Exploring Factors Affecting Undergraduate Students' Acceptance of E-learning Environment

Talib Ahmad ALmseidein

Department of Basic and Applied Science, Shoubak University Collage, AL-Balqa Applied University, Jordan

Abstract
This study attempts to explore the factors that influence undergraduate students' acceptance of E-learning systems. To achieve this purpose, the author proposed a new model that aims to examine the impact of system quality, information quality, service quality, system interactivity, computer anxiety, technology experience, computer self-efficacy, accessibility, instructor, course quality, and awareness of ethical issues on E-learning acceptance. Data collected through an online questionnaire survey, that was implemented at the Al-Balqa Applied University in the Jordan. There were 167 students took part in this study. Data has been analyzed using SmartPLS and SPSS and the Structural Equation Modelling (SEM) was applied to Verify the proposed model. The results revealed that all the suggested factors have a positive influence on E-learning acceptance among the students. Determining the factors that affect the acceptance of e-learning, it offers a useful suggestion for developers, decision-makers, policymakers, and designers to develop and improve e-learning system.

Keywords:
E-learning, Factors, Acceptance, Affecting, Student.

1.Introduction

The revolution represented in the development and improvement of information and communication technology (ICT) changed how learning services are provided and delivered. These improvements and developments help in beneficent the quality of education [1]. Result of Technological development rapidly especially in education sector, the e-learning system has emerged and developed as a wherewithal to smooth the educational process. lately, due to Corona Virus Disease 2019 (COVID-19) crisis, e-learning systems have become a very imperative need and an essential of education necessities in most countries of the world [2]. Therefore, e-learning systems is the best options available to teaching outside the classrooms, where is the ICT is the main component of e-learning [3].

Using e-learning is suitable when considering location, time, and health issues, also it plays a significant role to increase the skills and the effectiveness of knowledge through enabling access to e-resources and promoting collaboration in learning [4]. In previous studies there are various definitions of the e-learning system. [5] define it as a learning system integrating using of online media, internet technology, and digital media, to react and transfer the material. [6] define it as using of computers and other electronic devices and communications technology for learning and teaching new information and skills.

In the Jordan, the Ministry of High Education has encouraged higher institutions for education to adopt ICT in learning process. The Al-Balqa Applied University (BAU) has initiated embedding ICT by following an integrated approach, where various ICT tools are used in the learning process. the Moodle is one of the software tools used, which represents effective learning management systems for promoting the learning process. [7]. Despite of e-learning systems are used in many universities in Jordan, the success of using these systems will be determined by the acceptance shown by those students who deal extensively with these systems. Therefore, developers and providers of these systems must understand the way users perceive and respond to e-learning systems to develop e-learning systems and present them in an effective way to users to enhance the learning process. There are various factors that play a role in determining the success of this electronic environment and these factors must be considered to work on creating an efficient and felicitous e-learning system. Hence, it is important to know and understand the relevant factors which may have an impact on the learners' acceptance to adopting e-learning systems to help the learner to continue using e-learning systems so that the learner does not have a negative experience that in turn leads to superficial learning [8].

The successful implementation of an effectiveness e-learning systems would eventually depend on the degree of the learners' trend to acceptance and adopting the e-learning systems [9], [10]. According to [11] and [12] who indicated that the acceptance of the use of e-learning is affected by various external factors, and these factors must be taken into account by decision makers when implementing e-learning systems. Therefore, these factors must be explored and grouped in conformity with their importance. This study highlights to explore the factors influencing the E-learning acceptance in the Jordan educational environment.

2. Literature Review

Recently, the rapid development of ICT has played a significant role in evolvement of educational technology [13]. E-learning systems have become more flexible and interactive level, because of the latest developments of ICT, beside the enhancements on the internet technology. [14]. E-learning has many benefits over traditional learning methods, such as collaboration and communication and accessing to

Manuscript received November 5, 2022
Manuscript revised November 20, 2022
https://doi.org/10.22937/IJCSNS.2022.22.11.72

e-resources [15]. The user competency, his perception, and computer use expertise determines the successful fulfillment of e-learning systems [16]. In the previous studies had viewed the acceptance of e-learning systems, which were employed from technological, organizational, and environmental framework [17], [18].

Hammouri and Abu-Shanab [19] found acceptance of e-learning influenced by system quality, information quality, and computer self-efficacy. Perceived ease of use is the significant effect on students' acceptance and intent to adopt e-learning system in Jordan [20]. Almarabeh et al. [21] found the factors that directly affect students' acceptance toward using e-learning system are perceived usefulness and perceived ease of use. Al kurdi et al. [22] surveyed 270 university students to examine the factors affect students' acceptance of e-learning system. The results showed that "social influence, perceived enjoyment, self-efficacy, perceived usefulness, and perceived ease of use" are the most significant factors. Computer anxiety, technology experience, instructor attitude, course quality, and service quality factors that have been found to influence the acceptance of e-learning [23]. Accessibility has a positive effect on student behavior towards e-learning [24], Another vital role in providing user acceptance to adopt E-learning system is system interactivity [25].

Regarding this study, the goal is to explore the factors affecting student's acceptance of E-learning environments. According to the past studies related to students' acceptance of e-learning, the author proposed research model adapting factors, namely system quality, information quality, service quality, system interactivity, computer anxiety, technology experience, computer self-efficacy, accessibility, instructor, course quality, and awareness of ethical issue. Consequently, this study will validate the proposed model with students from the BAU in Jordan. Furthermore, recognizing these factors is going to help the decision-makers in developing e-learning systems and presenting them in an effective way to users to enhance the learning process.

3. Research Model and Hypotheses

The implementation of e-learning is being made in BAU university for a limited number of online courses, and these are available through Moodle. Hence, the aim of this study is to explore the influence of the constructs discussed previously concerning students' acceptance to adopt e-learning. Fig. 1 provides the proposed research model.

3.1. System Quality (SQ)

System quality (SQ) indicates to the performance of the system from user outlook [26]. More specifically, SQ determines the metrics by which system characteristics such as reliability, ease of use, availability, and adaptability influence users' expectations regarding the use of an e-learning system [27]. last studies pointed that SQ has a significant role in using and adopting an e-learning system [28], [29]. Besides, SQ has positive impact on students' acceptance and satisfaction of using e-learning system [30],[31],[32]. Thus, the hypothesis of this factor is:

Hypothesis 1. System quality has a positive effect on students' acceptance of e-learning system.

3.2. Information Quality

Information quality (IQ) refers to the quality of information provided through the information system that can be measured such as accuracy, comprehension, accessibility, completeness, timeliness, and suitability for the intended users [33],[34]. Previous studies have found there were a relationship between IQ and perceptions of the e-learning system' ease of use and usefulness [35],[36],[37],[38]. Gay [39] confirmed on the role of information quality in evaluating the convenience of e-learning system environment, which is important to push the acceptance of a student. Therefore, the following hypothesis is formulated:

Hypothesis 2. Information quality has a positive effect on students' acceptance of e-learning system.

3.3. Service Quality

Service quality (SEQ) refers to the service characteristics which are including responsiveness, availability, effectiveness, and assurance that provided by technical support at the ICT department to the end users [33]. Several previous studies, indicated the importance of the role that technical guidance and support, play in influencing students' intention toward the acceptance of e-learning [40],[41],[42]. furthermore, in [43] pointed that service quality is the availability of various communication technique to help students, in an appropriate time, in solving issues emerging from the use of technology. Cheng [36] stated that quality of service is identifying the acceptance of students to use e-learning system. Xu and Du [44] indicated if the quality of service is being low, this would affect students' perception of usefulness and ease of use. Hence, the hypothesis given below is formulated:

Hypothesis 3. Service quality has a positive effect on students' acceptance of e-learning system.

3.4. System Interactivity

System Interactivity (SI) refers to the interactions between faculty members and students and among students themselves, and the cooperation in learning that results from these interactions [45],[46]. The features of online SI will also allow instructors to manage students' interest and their quality of learning [47]. In [48] pointed out that SI was decisive for e-learning system development, to guarantee that students' acceptance of an e-learning system on a large scale. Furthermore, SI of the e-learning system can be helpful for students to catalyze their concern in learning; hence, students will perceive that the e-learning system is easier to use and more useful for them to earning knowledge [49]. Thus, the following hypothesis is put forward:

Hypothesis 4. System interactivity has a positive effect on students' acceptance of e-learning system.

3.5. Computer Anxiety

computer anxiety (CA) refers to the person's feeling of apprehension when dealing with information system to do a specific mission [50]. Students who suffer from CA are resistance to using systems [51]. In addition, students' who are computer inexperience may lead to their excitement anxiety in actual time. And therefore, anxiety to use a specific technology could impact the acceptance in the context of the use of information technologies in the field of teaching [23] was emphasizing as a factor with influence that might impede the using of e-learning [52],[53]. In line with this, it is stated that if using the e-learning system makes students feel inconvenient, then will tend to avert using e-learning systems [54]. Based on these notices, the following hypothesis is suggested:

Hypothesis 5. Computer Anxiety has a positive effect on students' acceptance of e-learning system.

3.6. Technology Experience

Technology experience (TE) indicates to the person's exposure to the technology -functionalities of the system- and the skills and capabilities gained by a person through using a technology [55]. Students' experience of having the ability to use a computer may play a role in encouraging or discouraging students in using and accepting technology [56]. Based on this, the students' previous experience may lead to an increase in their ability to learn how to use the e-learning system [57]. According to [58], that person's previous experience plays a major role in increasing their acceptance of e-learning systems. As a result, TE is necessary factor for preserving a positive usage experience and satisfaction with e-learning system [23]. Thus, the hypothesis of this factor is:

Hypothesis 6. Technology Experience has a positive effect on students' acceptance of e-learning system.

3.7. Computer Self-Efficacy

Computer self-efficacy (CSE) is a self-assessment of an individual's ability to use a computer to perform a particular task [59]. Several prior studies have revealed that there is a significant impact of CSE on students' acceptance. Hsia et al. [60] mentioned that students with higher CSE level are more ready to employ e-learning systems. Binyamin et al. [61] stated that CSE may affect students' usage of the e-learning system. In addition, CSE is a factor in accepting e-learning [62]. In according with this, CSE has found as an important factor of students' contentment in e-learning system [19]. Based on this the hypothesis given below is examined:

Hypothesis 7. Computer Self-Efficacy has a positive effect on students' acceptance of e-learning system.

3.8. Accessibility

Accessibility (ACC) is implying the degree of suitability and ease of how an individual can access the system and he / she ability to extracts the information from them [63]. Students' access to the e-learning system easily, the higher chances of students to regard the system as easy to employ [64]. Study conducted by [65] revealed that ACC has a significant impact on e-learning system acceptance. However, as ACC is not the same for every country, the following hypothesis is proposed:

Hypothesis 8. Accessibility has a positive effect on students' acceptance of e-learning system.

3.9. Instructor

Instructor (INS) plays a significant role in encouraging students to accept and use e-learning system [66]. The capability of instructor to provide feedback on learning processes immediately, identifying and updating the appropriate course content, this will lead to these students being to be more likely to use the e-learning system in their learning process [23]. [67] stated that improving students' attitudes towards e-learning is affected by the presence of the instructor. Study conducted by [68] showed that instructors influence students' acceptance of e-learning system. Based on this the hypothesis given below will be examined:

Hypothesis 9. Instructor has a positive effect on students' acceptance of e-learning system.

3.10. Course Quality

quality of courses (CQ) is crucial for students to continue using the e-learning system [69],[70]. Providing a well-designed online course can potentially assist students understand the content of the curriculum and facilitate them learning experiences [71]. furthermore, online course contents are easy for students to use and understand if they arranged and integrated with appropriate figures and examples [72]. Previous studies stated that well designed online courses suitable to students' knowledge, skills and capabilities enhanced quality of e-learning system Which contributed to increasing student acceptance of e-learning [73],[74]. In addition, Well-designed courses have a pivotal role in increasing the use and acceptance of students for the e-learning system [75]. Poorly designed courses will reduce usage of the e-learning system [76]. Therefore, the following hypothesis is shaped:

Hypothesis 10. Course Quality has a positive effect on students' acceptance of e-learning system.

3.11. Awareness of ethical issues

Awareness of ethical issues (AEI) refers to having knowledge or perception regarding the difference between right or wrong such as academic honesty, privacy, and surveillance [77]. Using e-learning system has made it simple for students to access unlimited e-resources, which exposes them to the possibility of trend towards unethical practices, so students have to be knowledgeable of ethical

issues when using e-learning. [78]. Many previous studies have indicated that ethical issues have increased as a result of the use of e-learning [79],[80],[81]. Based on this the hypothesis given below will be examined:

Hypothesis 11. Awareness of ethical issues has a positive effect on students' acceptance of e-learning system.

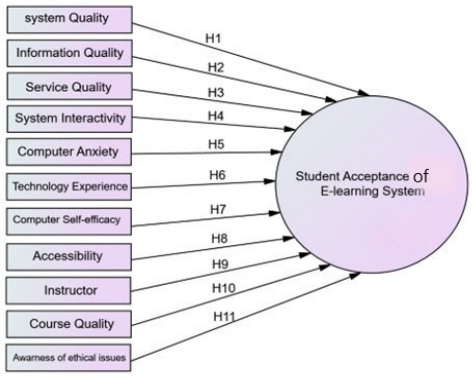

Fig. 1 proposed research model

4. Research Methodology

4.1. Study Sample

The study population in this study is undergraduate students who are using e-learning system in their education at BAU in the Jordan. The study sample consisted of 167 students who were chosen by the available sample method.

4.2. Instrument

An online survey instrument was evolved, to test the hypotheses proposed in this study. The online survey involved 32 items to measure the eleven constructs in the proposed research model. For each item was measured using a five-point Likert scale. The scale goes from 1 "strongly disagree" to 5 "strongly agree".

5. Finding

E-learning plays an important role in developing teaching and learning processes. Despite that, students' acceptance of this technology is the criterion for success in applying e-learning in universities. Accordingly, this study aims to explore the factors that affect the intent of students to accept e-learning in universities.

5.1. Measurement model analysis

To evaluate the measurement model there are two types of validities are needed [82]; namely convergent validity, and discriminant validity [83].

5.1.1. Convergent validity

To verify the convergent validity, the researcher used Partial Least Squares (SmartPLS ver. 3.2.6) to test the factor loading of the individual measures, composite reliability, and the average variance extracted (AVE). As shown in Table 1, the values of the factor loadings and composite reliability are greater than 0.7, whereas the value of the AVE is greater than 0.5. These results are in line with [84] who recommended that the indicator loadings and composite reliability must be equal to or greater than 0.7, while the AVE for each construct must be greater than 0.5 to be accepted. Thus, the convergent validity is emphasized.

Table 1:Results of measurements model – convergent validity

Constructs	Items	Loading	AVE	CR
System Quality	SQ_1	0.932	0.912	0.856
	SQ_2	0.931		
Information Quality	IQ_1	0.921	0.923	0.901
	IQ_2	0.903		
Service Quality	SEQ_1	0.895	0.899	0.862
	SEQ_2	0.892		
System Interactivity	SI_1	0.885	0.885	0.845
	SI_2	0.898		
Computer Anxiety	CA_1	0.921	0.921	0.935
	CA_2	0.918		
	CA_3	0.875		
Technology Experience	TE_1	0.885	0.901	0.895
	TE_2	0.869		
Computer Self-efficacy	CSE_1	0.945	0.865	0.876
	CSE_2	0.902		
Accessibility	ACC_1	0.856	0.896	0.875
	ACC_2	0.889		
	ACC_3	0.875		
Instructor	INS_1	0.844	0.874	0.921
	INS_2	0.928		
	INS_3	0.964		
Course Quality	CQ_1	0.945	0.892	0.875
	CQ_2	0.895		
awareness of ethical issues	AEI_1	0.864	0.923	0.842
	AEI_2	0.848		
	AEI_3	0.873		
Student Acceptance of the E-learning system	SAELS_1	0.930	0.929	0.922
	SAELS_2	0.903		
	SAELS_3	0.925		
	SAELS_4	0.877		
	SAELS_5	0.883		
	SAELS_6	0.861		

5.1.2. Discriminant validity

The degree of distinction of one construct between constructs in the research model is discriminant validity [85]. In this study two indicators used to examine discriminant validity, namely the Fornell-Larcker, and cross-loadings. The first indicator is that the square root of the AVE (diagonal value) for a particular construct must be greater compared to the variance shared among the construct and other constructs within the model. The Fornell-Larcker scale analysis is given in Table 2, which is met by the present study. The second indicator is that the loading of every item should be higher as compared to the loading of its similar variable [86]. Hence, Table 3 shows that the second scale has also met by this present study.

Table 2 : Results of discriminant validity – Fornell-Larcker scale

Variable	SQ	IQ	SEQ	SI	CA	TE	CSE	ACC	INS	CQ	AEI	SAELS
SQ	0.955											
IQ	0.921	0.961										
SEQ	0.856	0.856	0.948									
SI	0.842	0.902	0.875	0.941								
CA	0.845	0.862	0.863	0.796	0.960							
TE	0.824	0.845	0.845	0.862	0.856	0.949						
CSE	0.874	0.826	0.856	0.785	0.842	0.789	0.930					
ACC	0.874	0.847	0.795	0.764	0.863	0.745	0.756	0.947				
INS	0.862	0.891	0.763	0.732	0.765	0.821	0.746	0.910	0.935			
CQ	0.852	0.856	0.721	0.745	0.863	0.832	0.732	0.896	0.841	0.944		
AEI	0.821	0.874	0.802	0.785	0.932	0.856	0.823	0.853	0.813	0.786	0.961	
SAELS	0.825	0.841	0.793	0.823	0.856	0.861	0.863	0.803	0.878	0.752	0.812	0.964

Table 3: Results of discriminant validity – cross loadings

Items	SQ	IQ	SEQ	SI	CA	TE	CSE	ACC	INS	CQ	AEI	SAELS
SQ_1	0.932	0.745	0.702	0.812	0.523	0.542	0.731	0.732	0.645	0.563	0.712	0.532
SQ_2	0.931	0.724	0.743	0.802	0.502	0.752	0.712	0.823	0.635	0.714	0.732	0.571
IQ_1	0.712	0.921	0.789	0.532	0.577	0.514	0.562	0.812	0.602	0.652	0.753	0.574
IQ_2	0.732	0.903	0.654	0.514	0.562	0.578	0.514	0.632	0.514	0.532	0.785	0.562
SEQ_1	0.753	0.621	0.895	0.623	0.532	0.703	0.563	0.456	0.578	0.712	0.795	0.532
SEQ_2	0.785	0.541	0.892	0.678	0.538	0.645	0.714	0.563	0.645	0.732	0.821	0.731
SI_1	0.795	0.512	0.645	0.885	0.537	0.635	0.652	0.714	0.563	0.823	0.712	0.712
SI_2	0.821	0.872	0.635	0.898	0.522	0.602	0.532	0.621	0.714	0.812	0.712	0.562
CA_1	0.523	0.802	0.602	0.732	0.921	0.514	0.741	0.541	0.652	0.632	0.732	0.514
CA_2	0.563	0.832	0.514	0.823	0.918	0.578	0.563	0.731	0.532	0.456	0.753	0.578
CA_3	0.589	0.731	0.578	0.812	0.875	0.703	0.621	0.712	0.741	0.712	0.785	0.703
TE_1	0.621	0.712	0.645	0.632	0.742	0.885	0.541	0.562	0.563	0.732	0.795	0.731
TE_2	0.632	0.562	0.712	0.456	0.532	0.869	0.512	0.514	0.714	0.823	0.821	0.645
CSE_1	0.741	0.514	0.732	0.563	0.571	0.563	0.945	0.621	0.742	0.732	0.712	0.635
CSE_2	0.742	0.578	0.753	0.714	0.574	0.714	0.902	0.541	0.532	0.823	0.732	0.602
ACC_1	0.532	0.703	0.785	0.652	0.562	0.652	0.742	0.856	0.571	0.812	0.753	0.514
ACC_2	0.571	0.645	0.795	0.532	0.532	0.532	0.532	0.889	0.574	0.632	0.785	0.578
ACC_3	0.574	0.635	0.821	0.741	0.621	0.741	0.571	0.875	0.562	0.456	0.795	0.645
INS_1	0.562	0.602	0.712	0.563	0.541	0.563	0.574	0.563	0.844	0.563	0.645	0.635
INS_2	0.532	0.687	0.732	0.714	0.512	0.714	0.562	0.714	0.928	0.714	0.635	0.712
INS_3	0.520	0.723	0.742	0.652	0.872	0.532	0.532	0.652	0.964	0.652	0.602	0.732
CQ_1	0.632	0.712	0.532	0.532	0.802	0.571	0.520	0.532	0.731	0.832	0.514	0.753
CQ_2	0.602	0.732	0.571	0.741	0.832	0.574	0.632	0.741	0.712	0.854	0.578	0.785
AEI_1	0.596	0.823	0.574	0.563	0.621	0.562	0.742	0.563	0.562	0.621	0.867	0.795
AEI_2	0.635	0.812	0.562	0.714	0.541	0.532	0.532	0.578	0.514	0.541	0.912	0.821
AEI_3	0.642	0.632	0.532	0.652	0.512	0.621	0.571	0.645	0.578	0.512	0.895	0.712
SAELS_1	0.745	0.456	0.532	0.645	0.731	0.532	0.574	0.635	0.712	0.872	0.732	0.930
SAELS_2	0.701	0.563	0.571	0.635	0.712	0.563	0.578	0.712	0.732	0.802	0.823	0.903
SAELS_3	0.692	0.714	0.574	0.602	0.562	0.714	0.645	0.571	0.823	0.578	0.812	0.925
SAELS_4	0.687	0.652	0.562	0.514	0.514	0.652	0.635	0.574	0.812	0.645	0.632	0.877
SAELS_5	0.577	0.532	0.532	0.578	0.578	0.532	0.712	0.562	0.632	0.635	0.456	0.883
SAELS_6	0.785	0.741	0.621	0.645	0.703	0.741	0.752	0.532	0.456	0.712	0.563	0.861

5.2 . Structural model analysis

5.2.1. Examine the model

The fig. 2 shows the final study model which indicates the efficiency of the proposed model in this study.

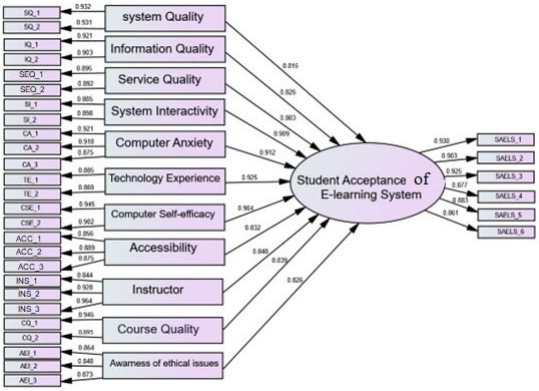

Fig. 2 Examination result

5.2.2. Effect size

To find out the relative effect of the external variables on the self-variables, it is done through the differences in the main values through the size of the effect. Table 4 shows the evaluation of the $f2$ value.

Table 4: Effect size criteria

$f2$	Result
Higher than 0.35	Large effect size
Between 0.15 to 0.35	Medium effect size
Between 0.02 to 0.15	Small effect size
Below than 0.02	No effect size

Source by [8].

The exogenous Variable code V1 to V11 (see Table 5) for explaining the endogenous latent variable V12 have f2 effect sizes of 0.623 to 0.462. Hence, the effect size of Variable code V1 to V11 on the endogenous latent variable V12 has a large effect size.

Table 5: Interpreting effect size- $f2$

Variable code	Variable	f2	Result
V1	SQ	0.462	Large effect size
V2	IQ	0.563	Large effect size
V3	SEQ	0.478	Large effect size
V4	SI	0.623	Large effect size
V5	CA	0.541	Large effect size
V6	TE	0.536	Large effect size
V7	CSE	0.589	Large effect size
V8	ACC	0.627	Large effect size
V9	INS	0.594	Large effect size
V10	CQ	0.542	Large effect size
V11	AEI	0.501	Large effect size

5.2.3. Predictive relevance

The predictive significance of the model was found as shown in Table 6, a Q2 value of 0.313 was gained in the study, which indicates that there is a highly predictive model. The result in this study is in line with the recommendation by [87].

5.2.4. Hypotheses testing – path coefficient

Table 7 shows all the proposed hypotheses that were examined by the structural equation modeling. All hypotheses were found to be significant. Based on the data analysis hypotheses H1, H2, H3, H4, H5, H6, H7, H8, H9, H10 and H11were supported by the data. System quality, information quality, service quality, system interactivity, computer anxiety, technology experience, computer self-efficacy, accessibility, instructor, course quality, and awareness of ethical issues, were found to have a positive effect on students' acceptance of e-learning system.

6. Discussion

The purpose behind conducting this study was to explore the factors that affect the acceptance of undergraduate students for e-learning. The framework for this study was developed based on theoretical literature. The model consisted of (11) factors, as shown in Figure 1. Based on the findings, all factors have been discovered to be significantly related to students' acceptance of e-learning. The result indicates that these suggested factors play a significant role of students' acceptance of e-learning system.

In this study, system quality has found to be significant positive effect on students' acceptance of e-learning. It is common to assume that users may accept to use technology when the system performance, availability, ease of use, and reliability are within their expectations. These results correspond with the findings of [19],[88].

Concerning information quality, this factor was positive significant as well. This result matches with [19],[20],[24],[88]. This confirms that the appropriateness of the quality of information in the system pushes students to accept e-learning. Regarding service quality, also it was positive significant as well. This indicated that the response of technical support at the ICT department to solve any problem that face students and the highly quality of service are important for students to be accepted of e-learning system. This finding matches with [23].

The system's contribution to achieving interaction between students themselves as well as with the teacher is important factors in students' acceptance of the e-learning system, and this is what was found in this study that the system interactivity has a positive effect on acceptance of e-learning, and which confirmed the result of this factor in the previous studies [24], [89].

The study showed a positive significant of computer anxiety on students' acceptance of e-learning system. This result consistent with the work of [23],[90].

This study supposes that continuing to promote students' acceptance of e-learning will enable them to develop a positive trend that can decrease their anxiety. Furthermore, the student's ability to deal with the e-learning system, such as downloading and uploading files, using the communication tools available through the system and other activities, plays a role in students' acceptance of e-learning system, and this has been proven through this study that technological experience affects students' acceptance of the e-learning system. This result confirms what was stated in the study of [91].

Students' computer self-efficacy factor had a positive influence on students' acceptance. This result in line with the findings of [19],[88]. This result indicates that while the students have sufficient computer skills, will affect their perception that the system is easy to use, thus their level of acceptance toward using the e-learning system is promoted. In terms of accessibility also has a positive effect on students' acceptance in this study.

The author of [92] indicated that the accessibility is a significant predictor of e-learning acceptance. The result corresponds to the result of [24]. Students' access to the system without problems such as electricity, internet connections and computer availability will increase their inclinations to accept the e-learning system. Besides the results, the instructor factor has a positive effect on students' acceptance, this result agrees with the result reported in [93].

The findings expose that instructor play a role in effecting students to accept the e-learning system. The instructors' encouragement, skills, providing feedback, the quality of the content provided and trend toward the system are mainly increase students' acceptance of the e-learning system. In contrast, course design has a significant positive effect on students' acceptance of e-learning system. The findings suggest that when the course design of an e-learning system is convenient for students' knowledge and diversity of the electronic content of the course, meaning that the course on which e-learning is based is well designed, the acceptance of students for the e-learning system will increase. Such a finding is consistent with those found in previous studies [23],[94] showing the importance of online courses quality in the formation of students' acceptance of the e-learning system.

The last factor is the students' awareness of ethical issues, which was also found to influences students' acceptance of the e-learning system. The results indicate that better awareness of students towards data privacy, intellectual property and academic integrity will increase their use and acceptance of e-learning. On the other hand, students' lack of awareness of ethical issues may negatively affect students' acceptance. After the Corona pandemic, the use of e-learning in higher education has become essential, so students must be made aware of ethical issues and increase their awareness of them. several researchers were focused on this factor in terms of its impact on the implementation of e-learning system [95],[96].

7. Conclusion

The aim of this study is to explore the factors that are affecting undergraduate students' intentions to accept E-learning system. This study suggests a model to recognize the factors that impact the acceptance of E-learning. To analyze the data collected from 167 participants, a structural equation model was used. The correlation between system quality, information quality, service quality, system interactivity, computer anxiety, technology experience, computer self-efficacy, accessibility, instructor, course quality, and awareness of ethical issue with E-learning system acceptance is examined in the basic model. Through analysis of the data, the results indicated that all the suggested factors have a positive effect on the students' acceptance of E-learning systems. Therefore, developers, decision-makers, policymakers, and designers of e-learning system have to consider these factors to develop and improve e-learning system. In addition, the researcher recommends adopting the factors affecting students' acceptance of e-learning as shown by the model, and this model can also be used to develop other models in this field.

Table 6: Construct cross validated redundancy

Variable	Sso	sse	Q2=(1 - SSE/SSO)
Student Acceptance of E-learning system	1230.000	845.000	0.313
System Quality	721.000	721.000	
Information Quality	721.000	721.000	
Service Quality	721.000	721.000	
System Interactivity	721.000	721.000	
Computer Anxiety	721.000	721.000	
Technology Experience	721.000	721.000	
Computer Self-efficacy	721.000	721.000	
Accessibility	721.000	721.000	
Instructor	721.000	721.000	
Course Quality	719.000	719.000	
awareness of ethical issues	719.000	719.000	

Table 7: Results of structural Model - Research Hypotheses

Variable	Std.Beta	Std.Error	T-value	P-value	Decision
System Quality → SAELS	0.856	0.154	3.785	0.000	Supported**
Information Quality → SAELS	0.823	0.132	4.652	0.000	Supported**
Service Quality → SAELS	0.812	0.124	3.234	0.000	Supported**
System Interactivity → SAELS	0.795	0.123	3.789	0.000	Supported**
Computer Anxiety → SAELS	0.845	0.111	3.653	0.000	Supported**
Technology Experience → SAELS	0.789	0.145	3.123	0.000	Supported**
Computer Self-efficacy → SAELS	0.792	0.116	4.123	0.000	Supported**
Accessibility → SAELS	0.863	0.105	4.156	0.000	Supported**
Instructor → SAELS	0.756	0.109	3.985	0.000	Supported**
Course Quality → SAELS	0.754	0.108	4.148	0.000	Supported**
awareness of ethical issues → SAELS	0.792	0.107	4.632	0.000	Supported**

Significant at p**= <0.01, p*<0.05

References

[1] D. Al-Fraihat, M. Joy, R. Masa'deh, and J. Sinclair, "Evaluating E-learning systems success: An empirical study," *Comput Human Behav*, vol. 102, 2020, doi: 10.1016/j.chb.2019.08.004.

[2] M. Al-Okaily, H. M Alqudah, A. Matar, A. Lutfi, and A. Taamneh, "IMPACT OF COVID-19 PANDEMIC ON ACCEPTANCE OF E-LEARNING SYSTEM IN JORDAN: A CASE OF TRANSFORMING THE TRADITIONAL EDUCATION SYSTEMS," *Humanities & Social Sciences Reviews*, vol. 8, no. 4, 2020, doi: 10.18510/hssr.2020.8483.

[3] E. Aboagye, J. A. Yawson, and K. N. Appiah, "COVID-19 and E-Learning: the Challenges of Students in Tertiary Institutions," *Social Education Research*, 2020, doi: 10.37256/ser.122020422.

[4] A. M. Maatuk, E. K. Elberkawi, S. Aljawarneh, H. Rashaideh, and H. Alharbi, "The COVID-19 pandemic and E-learning: challenges and opportunities from the perspective of students and instructors," *J Comput High Educ*, vol. 34, no. 1, 2022, doi: 10.1007/s12528-021-09274-2.

[5] A. Ramadhan, A. N. Hidayanto, G. A. Salsabila, I. Wulandari, J. A. Jaury, and N. N. Anjani, "The effect of usability on the intention to use the e-learning system in a sustainable way: A case study at Universitas Indonesia," *Educ Inf Technol (Dordr)*, vol. 27, no. 2, 2022, doi: 10.1007/s10639-021-10613-0.

[6] A. Moubayed, M. Injadat, A. B. Nassif, H. Lutfiyya, and A. Shami, "E-Learning: Challenges and Research Opportunities Using Machine Learning Data Analytics," *IEEE Access*, vol. 6, 2018, doi: 10.1109/ACCESS.2018.2851790.

[7] O. M. Mahasneh, H. M. Tawarah, and H. A. Al-Lawama, "Using structural equation model to reveal factors affecting faculty members in university colleges in the use of moodle," *International Journal of Education and Practice*, vol. 9, no. 1, 2021, doi: 10.18488/journal.61.2021.91.171.184.

[8] S. A. Salloum, M. Al-Emran, K. Shaalan, and A. Tarhini, "Factors affecting the E-learning acceptance: A case study from UAE," *Educ Inf Technol (Dordr)*, vol. 24, no. 1, 2019, doi: 10.1007/s10639-018-9786-3.

[9] M. A. Almaiah, A. Al-Khasawneh, and A. Althunibat, "Exploring the critical challenges and factors influencing the E-learning system usage during COVID-19 pandemic," *Educ Inf Technol (Dordr)*, vol. 25, no. 6, 2020, doi: 10.1007/s10639-020-10219-y.

[10] F. Kanwal and M. Rehman, "Factors Affecting E-Learning Adoption in Developing Countries-Empirical Evidence from Pakistan's Higher Education Sector," *IEEE Access*, vol. 5, 2017, doi: 10.1109/ACCESS.2017.2714379.

[11] N. Nordin, N. N. Nordin, N. I. A. Nordin, and N. F. Nordin, "The Successful Factors of Online Learning for Malaysia Higher Education Students: Smart PLS-SEM Analysis," in *Innovation of Businesses, and Digitalization during Covid-19 Pandemic*, 2023, pp. 803–815.

[12] B. Šumak, M. Heričko, M. Pušnik, and G. Polančič, "Factors affecting acceptance and use of moodle: An empirical study based on TAM," *Informatica (Ljubljana)*, vol. 35, no. 1, 2011.

[13] M. Al-Emran and K. Shaalan, "Academics' awareness towards mobile learning in oman," *International Journal of Computing and Digital Systems*, vol. 6, no. 1, 2017, doi: 10.12785/IJCDS/060105.

[14] S. S. Binyamin, M. J. Rutter, and S. Smith, "The moderating effect of gender and age on the students' acceptance of learning management systems in Saudi higher education," *Knowledge Management and E-Learning*, vol. 12, no. 1, 2020, doi: 10.34105/j.kmel.2020.12.003.

[15] W. M. Al-Rahmi *et al.*, "Integrating Technology Acceptance Model with Innovation Diffusion Theory: An Empirical Investigation on Students' Intention to Use E-Learning Systems," *IEEE Access*, vol. 7, 2019, doi: 10.1109/ACCESS.2019.2899368.

[16] Y. H. Lee, Y. C. Hsieh, and Y. H. Chen, "An investigation of employees' use of e-learning systems: Applying the technology acceptance model," *Behaviour and Information Technology*, vol. 32, no. 2, 2013, doi: 10.1080/0144929X.2011.577190.

[17] M. I. R. M. Jaradat, "Understanding individuals' perceptions, determinants and the moderating effects of age and gender on the adoption of mobile learning: Developing country perspective," *International Journal of Mobile Learning and Organisation*, vol. 8, no. 3, 2014, doi: 10.1504/IJMLO.2014.067028.

[18] A. Abu-Al-Aish and S. Love, "Factors influencing students' acceptance of m-learning: An investigation in higher education," *International Review of Research in Open and Distance Learning*, vol. 14, no. 5, 2013, doi: 10.19173/irrodl.v14i5.1631.

[19] Q. Hammouri and E. Abu-Shanab, "Exploring factors afecting users' satisfaction toward e-learning systems," *International Journal of Information and Communication Technology Education*, vol. 14, no. 1, pp. 44–57, Jan. 2018, doi: 10.4018/IJICTE.2018010104.

[20] a Al-Adwan, A. A.- Adwan, and J. Smedley, "Exploring students acceptance of e-learning using technology acceptance model in jordanian universities," *Int J Educ Dev Using Inf Commun Technol*, vol. 9, no. 2, 2013.

[21] T. Almarabeh, H. Mohammad, R. Yousef, and Y. Kh. Majdalawi, "The University of Jordan E-Learning Platform: State, Students' Acceptance and Challenges," *Journal of Software Engineering and Applications*, vol. 07, no. 12, 2014, doi: 10.4236/jsea.2014.712087.

[22] B. al Kurdi, M. Alshurideh, and S. A. Salloum, "Investigating a theoretical framework for e-learning technology acceptance," *International Journal of Electrical and Computer Engineering*, vol. 10, no. 6, 2020, doi: 10.11591/IJECE.V10I6.PP6484-6496.

[23] S. Ghazal, H. Al-Samarraie, and H. Aldowah, "'i am Still Learning': Modeling LMS Critical Success Factors for Promoting Students' Experience and Satisfaction in a Blended Learning Environment," *IEEE Access*, vol. 6, 2018, doi: 10.1109/ACCESS.2018.2879677.

[24] S. A. Salloum, A. Qasim Mohammad Alhamad, M. Al-Emran, A. Abdel Monem, and K. Shaalan, "Exploring students' acceptance of e-learning through the development of a comprehensive technology acceptance model," *IEEE Access*, vol. 7, 2019, doi: 10.1109/ACCESS.2019.2939467.

[25] B. al Kurdi, M. Alshurideh, S. A. Salloum, Z. M. Obeidat, and R. M. Al-dweeri, "An empirical investigation into examination of factors influencing university students' behavior towards elearning acceptance using SEM approach," *International Journal of Interactive Mobile Technologies*, vol. 14, no. 2, 2020, doi: 10.3991/ijim.v14i02.11115.

[26] S. M. Jafari, S. F. Salem, M. S. Moaddab, and S. O. Salem, "Learning Management System (LMS) success: An investigation among the university students," in *2015 IEEE Conference on e-Learning, e-Management and e-Services, IC3e 2015*, 2016. doi: 10.1109/IC3e.2015.7403488.

[27] A. Alia, "An investigation of the application of the Technology Acceptance Model (TAM) to evaluate instructors' perspectives on E-Learning at Kuwait University," 2017.

[28] M. Mahmodi, "The Analysis of the Factors Affecting the Acceptance of E-learning in Higher Education," *Interdisciplinary Journal of Virtual Learning in Medical Sciences*, vol. 8, no. 1, 2017, doi: 10.5812/ijvlms.11158.

[29] A. Y. Alsabawy, A. Cater-Steel, and J. Soar, "Determinants of perceived usefulness of e-learning systems," *Comput Human Behav*, vol. 64, 2016, doi: 10.1016/j.chb.2016.07.065.

[30] S. Ghazal, H. Aldowah, I. Umar, and B. Bervell, "Acceptance and satisfaction of learning management system enabled blended learning based on a modified DeLone-McLean information system success model," *International Journal of Information Technology Project Management*, vol. 9, no. 3, 2018, doi: 10.4018/IJITPM.2018070104.

[31] J. S. Mtebe and C. Raphael, "Key factors in learners' satisfaction with the e-learning system at the University of Dar es Salaam, Tanzania," *Australasian Journal of*

Educational Technology, vol. 34, no. 4, 2018, doi: 10.14742/ajet.2993.

[32] A. J. Omar, "An examination of variables influencing the acceptance and usage of E-learning systems in Jordanian higher education institutions," 2016.

[33] W. H. DeLone and E. R. McLean, "The DeLone and McLean model of information systems success: A ten-year update," in *Journal of Management Information Systems*, 2003, vol. 19, no. 4. doi: 10.1080/07421222.2003.11045748.

[34] J. C. Roca, C. M. Chiu, and F. J. Martínez, "Understanding e-learning continuance intention: An extension of the Technology Acceptance Model," *International Journal of Human Computer Studies*, vol. 64, no. 8, 2006, doi: 10.1016/j.ijhcs.2006.01.003.

[35] E. Lwoga, "Critical success factors for adoption of web-based learning management systems in Tanzania," *International Journal of Education and Development using Information and Communication Technology (IJEDICT)*, vol. 10, no. 1, 2014.

[36] Y. M. Cheng, "Effects of quality antecedents on e-learning acceptance," *Internet Research*, vol. 22, no. 3, 2012, doi: 10.1108/10662241211235699.

[37] V. Damnjanovic, S. Jednak, and I. Mijatovic, "Factors affecting the effectiveness and use of Moodle: students' perception," *Interactive Learning Environments*, vol. 23, no. 4, 2015, doi: 10.1080/10494820.2013.789062.

[38] W. Wongvilaisakul and S. Lekcharoen, "The acceptance of e-Learning using SEM approach: A case of IT Literacy development for PIM students," in *ECTI-CON 2015 - 2015 12th International Conference on Electrical Engineering/Electronics, Computer, Telecommunications and Information Technology*, 2015. doi: 10.1109/ECTICon.2015.7207117.

[39] G. H. E. Gay, "An assessment of online instructor e-learning readiness before, during, and after course delivery," *J Comput High Educ*, vol. 28, no. 2, 2016, doi: 10.1007/s12528-016-9115-z.

[40] T. Ramayah and J. W. C. Lee, "System characteristics, satisfaction and e-learning usage: A structural equation model (SEM)," *Turkish Online Journal of Educational Technology*, vol. 11, no. 2, 2012.

[41] H. C. Wang and Y. F. Chiu, "Assessing e-learning 2.0 system success," *Comput Educ*, vol. 57, no. 2, 2011, doi: 10.1016/j.compedu.2011.03.009.

[42] J. W. Lee, "Online support service quality, online learning acceptance, and student satisfaction," *Internet and Higher Education*, vol. 13, no. 4, 2010, doi: 10.1016/j.iheduc.2010.08.002.

[43] T. Ahn, S. Ryu, and I. Han, "The impact of Web quality and playfulness on user acceptance of online retailing," *Information and Management*, vol. 44, no. 3, 2007, doi: 10.1016/j.im.2006.12.008.

[44] F. Xu and J. T. Du, "Factors influencing users' satisfaction and loyalty to digital libraries in Chinese universities," *Comput Human Behav*, vol. 83, 2018, doi: 10.1016/j.chb.2018.01.029.

[45] K. A. Pituch and Y. kuei Lee, "The influence of system characteristics on e-learning use," *Comput Educ*, vol. 47, no. 2, 2006, doi: 10.1016/j.compedu.2004.10.007.

[46] M. M. Abbad, D. Morris, A. Al-Ayyoub, and J. M. Abbad, "Students' decisions to use an elearning system: A structural equation modelling analysis," *International Journal of Emerging Technologies in Learning*, vol. 4, no. 4, 2009, doi: 10.3991/ijet.v4i4.928.

[47] I. Rodríguez-Ardura and A. Meseguer-Artola, "E-learning continuance: The impact of interactivity and the mediating role of imagery, presence and flow," *Information and Management*, vol. 53, no. 4, 2016, doi: 10.1016/j.im.2015.11.005.

[48] S. Wrycza and M. Kuciapski, "Determinants of academic E-learning systems acceptance," in *Lecture Notes in Business Information Processing*, 2018, vol. 333. doi: 10.1007/978-3-030-00060-8_6.

[49] N. T. T. Ho, S. Sivapalan, H. H. Pham, L. T. M. Nguyen, A. T. van Pham, and H. V. Dinh, "Students' adoption of e-learning in emergency situation: the case of a Vietnamese university during COVID-19," *Interactive Technology and Smart Education*, vol. 18, no. 2, 2020, doi: 10.1108/ITSE-08-2020-0164.

[50] R. George Saadé and D. Kira, "Computer Anxiety in E-Learning: The Effect of Computer Self-Efficacy," *Journal of Information Technology Education: Research*, vol. 8, 2009, doi: 10.28945/166.

[51] K. D. Stiller and A. Köster, "Learner Attrition in an Advanced Vocational Online Training: The Role of Computer Attitude, Computer Anxiety, and Online Learning Experience," *European Journal of Open, Distance and E-Learning*, vol. 19, no. 2, 2016, doi: 10.1515/eurodl-2016-0004.

[52] Á. F. Agudo-Peregrina, Á. Hernández-García, and F. J. Pascual-Miguel, "Behavioral intention, use behavior and the acceptance of electronic learning systems: Differences between higher education and lifelong learning," *Comput Human Behav*, vol. 34, 2014, doi: 10.1016/j.chb.2013.10.035.

[53] Y. Park, H. Son, and C. Kim, "Investigating the determinants of construction professionals' acceptance of web-based training: An extension of the technology acceptance model," *Autom Constr*, vol. 22, 2021, doi: 10.1016/j.autcon.2011.09.016.

[54] B. A. Al-Alak and I. A. M. Alnawas, "Measuring the acceptance and adoption of e-learning by academic staff," *Knowledge Management and E-Learning*, vol. 3, no. 2, 2011, doi: 10.34105/j.kmel.2011.03.016.

[55] R. Thompson, D. Compeau, and C. Higgins, "Intentions to use information technologies: An integrative model," *Journal of Organizational and End User Computing*, vol. 18, no. 3, 2006, doi: 10.4018/joeuc.2006070102.

[56] J. Tondeur, M. Valcke, and J. van Braak, "A multidimensional approach to determinants of computer use in primary education: Teacher and school characteristics," *J Comput Assist Learn*, vol. 24, no. 6, 2008, doi: 10.1111/j.1365-2729.2008.00285.x.

[57] V. Venkatesh and H. Bala, "Technology acceptance model 3 and a research agenda on interventions," *Decision Sciences*, vol. 39, no. 2, 2008, doi: 10.1111/j.1540-5915.2008.00192.x.

[58] C. Buabeng-Andoh, "An Exploration of Teachers' Skills, Perceptions and Practices of ICT in Teaching and Learning in the Ghanaian Second-Cycle Schools,"

Contemp Educ Technol, vol. 3, no. 1, 2020, doi: 10.30935/cedtech/6066.

[59] D. R. Compeau and C. A. Higgins, "Computer self-efficacy: Development of a measure and initial test," *MIS Q*, vol. 19, no. 2, 1995, doi: 10.2307/249688.

[60] J. W. Hsia, C. C. Chang, and A. H. Tseng, "Effects of individuals' locus of control and computer self-efficacy on their e-learning acceptance in high-tech companies," *Behaviour and Information Technology*, vol. 33, no. 1, 2014, doi: 10.1080/0144929X.2012.702284.

[61] S. S. Binyamin, M. J. Rutter, and S. Smith, "The Influence of Computer Self-efficacy and Subjective Norms on the Students' Use of Learning Management Systems at King Abdulaziz University," in *International journal of information and education technology (IJIET)*, 2018, vol. 8, no. 10, pp. 693–699. doi: 10.18178/ijiet.2018.8.10.1124.

[62] N. Fathema, D. Shannon, and M. Ross, "Expanding The Technology Acceptance Model (TAM) to Examine Faculty Use of Learning Management Systems (LMSs) In Higher Education Institutions," *Journal of Online Learning and Teaching* , vol. 11, no. 2, 2015.

[63] M. M. Al-Debei, "The quality and acceptance of websites: An empirical investigation in the context of higher education," *Int J Bus Inf Syst*, vol. 15, no. 2, 2014, doi: 10.1504/IJBIS.2014.059252.

[64] R. A. Sánchez, A. D. Hueros, and M. G. Ordaz, "E-learning and the University of Huelva: A study of WebCT and the technological acceptance model," *Campus-Wide Information Systems*, vol. 30, no. 2, 2013, doi: 10.1108/10650741311306318.

[65] N. Ahmad, N. U. Umar, R. Kadar, and J. Othman, "Factors Affecting Students' Acceptance of e-Learning System in Higher Education," *Journal of Computing Research and Innovation*, vol. 5, no. 2, 2020, doi: 10.24191/jcrinn.v5i2.134.

[66] K. Al-Busaidi and H. Al-Shihi, "Instructors' Acceptance of Learning Management Systems: A Theoretical Framework," *Communications of the IBIMA*, 2010, doi: 10.5171/2010.862128.

[67] J. Louis-Jean and K. Cenat, "Beyond the Face-to-Face Learning: A Contextual Analysis," *Pedagogical Research*, vol. 5, no. 4, 2020, doi: 10.29333/pr/8466.

[68] M. S. Taat and A. Francis, "Factors influencing the students' acceptance of e-learning at teacher education institute: An exploratory study in Malaysia," *International Journal of Higher Education*, vol. 9, no. 1, 2020, doi: 10.5430/ijhe.v9n1p133.

[69] *D. H. Choi, J. Kim, and S. H. Kim, "ERP training with a web-based electronic learning system: The flow theory perspective," International Journal of Human Computer Studies, vol. 65, no. 3, 2007, doi: 10.1016/j.ijhcs.2006.10.002.*

[70] I. F. Liu, M. C. Chen, Y. S. Sun, D. Wible, and C. H. Kuo, "Extending the TAM model to explore the factors that affect Intention to Use an Online Learning Community," *Comput Educ*, vol. 54, no. 2, 2010, doi: 10.1016/j.compedu.2009.09.009.

[71] P. C. Sun, R. J. Tsai, G. Finger, Y. Y. Chen, and D. Yeh, "What drives a successful e-Learning? An empirical investigation of the critical factors influencing learner satisfaction," *Comput Educ*, vol. 50, no. 4, 2008, doi: 10.1016/j.compedu.2006.11.007.

[72] M. Paechter, B. Maier, and D. Macher, "Students' expectations of, and experiences in e-learning: Their relation to learning achievements and course satisfaction," *Comput Educ*, vol. 54, no. 1, 2010, doi: 10.1016/j.compedu.2009.08.005.

[73] J. K. Tarus, D. Gichoya, and A. Muumbo, "Challenges of implementing E-learning in Kenya: A case of Kenyan public universities," *International Review of Research in Open and Distance Learning*, vol. 16, no. 1, 2015, doi: 10.19173/irrodl.v16i1.1816.

[74] W. D. Chawinga and P. A. Zozie, "Increasing access to higher education through open and distance learning: Empirical findings From Mzuzu University, Malawi," *International Review of Research in Open and Distance Learning*, vol. 17, no. 4, 2016, doi: 10.19173/irrodl.v17i4.2409.

[75] J. S. Mtebe and R. Raisamo, "A model for assessing learning management system success in higher education in sub-saharan Countries," *Electronic Journal of Information Systems in Developing Countries*, vol. 61, no. 1, 2014, doi: 10.1002/j.1681-4835.2014.tb00436.x.

[76] M. A. Almaiah and A. al Mulhem, "A conceptual framework for determining the success factors of E-learning system implementation using Delphi technique," *J Theor Appl Inf Technol*, vol. 96, no. 17, 2018.

[77] D. Satterfield and S. Kelle, "Ethical issues in online education," in *Advances in Intelligent Systems and Computing*, 2017, vol. 494. doi: 10.1007/978-3-319-41947-3_24.

[78] T. A. Almseidein and O. M. K. Mahasneh, "Awareness of ethical issues when using an e-learning system," *International Journal of Advanced Computer Science and Applications*, vol. 11, no. 1, 2020, doi: 10.14569/ijacsa.2020.0110116.

[79] M. AbdulHafeez, S. Asadullah, M. Rosydi, and A. Farooq, "Inculcating ethical values in the students through e-Learning platform," in *2013 5th International Conference on Information and Communication Technology for the Muslim World, ICT4M 2013*, 2013. doi: 10.1109/ICT4M.2013.6518891.

[80] F. Ahmad, A. Shah, A. Muhammad, and F. Ahamd, "Resolving Ethical Dilemma in Technology Enhanced Education through smart mobile devices," 2015.

[81] A. Muhammad and A. Shah, "CHAPTER FIFTEEN ELEARNING: INCULCATION OF VALUES AND ETHICS IN HIGHER EDUCATION LEARNERS MUHAMMAD SHAHID FAROOQ," *Creat. Learn. MOOCs Harnessing Technol. a 21st Century Educ*, p. 205, 2015.

[82] H. Roky and Y. al Meriouh, "Evaluation by Users of an Industrial Information System (XPPS) Based on the DeLone and McLean Model for IS Success," *Procedia Economics and Finance*, vol. 26, 2015, doi: 10.1016/s2212-5671(15)00903-x.

[83] M. Sarstedt, C. M. Ringle, and J. F. Hair, "Partial least squares structural equation modeling," in *Handbook of market research*, Springer, 2021, pp. 587–632.

[84] J. F. Hair Jr, L. M. Matthews, R. L. Matthews, and M. Sarstedt, "PLS-SEM or CB-SEM: updated guidelines on

which method to use," *International Journal of Multivariate Data Analysis*, vol. 1, no. 2, pp. 107–123, 2017.

[85] J. F. Hair, M. Sarstedt, L. Hopkins, and V. G. Kuppelwieser, "Partial least squares structural equation modeling (PLS-SEM): An emerging tool in business research," *European Business Review*, vol. 26, no. 2. 2014. doi: 10.1108/EBR-10-2013-0128.

[86] D. Gefen and D. W. Straub, "The relative importance of perceived ease of use in IS adoption: A study of e-commerce adoption," *J Assoc Inf Syst*, vol. 1, no. 1, p. 8, 2000.

[87] R. S. Alotaibi and S. M. Alshahrani, "An extended DeLone and McLean's model to determine the success factors of e-learning platform," *PeerJ Comput Sci*, vol. 8, p. e876, 2022.

[88] M. A. Alkhateeb and R. A. Abdalla, "Factors influencing student satisfaction towards using learning management system moodle," *International Journal of Information and Communication Technology Education*, vol. 17, no. 1, 2021, doi: 10.4018/IJICTE.2021010109.

[89] S. S. Binyamin, M. J. Rutter, and S. Smith, "Extending the technology acceptance model to understand students' use of learning management systems in Saudi higher education," *International Journal of Emerging Technologies in Learning*, vol. 14, no. 3, 2019, doi: 10.3991/ijet.v14i03.9732.

[90] H. Rashidi, H. Heidari, M. Movahedin, M. Moazami Gudarzi, and M. Shakerian, "Investigating the Effective Factors on Adoption of E-Learning System in Qazvin University of Medical Sciences," *Journal of Computational Statistics and Modeling*, vol. 1, no. 2, pp. 1–25, 2021.

[91] N. Alqahtani, A. Innab, and G. Bahari, "Virtual Education During COVID-19: Exploring Factors Associated With E-Learning Satisfaction Among Saudi Nursing Students," *Nurse Educ*, vol. 46, no. 2, 2021, doi: 10.1097/NNE.0000000000000954.

[92] Y. H. Lee, C. Hsiao, and S. H. Purnomo, "An empirical examination of individual and system characteristics on enhancing e-learning acceptance," *Australasian Journal of Educational Technology*, vol. 30, no. 5, 2014, doi: 10.14742/ajet.381.

[93] N. Abdallah and O. Abdallah, "INVESTIGATING FACTORS AFFECTING STUDENTS' SATISFACTION WITH E-LEARNING: AN EMPIRICAL CASE STUDY," *Journal of Educators Online*, vol. 19, no. 1, 2022, doi: 10.9743/jeo.2022.19.1.3.

[94] M. A. Almaiah and I. Y. Alyoussef, "Analysis of the Effect of Course Design, Course Content Support, Course Assessment and Instructor Characteristics on the Actual Use of E-Learning System," *IEEE Access*, vol. 7, 2019, doi: 10.1109/ACCESS.2019.2956349.

[95] M. Al-Shehri, "Code of Ethics of Teaching-Learning for an e-Learning System," *Int J Comput Appl*, vol. 166, no. 5, 2017, doi: 10.5120/ijca2017914043.

[96] abdulhafeez Muhammad, asadullah Shaikh, Q. N. Naveed, and M. R. N. Qureshi, "Factors affecting academic Integrity in E-Learning of Saudi arabian Universities. an Investigation Using Delphi and aHP," *IEEE Access*, vol. 8, 2020, doi: 10.1109/aCCESS.2020.2967499.

Talib Ahmad ALmseidein received his BSc in Computer science from Mutah University, karak, Jordan in 2003; also he received his M.Sc. degree in Computer information systems from University of banking and financial science, Amman, Jordan in 2007. He is Currently an instructor with department of Basic and Applied Science, Shoubak University Collage, AL-Balqa Applied University, Jordan. His research interests include e-learning, Ethics in e-learning environment, and mobile learning.