, it may provide another platform to which these intangible cultural heritages may be disseminated and preserved.

1.1. Review of Related Literature and Hypothesis Formulation

1.1.1. Acceptance on the use of Social Media Platforms through Technology Acceptance Model (TAM) by Davis (1989)

With the advent of this new norm, researchers have been able to offer a wide range of information systems (IS) theories and models to examine the diffusion of innovative technologies, like the most recent models such as the Unified Theory of Acceptance and Use of Technology (UTAUT) (Alvi, 2021) and Extended Unified Theory of Acceptance and Use of Technology (UTAUT2) (Şimşek, & Ateş, 2022). Davis's Technology Acceptance Model (TAM) is one such popular framework. The Technology Acceptance Model (TAM) is a highly important model of technology acceptance that analyzes people's perceptions of a technology's usefulness and its ease of use to predict whether or not they would adopt it (Charness, & Boot, 2016). The perceived usefulness of a technology is associated with its efficiency and effectiveness, as well as its benefits for enhancing user performance (Tahar et al., 2020), while the perceived ease of use is the extent to which a person believes using a particular technology would be straightforward (Al-Bashayreh et al., 2022). Previous research from a wide range of fields and sectors, including higher education, has shown that this paradigm is being widely adopted. Since TAM has a good foundation for gauging its efficacy in measuring students' acceptance impacted by the two factors described above, the following hypotheses will be explored in the ongoing investigation:

H_1: Perceived ease of use positively influences the perceived usefulness of YouTube and Facebook;

H_2: Perceived ease of use positively influences behavioral intention in using YouTube and Facebook;

H_3: Perceived usefulness positively influences the behavioral intention of YouTube and Facebook; and

H_4: Behavioral intention positively influences the actual use of YouTube and Facebook

1.1.2. Actual Use of Technology and Dance Engagement

Strangely, many academics have focused on the efficiency and usefulness of digital technology in relation to educational procedures and outcomes since its widespread adoption (Rashid, & Asghar, 2016). Testing of various social media platforms and even learning management systems has proven a clear and favorable influence of technology on students' involvement, according to previously conducted studies (Bond, & Bedenlier, 2019; Schindler et al., 2017). Using technology in the classroom has been shown to increase student participation in various forms of active and collaborative learning (Nelson, & Kuh, 2005), such as learning

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and preserving Philippine traditional dances. This suggests that students' active and collaborative learning abilities are enhanced when technology is used in the classroom. Furthermore, students' opportunities to become involved in activities outside of their studies may improve if they adopt a more tech-savvy mindset. Findings from the study corroborated the hypothesis that students would be more involved in a variety of learning activities if they had easier access to information technology (Bergdahl et al., 2018). Another study by Juma'h Ahmed and Ismail (2021) found that with the right resources (including devices, tools, and teacher training), students are more motivated and engaged in their learning. Studies on how technology affects students' motivation and, more especially, their academic achievement, have already been conducted.

In addition, the study hopes to find out if college students' openness to new technologies has any bearing on their motivation to learn and share intangible cultural artifacts like Philippine traditional dances. The folk dances of the Philippines are an integral component of the country's cultural legacy, therefore it's clear that passing them down from one generation to the next is crucial (Kico et al., 2018). The term "Intangible Cultural Heritage" was developed to describe groups' shared yet individually distinctive cultural manifestations and behaviors (Alivizatou-Barakou et al., 2017). Intangible cultural property that possesses scientific, honest, and authentic features is well protected thanks to the internet's rapid development, as indicated by Liu (2022). For the purposes of preservation, dissemination, promotion, education, and community building, these cutting-edge tools are invaluable (Alivizatou-barakou et al., 2017). Accordingly, the purpose of this research is to ascertain if students' interest in dancing is affected by the widespread adoption of social media platforms like Facebook and video sharing websites like YouTube as tools for teaching and promoting traditional dances in the Philippines. In light of this, the following hypotheses will be investigated in this study:

**H$_5$**: Actual use of YouTube and Facebook positively influences students' dance engagement

1.1.3. Enjoyment with use of technology and dance engagement

The degree to which the act of utilizing the technology is regarded to be enjoyable in and of itself, aside from any performance that may be hoped for in the future, is known as enjoyment (Chao, 2019). It has been discovered that students' level of enjoyment is directly related to their level of openness toward new forms of technology. For example, the research conducted by Alawadhi et al. (2022) discovered that students' perceptions of how much they enjoy something have a direct impact on their perceptions of how easy something is to use and how useful it is, all of which are factors that influence how readily students accept new technology. According to the findings of a study conducted by Won et al. (2022), which was remarkably similar to the present one, the enjoyment factor was found to have the most important impact on the intention to use a sport-branded application. In addition, Winarno et al. (2021) discovered that enjoyment had a favorable influence on the perceived ease of using OVO Applications. These studies imply that students' adoption of technology is driven in large part by an inherent component known as pleasure (Huang, 2019). On the other hand, despite extensive literature searches, no published studies were located that addressed the function of enjoyment in the connection between students' acceptance of technology and their level of engagement with it, as it pertains to Philippine traditional dances. Learning traditional dances from the Philippines is one way to spread the country's intangible culture on a local college campus, and this study aimed to investigate

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the part that enjoyment plays in students' use of technology and participation in this endeavor. Given the lack of prior work by reputable scholars, the current investigation seeks to verify the following hypothesis.

H_6: Enjoyment does not moderate the relationship between Actual use of YouTube and Facebook and dance engagement

FIGURE 1. Conceptual Framework of the Study.
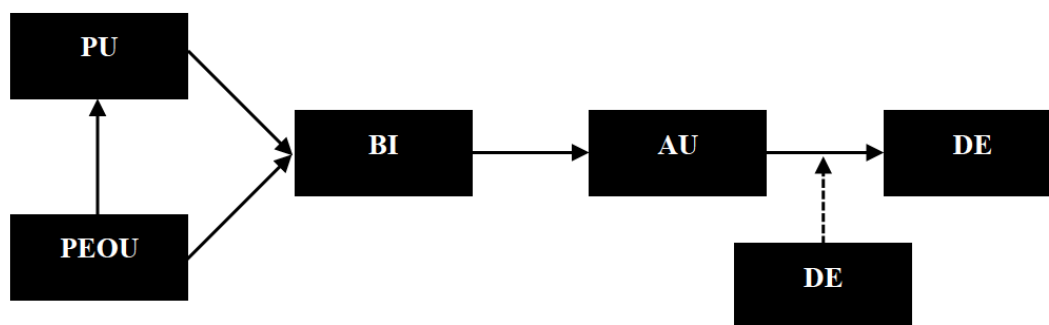
After performing the review of related literature, Figure 1 illustrates the conceptual framework to be used in the study.

1.1.4. Purpose of the study

Technology Acceptance Model has been widely used by numerous scholars across various disciplines assessing the acceptance of a platform to individuals. However, there have been no studies that were conducted focusing on the relationship between the actual use (by using TAM) of various social media platforms (i.e., Facebook and YouTube) and dance engagement, and the role of enjoyment to these two variables in order to promote and disseminate the intangible cultural heritage of the Philippines, such as its traditional dances. After the analysis of data, the findings obtained from this investigation may be used for practical implications that will greatly help higher education institutions, most especially the teachers, to formulate a more effective way on utilizing these social media platforms to students to engage them in the conservation of these ICH.

2. MATERIAL AND METHOD

2.1. Participants, Sampling Technique, and Sample Size

The respondents who took part in the research were students who were either in their first or second year at a local college in Region III, which is situated in the city of Angeles in the Philippines and offers a number of different degree programs (the academic year 2022-2023). The respondents were identified through the use of the technique of *purposeful sampling*. This method of selecting participants for research is a non-probabilistic strategy in which the researcher makes a conscious selection of people for the study based on the characteristics those participants have (Rodriguito et al., 2022). The *Raosoft Sample Size Calculator* was applied in order to determine the sample that should be used for this particular investigation. The

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proposed sample size is 334, which will be drawn from the total population of 2,500 first- and second-year students. Surpassingly, there are 1,916 students who have satisfactorily completed the survey questionnaire, and after the data was processed, all of the responses have been accepted for the purpose of conducting data analysis. The demographic information of those who responded to the online survey questionnaire is presented in Table 1. According to the findings, the majority of respondents are female, which accounts for 62.3% of the information that was gathered, while just 37.7% are males. In closing, 42% of respondents are from the Institute of Education, Arts, and Sciences, 41.2% are from the Institute of Business and Management, and 16.6% are from the Institute of Computing Studies and Library Information Science.

TABLE 1. Demographic Characteristics.

Item	Values	*f*	Percentage
Gender	Male	723	37.7%
	Female	1193	62.3%
Institute	Institute of Education, Arts, and Sciences	808	42.2%
	Institute of Business and Management	790	41.2%
	Institute of Computing Studies and Library Information Science	318	16.6%

2.2. Instruments

All respondents were provided a link to a Google forms-created online survey. The online questionnaire has four distinct sections. In the first section, information about the respondents' personal lives, including their ages and institutes, was gathered. The second section is devoted to information gathering about the four characteristics that make up the Technology Acceptance Model (TAM): perceived usefulness (PU), perceived ease of use (PE), behavioral intention to use (BI), and actual use (AU). The questions were modified from a survey by Davis (1989). Finally, the study adopted the *Sport Engagement Scale* (SES) developed by Guillén and Martínez-Alvarado (2014)absorption and dedication for the third section. The Sport Engagement Scale (SES) is a short (15-item) survey designed to gauge the extent to which respondents are involved in sports. A few word changes, such as "sports" being replaced with "dancing," were made to adapt the questionnaire to the goals of the present study. Furthermore, Morris and Roychowdhury (2020)'s PALMS (Physical Activity and Leisure Motivation Scale). Since the purpose of this research is to ascertain the role that PALMS plays in moderating the connection between students' acceptance or use of technology and their involvement in dance, only elements that fall under one of PALMS' constructs, enjoyment, have been employed.

2.3. Data Analysis

For the statistical evaluation, the study employed *Partial Least Squares-Structural Equation Modelling* (PLS-SEM) with SmartPLS 4. In light of the exploratory nature of this investigation, PLS-SEM is deemed to be a viable methodology (Ji et al., 2021). To further establish convergent validity, Hair et al. (2021) recommended looking at the items' *outer loadings* and the *average variance extracted* (AVE). In order to establish discriminant validity, the *Fornell-Larcker* criterion and *cross loading* were also proposed (Hair et al., 2021). For the purpose of determining discriminant validity, the *Heterotrait-Monotrait* criterion should also be applied. Path coefficients and the coefficient of determination ($R2$) will be calculated for the structural

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model. To evaluate the measurement and structural models in accordance with these considerations, the above criteria will be used.

TABLE 2. Measurement Model Results.

Constructs	Items	Loadings	Cronbach's Alpha	CR	AVE
Perceived ease of use (PE)	PE1	0.886	0.948	0.950	0.753
	PE2	0.878			
	PE3	0.909			
	PE4	0.893			
	PE5	0.758			
	PE6	0.874			
Perceived usefulness (PU)	PU2	0.863	0.937	0.937	0.787
	PU3	0.909			
	PU4	0.864			
	PU5	0.911			
Behavioral intention to use (BI)	BI1	0.921	0.929	0.931	0.816
	BI2	0.921			
	BI3	0.867			
Actual Use (AU)	AU1	0.907	0.857	0.862	0.753
	AU2	0.826			
Dance Engagement (DE)	DE5	0.916	0.932	0.934	0.727
	DE11	0.870			
	DE12	0.798			
	DE14	0.763			
	DE15	0.906			
Enjoyment (ENJ)	ENJ1	0.936	0.948	0.949	0.902
	ENJ4	0.963			

The reliability of each item on each scale was determined with a factor loading analysis. Each item must have a reliability threshold value of 0.7 or higher to be considered credible (Hair et al., 2021). In addition, the value of Cronbach's Alpha (CA) as well as the composite reliability (CR) have to be more than or equal to 0.70. After being extracted from the construct's structure, as shown in Table 2, all items are acceptable and meet the specifications. Constructs are validated by the Average Variance Extracted (AVE) (dos Santos, & Cirillo, 2021)such as the average variance extracted (AVE. Convergent validity is demonstrated by taking the mean squared loadings of items assessing the construct and comparing them to the normative measure. AVE should be at least 0.50 or higher, and the accompanying *p*-value must be at most 0.50 (Hair et al., 2021; Rodriguito et al., 2022). Therefore, convergent validity has been demonstrated by this process. Examining the Fornell-Larcker Criterion, cross-loadings, and the Heterotrait-Monotrait Ratio are all important steps in determining the degree to which discriminant validity has been achieved. Regarding the Fornell-Larcker criterion, the square root of the AVE (diagonal value) across each variable should therefore be greater than the correlation of the latent constructs, as demonstrated in Table 3. As can be seen in Table 4, the loading that is assigned to each indicator ought to be greater than the loadings that are assigned to the indicators that are associated with its related variables for the cross-loadings. Verification needs to be done on the Heterotrait-

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Monotrait ratio (HTMT), which should have a value that is lower than 0.85. TAM, with its massive sample size, is a perfect illustration of how a more liberal approach would call for a threshold of.90 (Henseler et al., 2015) such as partial least squares, the Fornell-Larcker criterion and the examination of cross-loadings are the dominant approaches for evaluating discriminant validity. By means of a simulation study, we show that these approaches do not reliably detect the lack of discriminant validity in common research situations. We therefore propose an alternative approach, based on the multitrait-multimethod matrix, to assess discriminant validity: the heterotrait-monotrait ratio of correlations. We demonstrate its superior performance by means of a Monte Carlo simulation study, in which we compare the new approach to the Fornell-Larcker criterion and the assessment of (partial. Table 5 demonstrates that the tests have demonstrated discriminant validity.

TABLE 3. Fornell-Larcker Criterion Results.

	AU	BI	DE	ENJ	PE	PU	ENJ x AU
AU	**0.868**						
BI	0.859	**0.903**					
DE	-0.049	-0.051	**0.853**				
ENJ	-0.043	-0.051	0.035	**0.950**			
PE	0.859	0.894	-0.041	-0.038	**0.868**		
PU	0.729	0.784	-0.047	-0.048	0.810	**0.887**	
ENJ x AU	0.067	0.047	0.021	0.071	0.056	0.059	

TABLE 4. Cross loading Results.

	AU	BI	DE	ENJ	PE	PU	ENJ x AU
AU1	**0.907**	0.779	-0.044	-0.045	0.78	0.668	0.056
AU2	**0.826**	0.709	-0.042	-0.029	0.709	0.595	0.049
BI1	0.784	**0.921**	-0.043	-0.043	0.838	0.712	0.039
BI2	0.785	**0.921**	-0.045	-0.039	0.835	0.714	0.04
BI3	0.758	**0.867**	-0.051	-0.056	0.749	0.698	0.034
DE11	-0.04	-0.039	**0.870**	0.035	-0.027	-0.039	0.003
DE12	-0.036	-0.038	**0.798**	0.033	-0.035	-0.036	0.019
DE14	-0.044	-0.054	**0.763**	0.019	-0.048	-0.05	0.02
DE15	-0.053	-0.052	**0.906**	0.022	-0.038	-0.044	0.011
DE5	-0.038	-0.036	**0.916**	0.042	-0.03	-0.034	0.028
ENJ1	-0.047	-0.056	0.033	**0.936**	-0.043	-0.05	0.064
ENJ4	-0.035	-0.04	0.034	**0.963**	-0.03	-0.041	0.056
PE1	0.767	0.785	-0.029	-0.036	**0.886**	0.726	0.047
PE2	0.747	0.788	-0.039	-0.035	**0.878**	0.709	0.054
PE3	0.785	0.819	-0.042	-0.041	**0.909**	0.73	0.043
PE4	0.791	0.792	-0.025	-0.027	**0.893**	0.731	0.049
PE5	0.654	0.682	-0.023	-0.025	**0.758**	0.609	0.048
PE6	0.721	0.784	-0.056	-0.034	0.874	**0.706**	0.023
PU2	0.627	0.692	-0.018	-0.05	0.684	**0.863**	0.031
PU3	0.653	0.701	-0.056	-0.033	0.746	**0.909**	0.053
PU4	0.632	0.696	-0.048	-0.047	0.682	**0.864**	0.046
PU5	0.672	0.692	-0.044	-0.041	0.759	**0.911**	0.056
ENJ x AU	0.061	0.042	0.019	0.063	0.05	0.053	**1.000**

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TABLE 5. Heterotrait-Monotrait (HTMT) ratio.

	AU	BI	DE	ENJ	PE	PU	ENJ x AU
AU							
BI	0.861						
DE	0.049	0.051					
ENJ	0.043	0.051	0.035				
PE	0.859	0.895	0.041	0.038			
PU	0.729	0.785	0.047	0.048	0.809		
ENJ x AU	0.061	0.042	0.019	0.063	0.051	0.053	

3. RESULTS

FIGURE 2. Structure Model.
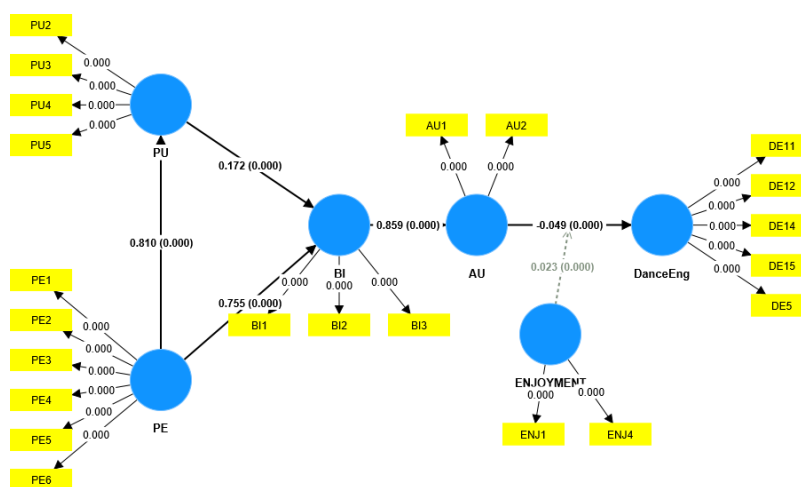
The model's ability to account for observed phenomena was determined by calculating the magnitude of the residuals between the predicted and observed values of the dependent variables. According to Hair et al. (2021), when evaluating a structural model, $R2$ and path coefficients are the most important statistics to consider. Figure 1 shows that the model's $R2$ for PU is 58.4%, BI is 72.7%, AU is 59.2%, and DE is 0.03%.

TABLE 6. Hypotheses testing results.

Hypotheses	Path	Path Coefficient	*p-value*	Decision
H_1	PE → PU	0.810	0.000	Supported
H_2	PE → BI	0.755	0.000	Supported
H_3	PU → BI	0.172	0.000	Supported
H_4	BI → AU	0.859	0.000	Supported
H_5	AU → DE	-0.049	0.000	Rejected
H_6	AU x ENJ → DE	0.023	0.000	Rejected

Based on the result of the path analysis performed, Figure 2 and Table 6 revealed the path coefficients and *p*-values for each hypothesis. H_1 describes the path between PE and PU which findings indicated that, PE positively predicts PU ($B = 0.810$, $p = <.01$). Based on the result, it can be construed that H_1 has been

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supported. H_2 illustrates the path between PE and BI which finding revealed that, PE leverages BI (B = 0.755, p = <.01); therefore, H_2 has been **supported**. Additionally, H_3 describes the path between PU and BI, the findings revealed that PU increases BI (B = 0.172, p = <.01); hence H_3 has been **supported**. H_4 presents the path between BI and AU which based on the finding that, BI positively impacts AU (B = 0.859, p = <.01), postulating that H_4 has been **supported**. H_5 illustrates the path between AU and DE, based on the result, AU negatively predicts DE (B = -0.049, p = <.01) which denotes that H_5 has been **rejected**. On the positive note, H_6 describes the moderating role of ENJ between AU and DE. Findings revealed that ENJ positively moderates AU and DE (B = 0.023, p = <.01), which means that H_6 has been **rejected**.

4. DISCUSSION

The results of this study suggest that PE and PU positively influence students' behavioral intentions consequential to their actual use of YouTube and Facebook in learning and promoting intangible culture, the traditional Philippine Dances. This is similar to the findings of previously conducted studies (Lima et al., 2021; Yaacob, & Md Saad, 2020). Moreover, it implies that using TAM to measure acceptance of the new technology is highly preferable (Enu-Kwesi, & Opoku, 2020). Theoretically, TAM has been resilient and have a strong predictive power to assess individuals' intention to use a new technology for decades. On the other hand, it was observed that using YouTube and Facebook in learning and promoting intangible culture negatively predicts students' engagement in dance. The result refuted the findings of Li et al. (2018) wherein despite of initial difficulties, students benefit from technology integration in dance. Similarly, the findings of Zhou (2022) revealed that introducing information technology into dance education can optimize resources, enrich the performance context of dance education, broaden the opportunities for both teachers and students, and the application of IT for direct appreciation and design. It can be determined that even though the students have a higher level of acceptance and actual use of YouTube and Facebook, it negatively impacts their engagement in learning and dancing, and in the promotion of the Philippine traditional dances. On the positive note, the relationship between use of technology and dance engagement can be positively moderated by enjoyment. It can be construed that if the perceived level of enjoyment of students towards the dances being learned and promoted is significantly high, it can positively affect the relationship between use of technology and engagement. Since no prior studies were conducted in relation to this current investigation, performing a similar study is highly recommended.

5. CONCLUSIONS

TAM is still a powerful model in assessing students' level of acceptance towards the use of technology. Similar to the findings of this research, it was found that students' have a significantly high acceptance and usage towards YouTube and Facebook in learning and in the promotion of intangible cultural heritage, which are the Philippine traditional dances. Moreover, the study also found that the actual use of YouTube and Facebook negatively predicts students' engagement. In this, this study concluded that both YT and FB may not be an effective platform in learning and promotion of the Philippine intangible cultural heritage. On the positive side, enjoyment positively moderates the relationship between using YT and FB and students' engagement.

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This can be construed that the higher the level of enjoyment perceived by the students in learning folk dances, there would be an increase in their engagement through the use of YT and FB, and a predictor of successful transmission and promotion of the intangible cultural heritage of the Philippines at the local college.

Practical implications may be derived based on the findings of the study. First, it has been observed that social media platforms, such as Facebook and YouTube, is highly being used by the students who participated for the study. In this regard, higher education teachers may maximize the advantage of these social media platforms in the dissemination, propagation, and preservation of these intangible cultural heritages by posting various videos (e.g., original videos of different folk dances and instructional videos which can be used as a basis by students in learning these dances) with the combination of general knowledge about the history of these dances. On the one hand, it was found that the actual use of these social media platforms may negatively affect the engagement of students to dance. Teachers should be able to carefully choose what traditional dances shall be taught to students through the means of these social media platforms to which these learners may see as deem enjoyable and exciting to learn. As can be observed from the findings of this study, as long as students perceived that the dance being introduced to them is highly enjoyable, a positive relation between the use of technology and their dance engagement. In this way, learning and dissemination of traditional folk dances of the country will be effective.

5.1. Limitations and future lines of research

This study has some limitations that should be taken into consideration by other readers and scholars globally. First, this study is limited to students from a local college in the Philippines. Hence, it does not generalize the entire population of undergraduate students from various higher education institutions in the country, and to other parts of the globe. In this regard, performing a similar study in order to support or repudiate these new findings is highly recommended. Second, this study has employed a pure quantitative approach. Therefore, performing a more sophisticated approach such as qualitative or mixed-method design by amassing information not only from the students, but also to teachers, may provide a more scholarly information to deepen the understanding of the different factors which may affect the actual use of social media platforms and dance engagement aside from enjoyment. Additionally, it will help researchers to formulate a more cohesive intervention in order to successfully promote the intangible cultural heritage to students which will definitely boost nationalism and patriotism. In conclusion, this study provides additional information to the body of knowledge and filling the gap in research due to scarcity of investigations that were conducted in relation to this topic.

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