INTERNATIONAL JOURNAL OF ACADEMIC RESEARCH IN BUSINESS & SOCIAL SCIENCES

Vol 13, Issue 12, (2023) E-ISSN: 2222-6990

The Adoption of AI-Enabled Adaptive e-Learning Environment in Palestinian Schools: Integrating Extended Technology Acceptance Model and System Success Model

Ashraf A. Qahman, Hadi A. Dahlan. Mohamad S. Zakaria, Muhammad Hussin, Yousef K. A. Samra, Reda F. Aldaya, Rosseni Din & Nabilah Othman

University Kebangsaan Malaysia 43600 UKM Bangi Selangor MALAYSIA

Corresponding Author Email: rosseni@ukm.edu.my

To Link this Article: http://dx.doi.org/10.6007/IJARBSS/v13-i12/20277 DOI:10.6007/IJARBSS/v13-i12/20277

Published Date: 27 December 2023

Abstract

AI-enabled adaptive learning environment is revolutionizing educational landscapes globally by offering personalized learning experiences. Despite their proven effectiveness, the acceptance of these technologies remains largely unexplored in Palestinian schools. This study aims to fill this research gap by investigating the factors influencing the acceptance of AI-enabled adaptive e-learning environment among schools in the Gaza Strip, Palestine. Utilizing the Extended Technology Acceptance Model (ETAM) and the DeLone and McLean Information Systems (IS) Success Model, a total of 202 schools participated in the study. The study examined several latent variables, including User Interface (UI), Perceived Ease of Use (PEU), Perceived Usefulness (PU), Information Quality (IQ), System Quality (SQ), Behavioral Intentions (BI), and Actual Use (AU). Statistical analyses, including Structural Equation Modeling (SEM), revealed that PU, PEU, and SQ positively influenced schools' behavioral intentions (BI) towards the actual use of the system. However, IQ showed mixed results, suggesting room for improvement in content delivery. The findings confirm that the level of acceptability among schools is significantly influenced by the system's ease of use, quality, and perceived usefulness, leading to a positive behavioral intention for its actual adoption. Given these results, schools and policymakers should focus on these critical aspects to facilitate broader acceptance and effective implementation of adaptive learning systems. This model can also serve as a framework for future quantitative and qualitative studies in areas of Palestine currently inaccessible due to Israeli occupation, such as the West Bank, or for other countries and can be adapted for use in other contexts.

Keywords: e-Learning, Technology Acceptance Model (TAM), Attitudes, IT Acceptance and Adoption, Palestinian Schools, AI-enabled Adaptive Learning.

Introduction

The rapid advancements in Information and Communication Technology (ICT) and multimedia technology have revolutionized traditional educational practices globally (Adzhari & Din, 2021). One significant outcome of this revolution is the development and utilization of AI-enabled adaptive e-learning environment. While these systems have garnered considerable attention and investment in Western educational settings (Kabudi et al., 2021), their application and acceptance in Palestinian schools, remain largely unexplored (Obaid, 2020; Subaih et al., 2021). This study aims to bridge this gap by examining the factors that influence the acceptance and adoption of such cutting-edge environment in Palestinian schools.

E-learning, as defined by Alonso et al (2005), involves leveraging information and communication technologies to enhance the quality of education. This is achieved by facilitating access to educational resources and services, as well as enabling remote collaboration and information exchange (Alonso et al., 2005). It offers a promising alternative to traditional educational pathways, especially in conflict-affected areas like Palestine, where conventional methods are often disrupted due to geopolitical challenges. However, despite the potential benefits, e-learning initiatives in Palestinian territories, are still in their infancy stages (Obaid, 2020; Subaih et al., 2021).

The current study employs the Extended Technology Acceptance Model (ETAM) and the DeLone and McLean Information Systems (IS) Success Model to explore various factors affecting the adoption of AI-enabled adaptive e-learning environment. These factors include User Interface (UI), Perceived Ease of Use (PEU), Perceived Usefulness (PU), Information Quality (IQ), System Quality (SQ), Behavioral Intentions (BI), and Actual Use (AU). Preliminary findings indicate that factors like PU, PEU, and SQ are positively correlated with schools' behavioral intentions to adopt such systems, aligning with the global trends in e-learning acceptance. A total of 202 schools across different regions in the Gaza Strip participated in the study, providing valuable insights into the state of e-learning acceptance in Palestinian schools.

Our findings indicate a generally positive relationship between perceived usefulness, ease of use, and the overall quality of the AI-enabled e-learning environment with the behavioral intention to adopt such environments. However, areas like information quality need further improvement for a more effective learning experience. This work, therefore, contributes invaluable data and recommendations for educational policymakers and institutions in Palestine, aiming to enhance the adoption and effective utilization of AI-enabled adaptive e-learning environment.

Importantly, this study is one of the first to address the acceptance and adoption of AI-enabled e-learning environment in Palestinian schools, making it a significant contribution to the broader discourse on e-learning adoption in Palestinian educational institutions. The study's results not only enrich our understanding of e-learning acceptance in the Gaza Strip but also lay the groundwork for similar studies in other Palestinian territories inaccessible due to geopolitical constraints and the Israeli occupation.

Literature Review

The transformation in education technology has evolved alongside advancements in Information and Communication Technology (ICT). Since the inception of the internet in the 1980s, the educational landscape has transitioned from traditional methods to a more digitalized environment. E-learning platforms like Moodle have emerged as crucial tools,

offering flexibility and removing geographical constraints (Amin & Paiman, 2022). This is particularly relevant in conflict-affected areas like Palestine, where traditional methods of education often face disruptions. However, the success of e-learning environment isn't universal; it requires users to have certain digital skills and access to appropriate devices, leading to varying perceptions and goals among users.

Understanding the acceptance of technology, especially in the educational sector, is a subject of ongoing research. Various models have been devised to predict how well technology will be accepted among users. Notable among these are the Technology Acceptance Model (TAM) by Davies and the Information System Success Model (ISSM) by DeLone and McLean (Hawash et al., 2021).

Introduced by Davis and Bagozzi (Davis, 1989), TAM has become a cornerstone in technology acceptance research. It primarily focuses on the acceptance and willingness of users to adopt information technology. The model explores factors like perceived usefulness and perceived ease of use as key determinants in shaping an individual's attitude towards using new technology. TAM suggests that perceived ease of use directly impacts perceived usefulness and has been widely adopted across multiple sectors, including education.

On the other hand, DeLone and McLean introduced ISSM in 1992, which has been adapted over time. Unlike TAM, ISSM prioritizes 'net benefits' as the primary indicator of a system's success. The model identifies six interrelated constructs: system quality, information quality, technology usage, user satisfaction, individual impact, and organizational impact. Among these, only individual and organizational impacts are considered as dependent variables (Al-Adwan et al., 2022). ISSM posits that the quality of the system and the information it contains are critical factors influencing user satisfaction and, ultimately, the successful use of technology. ISSM has been especially noted as one of the most widely used models for measuring the success of Information Systems in the context of e-learning.

In the context of the COVID-19 pandemic, research has also extended to include the Extended Technology Acceptance Model (ETAM). This model incorporates additional factors like system quality, information quality, and user interface. These variables have been proven to be antecedents in measuring the actual use of a system through behavioral intentions (Sukendro et al., 2020).

Both TAM and ISSM, along with ETAM, have been extensively applied in e-learning contexts. For example, ISSM has been used to evaluate user satisfaction in higher educational institutions (Al-Adwan et al., 2022). However, it's important to note that these models have limitations and are often adapted to fit the specific objectives of a study (Mustafa & Garcia, 2021). In this research, these models were adopted to assess various factors affecting the acceptance and effective utilization of AI-enabled adaptive e-learning environment in Palestinian schools.

This study integrates elements from the Extended Technology Acceptance Model (ETAM) and DeLone and McLean's Information System Success Model to offer an in-depth look into the adoption and utility of AI-enabled adaptive e-learning environment in Palestinian schools (Ong, et al., 2021). The framework includes a set of variables: User Interface (UI), Perceived Ease of Use (PEU), Perceived Usefulness (PU), Information Quality (IQ), System Quality (SQ), Behavioral Intentions (BI), and Actual Use. These factors and their complex interplay are visually represented in Figure 1.

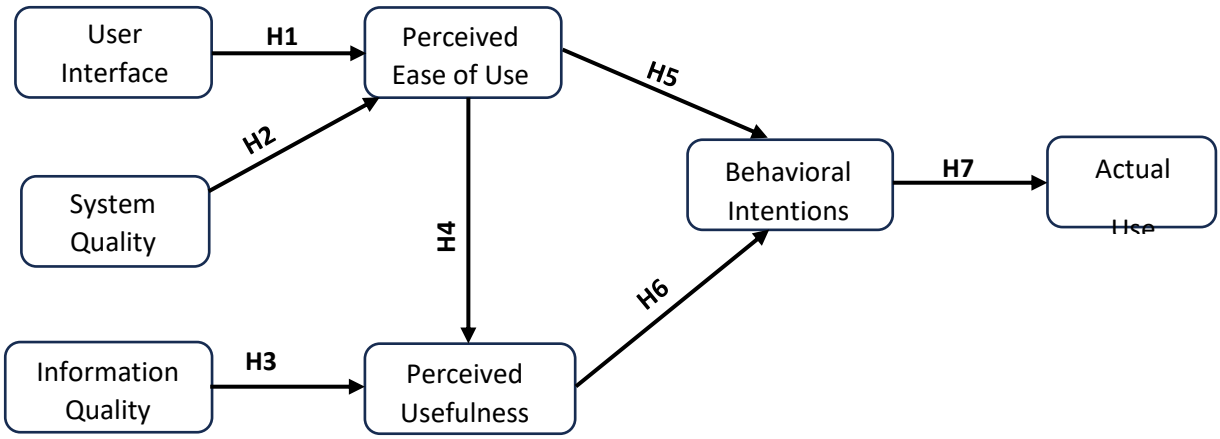

Figure 1. Theoretical research framework.

Given the singular challenges and opportunities in the Palestinian educational setting, this study posits the seven unique hypotheses. The methodology for developing these hypotheses was adapted from Prasetyo et al (2021), who examined the factors affecting the acceptance of e-learning platforms during the COVID-19 pandemic. However, in this paper only preliminary results showing correlations among the variables, reliability of the constructs and demographic and descriptive statistics will be reported to somewhat give early understanding on relationships of (i) AI-enhanced user interfaces towards educators' and students' perceived ease of system use, (ii) behavioral intentions as a significant predictor of actual system usage, particularly in the context of AI-enabled e-learning environment in Palestinian educational settings, (iii) information quality on the perceived usefulness of the system, a relation heightened by the specific cultural and educational nuances of Palestine, (iv) system quality, especially AI-enabled features, with the actual system use, (v) perceived ease of use and behavioral intentions in the Palestinian context, influencing the adoption rates of AI-enabled e-learning environment, (vi) perceived usefulness and the relationship between system quality and behavioral intentions, particularly in Palestinian educational settings and (vii) factors such as system quality and information quality with perceived ease of use, affecting both educators and students. By setting these objectives with such relationships in the specific context of Palestinian schools, this study aims to provide nuanced insights that could be translated into actionable educational policies and strategies, setting it apart from existing research.

Previous Research and Their Relevance

Several frameworks and models have been used to study the acceptance of technology in educational settings. Among the most prominent is the Technology Acceptance Model (TAM), which posits that perceived usefulness (PU) and perceived ease of use (PEU) are vital drivers for technology adoption (Karahanna & Straub, 1999). Extended versions of TAM, known as ETAM, have included additional variables to capture the nuances of technology acceptance in various contexts, including e-learning. Alongside TAM, the DeLone and McLean Information Systems (IS) Success Model has also gained traction in Information Systems research (Freeze et al., 2010). This model introduces variables like System Quality (SQ) and Information Quality (IQ) as significant indicators for successful technology adoption.

In more integrated approaches, studies have tried to combine TAM and the DeLone and McLean model, aiming for a more comprehensive framework for studying technology

acceptance. These hybrid models often incorporate variables like System Quality, Information Quality, and User Interface (UI), in addition to the traditional TAM variables of Perceived Usefulness and Perceived Ease of Use.

Earlier studies have identified various factors that influence the adoption of e-learning environment. Research by Rosen & Weil highlighted that teachers' reluctance to use computer-based teaching often stemmed from a lack of experience with technology and insufficient technical support (Rajak & Shaw, 2021). This aligns with the emphasis of our study on System Quality (SQ) and Information Quality (IQ) as factors influencing Perceived Ease of Use (PEU) and Perceived Usefulness (PU) Palestinian schools.

Studies by Robertson et al. noted the importance of teachers' perceptions and psychological factors in shaping their attitudes toward technology (Hallam et al., 2009). This is particularly relevant to our study, which found that System Quality, especially aspects like usability, significantly impacts perceived ease of use.

Other research pointed out that educational institutions often adopt e-learning systems for reasons like global competition and cost reduction. These drivers resonate with the unique geopolitical context of education in the Palestinian territory, where e-learning is often a necessity due to socio-political challenges. Additionally, studies by Tung, Chang and Chou highlighted the significant effects of perceived usefulness and perceived ease of use on the behavioral intention to use e-learning environment (Tung et al., 2008).

Research by Chang et al. emphasized that individual experiences and cognitive factors influence technology adoption (Chang et al., 2020). This is especially pertinent in our context, where actual use may vary due to perceived difficulty and risks associated with new learning platforms.

A specific gap remains in understanding how these factors influence the acceptance of e-learning environments among the schools in the Palestinian territory (Subaih et al., 2021). This study aims to fill this gap by integrating the Extended Technology Acceptance Model (ETAM) and the DeLone and McLean IS Success Model, focusing specifically on the Palestinian educational context.

Methodology

An online questionnaire was distributed through Google Forms, in line with similar research methodologies found in the literature (Hawash et al., 2021; Prasetyo, Ong, et al., 2021). Unlike traditional survey methodologies that target individual respondents, this study uniquely considered the school as the unit of analysis. Each participating school was requested to select a teacher to represent its views and respond to the questionnaire. The selection of the teacher was based on criteria determined by each school, ensuring that the respondent had adequate expertise and familiarity with the subject matter. The survey was crafted to investigate the various determinants influencing the adoption and continued use of AI-enhanced adaptive e-learning environment within Palestinian schools.

The survey consisted of eight distinct sections: demographic details, quality of the system, quality of information, user interface design, perceived utility, ease of use, intent to continue using the system, and actual system usage. The questionnaire featured a compilation of 30 questions, borrowed and adapted from a range of existing studies (Chao, 2019; Hawash et al., 2021; Ong, et al., 2021; Vanneste et al., 2013). Seven experts in the field reviewed these questions over three rounds of iterations, eventually endorsing 19 (Table 1) out of the 30 original questions for inclusion in the final survey.

A preliminary test of the survey was conducted with a sample of 46 teachers from different schools to assess its validity. In line with Taber's recommendations (2018), the overall result got a Cronbach's alpha value of 0.906 (acceptable ≥ 0.700). Thus, the questionnaire was considered valid and was distributed (Taber, 2018).
The demographic information consisted of questions regarding school geographical location, school students' gender, school's operational timeframe, school's educational level, school's governance. A 5-point Likert scale was utilized in this study to measure all latent variables. The 5-point Likert scale had a measure of strongly disagree as 1 and strongly agree as 5.

Table 1
The construct and measurement items.

Construct	Item	Measurements
System Quality	SYS1	The services & functionalities of AI-enabled adaptive learning system will be easy to use.
	SYS2	Communicating with AI-enabled adaptive learning system will be flexible.
Information Quality	IQ1	AI-enabled adaptive learning system will provide useful information for my needs.
	IQ2	
	IQ3	AI-enabled adaptive learning system will offer exactly the knowledge I need.
	IQ4	The information and content offered by AI-enabled adaptive learning system will be up-to-date.
		The information provided by AI-enabled adaptive learning system will be accurate.
Perceived Usefulness	PU1	Usage of AI-enabled adaptive learning system will increase my academic productivity.
	PU2	
	PU3	AI-enabled adaptive learning system will improve my performance in my academics.
		AI-enabled adaptive learning system will make it easier to study in distance learning.
Perceived Ease of Use	PEU1	AI-enabled adaptive learning system will enable me to study asynchronously.
User Interface	UI1	Various features will be well integrated with AI-enabled adaptive learning system.
	UI2	
	UI3	The user interface will affect my desire to use AI-enabled adaptive learning system.
	UI4	
		User interface will affect speed of learning and using the AI-enabled adaptive learning system.
		The user interface will make finding what I need in the AI-enabled adaptive learning system easy
Behavioral Intentions	BI1	I am motivated to use AI-enabled adaptive learning system.
	BI2	I would recommend to others to use AI-enabled adaptive learning system.
	BI3	I am willing to use AI-enabled adaptive learning system for the whole year.
	BI4	Using AI-enabled adaptive learning system will make learning more interesting.
Actual Use	AU1	Everyone will learn more when using AI-enabled adaptive learning system.

Participants

The study engaged schools across the Gaza Strip, the focus on schools in the Gaza Strip within the Palestinian territories was motivated by several factors. The region presents a unique and challenging educational landscape influenced by socio-political complexities,

technological limitations, and resource constraints (Subaih et al., 2021). Furthermore, the Gaza Strip has a high concentration of schools that vary in terms of management, ranging from government-run institutions to those managed by the United Nations Relief and Works Agency (UNRWA). This diversity makes the area a rich context for investigating the factors affecting the adoption of AI-enabled adaptive e-learning environment. Moreover, the insights gained from this study have the potential to inform educational policy and technological implementation in similarly complex educational settings. The questionnaire took approximately 15–20 minutes to complete. The study collected responses from 213 schools, which were reduced to 202 after the elimination of duplicates. Considering that there are 421 government schools and 257 UNRWA schools in Gaza, our sample size of 202 schools is significant and provides a solid basis for making generalizations about technology acceptance in educational settings across the region.

Prior to survey completion, respondents were required to submit an informed consent form. Convenience sampling was employed, and the survey link was accessible to respondents from July to September 2023. The survey was disseminated through government schools in collaboration with the Gaza Strip's Ministry of Education, which kindly sent an official letter urging schools to participate. For schools managed by UNRWA, we partnered with teacher groups for distribution. Table 2 represents the descriptive statistics and demographic characteristics of the participating schools, the majority of participating schools were male-only, accounting for 91 schools, while 77 were female-only and 34 were mixed-gender. Most schools operated during morning hours, with 137 falling under this category, and 65 operating in the evening. Preparatory schools were most common, numbering 94, followed by 59 primary schools and 49 secondary schools. In terms of management, 153 schools were government-run, and 49 were managed by UNRWA. Geographically, the schools were mainly situated in the Gaza Governorate (69), followed by Khan Yunis (49), North Gaza (29), Rafah (28), and the Central Region (27). These demographics offer a detailed overview of the diverse settings in which AI-enabled adaptive e-learning.

Table 2
Descriptive statistics of the respondents (n = 202)

Characteristics	**Category**	**N**	**Percentage (%)**
Gender	Male-only	91	45.0%
	Female-only	77	38.1%
	Mixed	34	16.8%
Operating Hours	Morning	137	67.8%
	Evening	65	32.2%
Educational Stage	Preparatory	94	46.5%
	Primary	59	29.2%
	Secondary	49	24.3%
Management Structure	Government	153	75.7%
	UNRWA	49	24.3%
Geographical Distribution	Gaza	69	34.2%
	Khan Yunis	49	24.3%,
	North Gaza	29	14.4%
	Rafah	28	13.9%
	Central	27	13.4%

In the analysis phase of our study, Structural Equation Modeling (SEM) was employed to explore the relationships among the key variables identified within the Palestinian educational context. SEM is particularly advantageous for its ability to examine multiple dependent relationships and the mediating effect among variables (Mohtar et al., 2019). Utilizing SEM can help us to validate our theoretical model, which combines insights from the Extended Technology Acceptance Model (ETAM) Sukendro et al (2020) and DeLone and McLean's Information System Success Model (Ong, et al., 2021). Specifically, the model integrates variables such as User Interface (UI), Perceived Ease of Use (PEU), Perceived Usefulness (PU), Information Quality (IQ), System Quality (SQ), Behavioral Intentions (BI), and Actual Use. This approach aligns with the frameworks established in previous studies employing ETAM and DeLone and McLean's model (Mastan et al., 2022; Prasetyo, Ong, et al., 2021). SEM analysis was conducted using a dataset of 202 responses from Palestinian schools in the Gaza Strip, offering a robust foundation for the study. The analysis confirmed several of our hypotheses and provided valuable insights into the factors that significantly influence the acceptance and effective utilization of AI-enabled adaptive e-learning environment in Palestinian schools. These findings are integral for shaping educational policy and technology adoption strategies within the region.

Results

Figure 2, which is a graphical representation of Table 3, employs the Structural Equation Modeling (SEM) framework to assess various factors influencing the acceptance and sustained utilization of e- learning environments in Palestinian schools. The table provides correlation values for relationships between key variables such as System Quality (SQ), Information Quality (IQ), Perceived Usefulness (PU), Perceived Ease of Use (PEU), User Interface (UI), Behavioral Intentions (BI), and Actual Use (AU). During the analysis, it was particularly noteworthy that the relationships between System Quality and Perceived Ease of Use (SQ-PEU, 0.196), Information Quality and Perceived Ease of Use (IQ-PEU, 0.338), and Actual Use and System Quality (AU-SQ, 0.348) exhibited low correlation values. These lower values suggest that these relationships may have limited impact on the outcome variables and could be areas warranting further investigation.

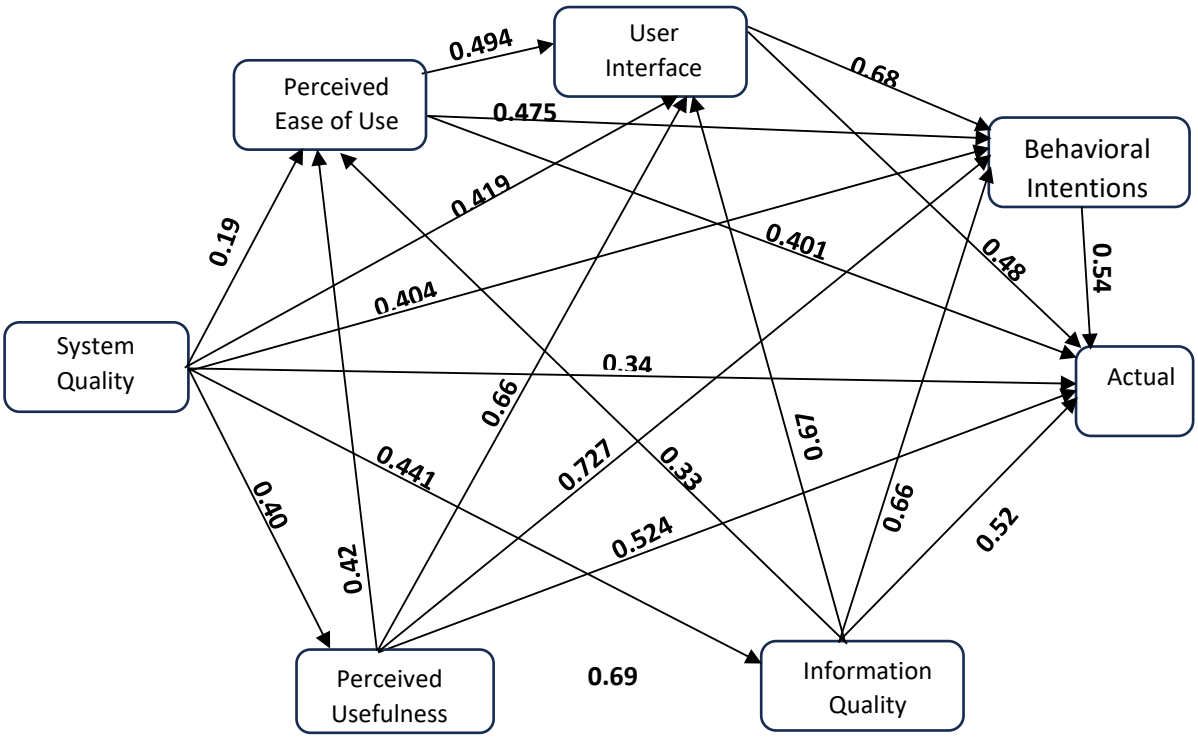

Figure 2. SEM analysis for evaluating factors affecting E-learning environment adoption.

Table 3
Correlation Matrix of Key Variables affecting the Adoption of E- Learning Systems.

	SQ	IQ	PU	PEU	UI	BI	AU
SQ	1.000	0.397	0.441	0.196	0.419	0.404	0.348
IQ	0.397	1.000	0.693	0.338	0.676	0.667	0.524
PU	0.441	0.693	1.000	0.425	0.666	0.727	0.524
PEU	0.196	0.338	0.425	1.000	0.494	0.475	0.401
UI	0.419	0.676	0.666	0.494	1.000	0.681	0.487
BI	0.404	0.667	0.727	0.475	0.681	1.000	0.543
AU	0.348	0.524	0.524	0.401	0.487	0.543	1.000

Table 4 provides descriptive statistics for the constructs evaluated in this study, capturing metrics such as mean, standard deviation, and the minimum and maximum values for each factor. This offers a comprehensive overview of the data distribution for the key constructs. Following this, Table 5 dives deeper into the individual questions that make up each construct, detailing their respective means, standard deviations, and range. This table provides a granular view of the data and helps in understanding the variability within each construct. Table 6 then summarizes the reliability and validity tests conducted for the study's constructs, presenting Cronbach's alpha (α) and Composite Reliability (CR) values. All constructs exceeded the academic standard threshold of 0.700 for both these metrics, thereby confirming acceptable internal consistency of the measures used in this study (Alumran et al., 2014; Black et al., 2010).

Table 4
Descriptive statistics for constructs affecting the Adoption of E- Learning Systems.

Factors	Mean	Standard Deviation	Minimum	Maximum
System Quality	4.165	0.735	3	5
Information Quality	3.515	1.033	1	5
Perceived Usefulness	2.993	1.286	1	5
Perceived Ease of Use	3.07	1.28	1	5
User Interface	3.075	1.2275	1	5
Behavioral Intentions	3.1325	1.1925	1	5
Actual Use	3.09	1.28	1	5

Table 5
Descriptive Statistics for Each Question

Question	Factor	Mean	Standard Deviation	Minimum	Maximum
SYS1	System Quality	4.05	0.73	3	5
SYS2		4.28	0.74	3	5
IQ1	Information Quality	4.66	0.50	3	5
IQ2		3.13	1.30	1	5
IQ3		3.21	1.08	1	5
IQ4		3.08	1.25	1	5
PU1	Perceived Usefulness	2.97	1.30	1	4
PU2		2.92	1.34	1	4
PU3		3.09	1.22	1	5
PEU1	Perceived Ease of Use	3.07	1.28	1	5
UI1	User Interface	3.07	1.24	1	5
UI2		2.89	1.34	1	5
UI3		3.12	1.16	1	5
UI4		3.22	1.17	1	5
BI1	Behavioral Intentions	3.27	1.09	1	5
BI2		3.18	1.14	1	5
BI3		3.07	1.23	1	5
BI4		3.01	1.31	1	5
AU1	Actual Use	3.09	1.28	1	5

Table 6
Summarizes the reliability and validity tests conducted for the study's constructs.

Factors	Cronbach's Alpha	Composite Reliability (CR)	Average Variance Extracted (AVE)
System Quality	0.646	0.81	0.68
Information Quality	0.522	0.90	0.70
Perceived Usefulness	0.734	0.91	0.78
Perceived Ease of Use	1.000	0.72	0.72
User Interface	0.671	0.89	0.67
Behavioral Intentions	0.752	0.93	0.77
Actual Use	1.000	0.81	0.81

Discussion

The present study employs an integrated model based on the Extended Technology Acceptance Model (ETAM) and the Delone and McLean IS Success Model to evaluate the factors affecting the acceptance of adaptive e-learning environment in Palestinian schools. Structural Equation Modeling (SEM) was used as the primary analytical tool to assess the relationships among variables such as System Quality (SQ), Information Quality (IQ), Perceived Usefulness (PU), Perceived Ease of Use (PEU), User Interface (UI), Behavioral Intentions (BI), and Actual Use (AU). A comprehensive online questionnaire administered for data collection consisted of various metrics like mean, standard deviation, and correlation coefficients among factors.

One of the foundational aspects of the Technology Acceptance Model (TAM) is Perceived Usefulness (PU) and Perceived Ease of Use (PEU). Our study corroborates previous findings that a user-friendly system offering flexibility and adaptability significantly impacts PU and BI. Specifically, our SEM results indicate a moderate correlation of 0.425 between PEU and PU, highlighting that user-friendly systems make e-learning environment more appealing.

This importance of user-friendliness is further emphasized by the significant relationship of the User Interface (UI) on Perceived Ease of Use (PEU), with a strong correlation of 0.494. The user interface, including its well-integrated features and intuitive layout, plays a critical role in the system's ease of use. Given the socio-political challenges in the Palestinian territory, having an easy-to-navigate and intuitive interface is particularly crucial, as it can mitigate some of the barriers to effective e-learning.

Further, the study revealed a notable correlation of 0.543 between Behavioral Intentions (BI) and Actual Use (AU), implying that the intentions to use e-learning environment significantly translate into actual usage. These findings are in line with previous research suggesting that Behavioral Intention is a precursor to Actual Use, and they could be instrumental for educational policymakers aiming to improve e-learning adoption rates.

Lastly, System Quality (SQ) and Information Quality (IQ) emerged as significant predictors of perceived usefulness and ease of use. With correlation values ranging between 0.348 to 0.441 for SQ and 0.524 to 0.693 for IQ, the quality of the system influences not just the ease of information access but also its perceived usefulness. This emphasis on system and information quality is particularly important in the context of the Palestinian territory, where

access to quality educational resources may be limited. In conclusion, the study provides a comprehensive understanding of the factors affecting e-learning adoption in this unique setting, serving as a cornerstone for future academic research and practical implementations in the area of e-learning.

Theoretical Contributions

The application of Structural Equation Modeling (SEM) in the context of adaptive e-learning environment acceptance in Palestinian schools is a pivotal advancement in understanding technology adoption in education. SEM is a powerful tool for elucidating complex relationships between multiple variables through its robust computational capabilities, as mentioned in previous studies (Mohtar et al., 2019; Ong, et al., 2021; Purwaningsih & Kusuma, 2015). This technique is especially invaluable for investigating why users opt for specific technologies or platforms, a question of immediate relevance in the era of online education (Roque, et al., 2021).

Recently, reliance on technology for educational purposes has increased, our study uses SEM to dissect the factors influencing the choice of e-learning environment among schools in the Palestinian territory. The study analyzes not just individual metrics like System Quality (SQ), Information Quality (IQ), Perceived Usefulness (PU), Perceived Ease of Use (PEU), User Interface (UI), Behavioral Intentions (BI), and Actual Use (AU), but also the interrelationships among these metrics.

The theoretical contributions of our study hold significant implications for both educators and students, particularly in regions facing socio-political challenges such as the Palestinian territory. By identifying key factors such as ease of use, the quality of system and information, and user interface design, our study provides insights into what makes an e-learning environment more or less likely to be accepted by end-users.

Our study bridges existing gaps in the literature by focusing on a region that has been relatively under-researched in the context of e-learning and technology adoption. It adds to the growing body of evidence that underscores the importance of system and information quality as critical factors influencing technology adoption, corroborating the findings of previous research in different socio-cultural settings (Hawash et al., 2021; Kabudi et al., 2021; Ouyang et al., 2022).

The theoretical underpinnings of this study could serve as a foundation for educational policymakers aiming to improve e-learning adoption rates. They could take into consideration the factors identified in this study to make more informed decisions, particularly in a setting where educational resources are scarce or where socio-political factors hinder traditional educational processes.

In summary, the theoretical contributions of this study are manifold. They offer educators and policymakers a nuanced understanding of the factors affecting e-learning environment adoption in a complex socio-political environment. Moreover, they provide a roadmap for future academic research aimed at optimizing e-learning environment for higher acceptance and more effective learning outcomes.

Practical Implications

The transition from traditional classroom settings to e-learning environment has been both rapid and complex, especially in the Palestinian territory where socio-political factors add another layer of complexity. The practical implications of our study offer actionable insights

for various stakeholders, including educators, policymakers, and e-learning environment developers.

Our findings on System Quality (SQ), Information Quality (IQ), and User Interface (UI) suggest that these factors are crucial for the acceptance of e-learning environment. Educational institutions and e-learning environment providers can use these insights to tailor their services to meet the specific needs and preferences of students in the Palestinian territory. For instance, improving the system's reliability and responsiveness could significantly enhance its perceived ease of use.

The study could serve as a valuable resource for government bodies and non-profit organizations aiming to bridge educational inequalities. Our findings on the significance of Perceived Usefulness (PU) and Behavioral Intentions (BI) could guide these organizations in selecting and promoting e-learning environment that are most likely to be accepted and effectively utilized by students from various socio-economic backgrounds.

The data concerning Perceived Ease of Use (PEU) and Actual Use (AU) could encourage more effective collaborations between teachers and students. By understanding what makes an e-learning environment easy to use, educators can better structure their online teaching methods, and students can more effectively engage with the material. Our research also found that factors like Perceived Usefulness (PU) and User Interface (UI) have significant effects on Behavioral Intentions (BI) to use the system. Educational institutions could leverage this information to develop customized learning pathways that align with students' behavioral intentions, thereby enhancing both engagement and learning outcomes.

This study can act as a roadmap for educational policymakers, offering them data-driven insights into what factors are most important for e-learning environment adoption. This is particularly useful in the Palestinian context, where decision-makers need to consider both the effectiveness and the socio-political implications of different e-learning environment. In summary, the practical implications of our study are far-reaching and could significantly influence the direction of e-learning strategies in the Palestinian territory. From enhancing system and information quality to better understanding user behavior, these insights offer a robust framework for optimizing e-learning experiences for students in this region.

Limitations and Future Research

While the study provides valuable insights into the factors affecting the acceptance and loyalty towards e-learning environment among schools in the Palestinian territory, it is not without limitations. The study did not delve into the nuanced differences that might exist between various age groups, grade levels, or gender. Neither did it consider the prior experience of respondents with e-learning environment, which could significantly affect their perceptions and acceptance levels. The study did not account for the impact that different subjects or instructors might have on the acceptance of e-learning environment. The pedagogical methods and technological proficiency of instructors could also be considered as additional variables affecting e-learning environment acceptance and loyalty. While this study provides a detailed analysis of factors influencing e-learning environment loyalty among Palestinian schools, the findings may not be generalizable to other settings or cultures.

Future Research Directions

Future research could broaden the scope to include different age groups, educational levels, and possibly even educators themselves to provide a more comprehensive view.

Furthermore, future studies could examine how different subjects and teaching methods affect e-learning environment acceptance, adding another layer to our understanding of e-learning environment. Extending the study to include schools or individual users from different countries could offer a comparative analysis, allowing for a more global understanding of e-learning environment acceptance and loyalty. In addition, incorporating the prior experience of online learning could offer another dimension to understanding platform loyalty and could be especially useful in settings where e-learning is still in a nascent stage. Considering the quality and accessibility of technological resources available to students could add an important layer to understanding the broader challenges and opportunities tied to e-learning environment acceptance. By addressing these limitations and extending the scope of the research, future studies can offer even more nuanced and actionable insights into the factors affecting e-learning environment acceptance and loyalty.

Conclusions

The primary objective of this research was to explore determinants influencing the acceptance of online learning platforms among students in the Palestinian territories. Utilizing Structural Equation Modeling, the study analyzed the relationships among several latent variables, including user interface, perceived ease of use, perceived usefulness, information quality, system quality, behavioral intentions, and actual use. The study found these variables to be significant in shaping the acceptance and loyalty towards e-learning environment. Data was collected from 202 respondents, focusing on Palestinian schools. The most significant finding was the influential role of Perceived Ease of Use (PEU) on Perceived Usefulness (PU) and ultimately on Actual Use (AU) of the e-learning platforms. This was followed by the role of the user interface on PEU and behavioral intentions on AU. Essentially, the study revealed that engagement with platforms is more likely when they offer ease of use and high functionality in their user interface.

The study contributes to existing literature by providing a localized understanding of e-learning acceptance in the Palestinian territories, a context that has not been extensively represented in previous studies. The study's findings can be applied to improve e-learning environment, guide educational policy, and inform the design of future online courses and platforms.

Aknowledgement

I would like to convey our utmost appreciation to Learning & Teaching Innovation Research Centre, Faculty of Education, Universiti Kebangsaan Malaysia for support to publish this journal publication. We would like to thank to Faculty of Education research grant GG-2021-014 which supports the APC for this article. Special thanks to all researchers under the Personalized Education Research Group for their intellectual, spiritual, and moral support.

Reference

Adzhari, N. A. N., & Din, R. (2021). Enhancing English language teaching by implementing ICT as an educational tool. *Journal of Personalized Learning, 4*(1), 101-110.

Al-Adwan, A. S., Nofal, M., Akram, H., Albelbisi, N. A., & Al-Okaily, M. (2022). Towards a Sustainable Adoption of E-Learning Systems: The Role of Self-Directed Learning. *Journal of Information Technology Education: Research, 21, 245-267*.

Alonso, F., López, G., Manrique, D., & Viñes, J. M. (2005). An instructional model for web-based e-learning education with a blended learning process approach. *British Journal of educational technology, 36*(2), 217-235.

Alumran, A., Hou, X.-Y., Sun, J., Yousef, A. A., & Hurst, C. (2014). Assessing the construct validity and reliability of the parental perception on antibiotics (PAPA) scales. *BMC public health, 14*, 1-9.

Amin, M. M., & Paiman, N. (2022). University English Language Teachers' Use of Digital Platforms for Online Teaching. *International Journal of Emerging Technologies in Learning (Online), 17*(20), 134-148.

Black, W. C., Babin, B. J., & Anderson, R. E. (2010). *Multivariate data analysis: A global perspective*: Pearson.

Chang, Y.-C., Enkhjargal, U., Huang, C.-I., Lin, W.-L., & Ho, C.-M. (2020). Factors affecting the Internet banking adoption. *Jurnal Ekonomi Malaysia, 54*(3), 117-131.

Chao, C.-M. (2019). Factors determining the behavioral intention to use mobile learning: An application and extension of the UTAUT model. *Frontiers in psychology, 10*, 1652, 1-14.

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS quarterly*, 319-340.

Freeze, R. D., Alshare, K. A., Lane, P. L., & Wen, H. J. (2010). IS success model in e-learning context based on students' perceptions. *Journal of Information systems education, 21*(2), 173-184.

Hallam, S., Burnard, P., Robertson, A., Saleh, C., Davies, V., Rogers, L., & Kokatsaki, D. (2009). Trainee primary-school teachers' perceptions of their effectiveness in teaching music. *Music education research, 11*(2), 221-240.

Hawash, B., Mokhtar, U. A., & Yusof, Z. M. (2021). Users' acceptance of an electronic record management system in the context of the oil and gas sector in Yemen: an application of ISSsxdM-TAM. *International Journal of Management and Enterprise Development, 20*(1), 75-98.

Kabudi, T., Pappas, I., & Olsen, D. H. (2021). AI-enabled adaptive learning systems: A systematic mapping of the literature. *Computers and Education: Artificial Intelligence, 2*, 100017, 1-12.

Karahanna, E., & Straub, D. W. (1999). The psychological origins of perceived usefulness and ease-of-use. *Information & management, 35*(4), 237-250.

Mastan, I. A., Sensuse, D. I., Suryono, R. R., & Kautsarina, K. (2022). Evaluation of distance learning system (e-learning): a systematic literature review. *Jurnal Teknoinfo, 16*(1), 132-137.

Mohtar, L. E., Halim, L., Rahman, N. A., Maat, S. M., Iksan, Z. H., & Osman, K. (2019). A model of interest in STEM careers among secondary school students. *Journal of Baltic Science Education, 18*(3), 404-416.

Mustafa, A. S., & Garcia, M. B. (2021). *Theories integrated with technology acceptance model (TAM) in online learning acceptance and continuance intention: A systematic review.*

Paper presented at the 2021 1st Conference on online teaching for mobile education (OT4ME), 68-72.

Obaid, T. (2020). Factors driving e-learning adoption in palestine: an integration of technology acceptance model and IS success model. 1-5.

Ouyang, F., Zheng, L., & Jiao, P. (2022). Artificial intelligence in online higher education: A systematic review of empirical research from 2011 to 2020. *Education and Information Technologies, 27*(6), 7893-7925.

Prasetyo, Y. T., Ong, A. K. S., Concepcion, G. K. F., Navata, F. M. B., Robles, R. A. V., Tomagos, I. J. T., Redi, A. A. N. P. (2021). Determining factors Affecting acceptance of e-learning platforms during the COVID-19 pandemic: Integrating Extended technology Acceptance model and DeLone & Mclean is success model. *Sustainability, 13*(15), 8365.

Prasetyo, Y. T., Roque, R. A. C., Chuenyindee, T., Young, M. N., Diaz, J. F. T., Persada, S. F., . . . Perwira Redi, A. A. N. (2021). *Determining factors affecting the acceptance of medical education elearning platforms during the covid-19 pandemic in the philippines: Utaut2 approach.* Paper presented at the Healthcare.9(7), 780, 1-13.

Purwaningsih, R., & Kusuma, P. D. (2015). *Analisis Faktor-Faktor Yang Mempengaruhi Kinerja Usaha Kecil Dan Menengah (UKM) Dengan Metode Structural Equation Modeling (Studi kasus UKM berbasis Industri Kreatif Kota Semarang).* Paper presented at the Prosiding Seminar Sains Nasional dan Teknologi, 1(1),7-12.

Rajak, M., & Shaw, K. (2021). An extension of technology acceptance model for mHealth user adoption. *Technology in Society, 67*, 101800.

Subaih, R. H. A., Sabbah, S. S., & Al-Duais, R. N. E. (2021). Obstacles facing teachers in Palestine while implementing e-learning during the COVID-19 pandemic. *Asian Social Science, 17*(4), 44-45.

Sukendro, S., Habibi, A., Khaeruddin, K., Indrayana, B., Syahruddin, S., Makadada, F. A., & Hakim, H. (2020). Using an extended Technology Acceptance Model to understand students' use of e-learning during Covid-19: Indonesian sport science education context. *Heliyon, 6*(11)., 1-9.

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in science education, 48*, 1273-1296.

Tung, F.-C., Chang, S.-C., & Chou, C.-M. (2008). An extension of trust and TAM model with IDT in the adoption of the electronic logistics information system in HIS in the medical industry. *International journal of medical informatics, 77*(5), 324-335.

Vanneste, D., Vermeulen, B., & Declercq, A. (2013). Healthcare professionals' acceptance of BelRAI, a web-based system enabling person-centred recording and data sharing across care settings with interRAI instruments: a UTAUT analysis. *BMC medical informatics and decision making, 13*(1), 1-14.