



Thematic Analysis for Classifying the Main Challenges and Factors Influencing the Successful Implementation of E-learning System Using NVivo

Mohammed Amin Almaiah , Ahmed Al Mulhem

King Faisal University, Alahsa 31982, Saudi Arabia

Corresponding author: Mohammed Amin Almaiah (malmaiah@kfu.edu.sa)

ABSTRACT

The problem of low usage of e-learning system still exists due to some factors that cause students' reluctance to use this system. However, the successful implementation of e-learning system relies on understanding the adoption factors as well as the main challenges that face the current e-learning systems. There is lack of agreement about the main factors that shape the successful adoption of e-learning system; hence, a clear gap has been identified in the knowledge on the critical factors of e-learning adoption. Therefore, this research seeks to explore the main challenges that face the current e-learning systems and investigate the main factors that support the adoption of e-learning system. This study employed the interview approach using thematic analysis through NVivo software. The interview was conducted with 31 experts in e-learning systems at five Jordanian universities. The results highlight 20 e-learning adoption factors and challenges that strengthen the findings from previous literature. The study reveals e-learning system adoption factors and challenges, namely, change management issues, financial support issues, e-learning system quality factors, culture factors, Self-efficacy factors and trust factors, which unexplored in e-learning system adoption literature previously.

Key words : E-learning system, adoption; success factors, challenges of e-learning system.

1. INTRODUCTION

The great developments of information and communication technologies (ICT) have motivated universities to offer online learning materials to their students. The provision and usage of online learning materials in e-learning systems is becoming the main challenge for many universities [1]. The e-learning system is an important source of information, due to its ubiquity (availability anywhere and anytime), low cost, ease of use and interactive character. Mihhailova [2] defined e-learning as the use of information and communication technologies by the educational institutions for the provision of learning materials to the learners. By converting from traditional learning, this will enable learner's access to e-learning systems like Blackboard 24 hours per day, and presents several benefits such as increase effectiveness and

efficiency of learning services through improved connectivity with teachers and better access to learning materials [3].

Since the success of e-learning system depends on students' willingness and acceptance to adopt this system [4], a lack of e-learning system usage hampers the realisation of benefits [35], [36]. This results in an unsuccessful system and is a waste of universities money [5]. Research on this topic is still at its infancy, where the views of the students are not fully studied [6]. Studying e-learning adoption can lead universities to better understand their students' needs, and eventually lead to a successful e-learning system [7]. To best of our knowledge, there has not been a thorough analysis of factors influencing adoption of e-learning system in Jordan; despite that, e-learning systems were introduced in many Jordanian universities almost three years ago. Therefore, this research seeks to investigate the factors that affect adoption of e-learning system in Jordan. Hence, we ask the following questions in that respect:

- (1) What are the main challenges that face the successful adoption of e-learning system in Jordanian universities?
- (2) What are the main factors that affect the successful adoption of e-learning system in Jordanian universities?

2. LITERATURE REVIEW

2.1 RELATED STUDIES OF E-LEARNING SYSTEM ADOPTION

The success of any information system depends on the usage of the system by users [34]. Thus, in the context of e-learning system, student's acceptance of e-learning is considered as one of the main criteria for the success e-learning system. Several studies in the literature have addressed issues related to e-learning adoption in many countries over the world. For instance, in Malaysia, Al-Rahmi et. al [8] used the TAM with IDT model to investigate the critical factors that affect the use of e-learning system Malaysian students. The results revealed that relative advantages, observability, trialability, perceived compatibility, complexity, and perceived enjoyment are the factors that play a significant role in students' decision to use e-learning system in Malaysia. Salloum et, al [9] used UAE as a case study for a quantitative investigation. The results indicated that three factors (innovativeness, quality, trust, and knowledge sharing) were observed to achieve better

e-learning system acceptance among students. Al-Gahtani [10] investigated the factors influencing student acceptance of e-learning based on TAM3. He found the most significant determinants of e-learning acceptance were playfulness, self-efficacy and anxiety, while using computers, perceptions of external control, subjective norms and perceived usefulness. However, in the context of Saudi Arabia, social influence, demonstrability and perceived enjoyment were not related to the acceptance of e-learning systems. Another study conducted by Almaiah and Almulhem [11], they proposed new framework using Delphi method to determine the success factors of e-learning system implementation in Saudi Arabia. The results highlighted 11 critical factors grouped into four domains that cover website quality, technology options, top management support, and e-learning awareness by academic faculty and students. Bellaaj, Zekri and Albugami [12] used the Unified Theory of Acceptance and Use of Technology (UTAUT) model to explore the factors affecting students' use of e-learning systems at the University of Tabuk, Saudi Arabia. They found that expectations regarding performance and effort had a strong influence on e-learning acceptance. In another study in Azerbaijan, Chang, Hajiyev and Su [13] found subjective norms, experience and enjoyment influenced acceptance of e-learning. Abdullah and Ward [14] also investigated factors influencing e-learning acceptance using TAM. Their findings revealed that self-efficacy; subjective norms, enjoyment, anxiety and experience with using computers had a significant effect on students' acceptance of e-learning. Similarly, Alhabeeb and Rowley [15] found that academic staff knowledge of learning technologies, student knowledge of computer systems and technical infrastructure, were significant factors in facilitating the successful acceptance of e-learning in Saudi Arabian universities.

Although numerous studies exist on e-learning adoption, the current study aims to add new contribution to the existing literature on investigation of the main challenges and factors influencing e-learning successful adoption in new context, which is Jordan, which may set an example for other developing countries.

2.2 REVIEW STUDIES ON E-LEARNING SYSTEM CHALLENGES

E-learning usage and adoption among users is a challenging issue for many universities, both in developed and developing countries, but it is likely to be less of a concern in developed countries over the willingness of their students to accept and use the e-learning system, as significant progressive steps have already been taken, according to literatures, in this regard [16]. Eltahir [17] indicated that the challenges of adopting e-learning system in developing countries, however, remain a reality due to the digital divide with the developing countries.

Our existing literature review identified several challenges related to adopting the e-learning system. After this review, we noted that these challenges could be classified into four categories namely (1) technological challenges, (2) individual challenges, (3) cultural challenges and (4) course challenges. We found also that these challenges are very different from one country to another country, due to different culture, context and readiness. For example, lack of ICT knowledge, poor network infrastructure and weakness of content development were the main challenges of e-learning system adoption in developing countries [39]. Another study revealed that system characteristics, internet experience and computer self-efficacy were the main issues that impede the successful adoption of e-learning system in Pakistan [40]. A similar study conducted in Kenya identified three main challenges of e-learning are inadequate ICT infrastructure, lack of technical skills and financial constraints [41]. A study by Kisanga and Ireson [42] identified that poor interface design; inadequate technical support and lack of IT skills are the primary barriers that hinder the successful implementation of existing e-learning projects. Mulhanga and Lima [43] claimed that cultural, political, and economical constraints are the main reasons to fail the e-learning initiatives in Africa. In the same way, Kenan et al. [44] classified the challenges that affect the actual use of e-learning into four categories: management challenges, technological challenges, implementation challenges and cultural challenges. Despite these efforts, none of these studies have investigated the actual challenges that face users during the use of e-learning system.

A study conducted by Al-araibi et. al [18], which puts the technological issues as the main criteria for the success of e-learning system, indicated that 45% of e-learning projects in developing countries are total failures, 40% are partial failures, while only 15% are successful. Therefore, based on these findings, along with other studies, many researchers in the field of IS/IT have conducted researches in order to look into the challenges to the successful implementation of e-learning system initiatives [18],[19],[20]. However, the problem of low usage and adoption still exists due to some factors that cause learners' reluctance to use the new technology in Jordan, similar to other developing countries [38] [37]. Therefore, empirical researches are important to identify the main challenges that faces the e-learning system adoption to help decision makers in universities to overcome the issue of low adoption of e-learning system, which is the objective of this research.

Table 1: Comparison between studies about the main reasons of e-learning failures

Study	Al-araibi et., al [18]	Eltahir [17]	Esterhuyse and Scholtz [19]	Islam et., al [20]	Naveed et al., [5]	Stoffregen et al., [21]	Al-Azawei et al., [22]	Kisanga and Ireson [23]	Al Gamdi and Samarji [24]
Reasons of E-learning system failures									
Technological Challenges	✓		✓		✓	✓		✓	
Lack of technical support		✓	✓	✓			✓		
Lack of Awareness	✓				✓				✓
Universities Readiness	✓	✓			✓	✓		✓	✓
lack of security and privacy concerns	✓			✓			✓	✓	
Lack of technological infrastructure	✓				✓	✓	✓		

3. RESEARCH METHODOLOGY

The research methodology for identifying and classifying the main challenges and factors of e-learning system adoption has been designed as shown in Figure 1. Based on the research methodology framework, which consists of three main steps. In the first step, in-depth review of literature on e-learning adoption factors and challenges has been conducted. In the

second step, thematic analysis for identifying and classifying of e-learning challenges was applied. The same step also applied for analysis for identifying and classifying of e-learning adoption factors. In the final step, collecting and determining the main challenges and factors of e-learning adoption. In the following sections, we will describe in details the data collection method, sample of the study and the data analysis technique used in this study.

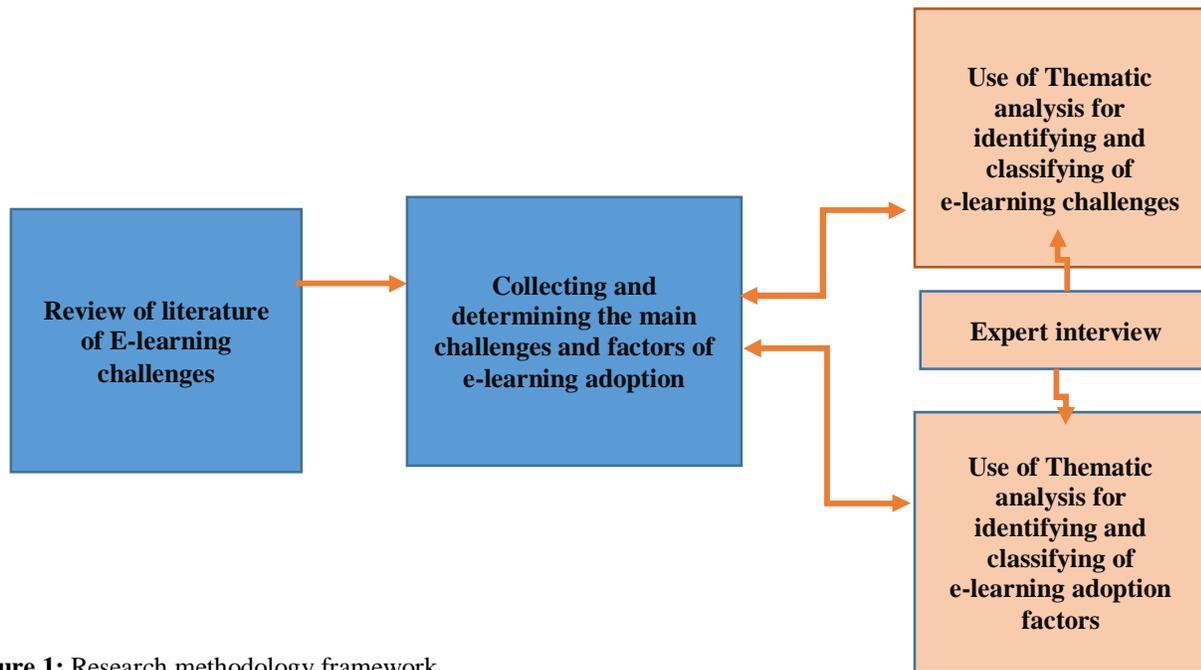


Figure 1: Research methodology framework

3.1 DATA COLLECTION METHOD

In this research, a qualitative research is conducted, based on a semi-structured interview method to obtain and analyze data. The qualitative method was designed to help the researchers to understand the e-learning system adoption from multiple sources as well as multiple perspectives, which is difficult to explain in quantitative terms [25]. Qualitative method is the best way to explore more thoroughly the participants' experiences, attitudes and belief, as it does not regard facts as objective, but as a subjective reality related to differences in each individual [26]. Moreover, it is a helpful method to achieve the research objectives in a smooth way, as highlighted by [26]. One of the advantages of the qualitative method in this study is to explore information from participants in order to generate the said case study rather than just list numeric data. Therefore, this approach allowed the researchers to connect with policymakers, IT experts and faculty members who are currently implementing and supporting the e-learning systems in Jordanian universities. Furthermore, the qualitative approach further allowed the researchers to deeper understanding about the main factors that affect the e-learning system adoption in Jordanian universities, along with the major challenges that the e-learning adoption faces. Thus, this could also yield enough information to answer the research questions.

3.2 SEMI-STRUCTURED INTERVIEW

A semi-structured interview format was used in this study. The questions of this semi-structured interview was shaped based on the research objectives. The interview consisted of two main questions. The interviewees were asked to answer the following two questions:

- (1) What are the main challenges that hinder the adoption of e-learning system in Jordanian universities ? and
- (2) What are the main factors that could lead to the successful implementation of e-learning system in Jordanian universities ?

3.3 CONTEXT OF THE STUDY

This study was conducted in five public Jordanian universities, namely University of Jordan (UJ), Hashemite University (HU), Al-yarmouk University (AU), Jordan of Science and Technology University (JUST) and Al-Balqa'a University (BU). These universities are currently implementing the e-learning system to deliver the online learning courses for their students. The interview questions was designed to collect the data from the experts who are currently using the e-learning system in these universities. Therefore, these universities could help us to achieve the research objective.

3.4 PARTICIPANTS

The interview method was conducted, with a total of 31 participants. The study sample included of 25 faculty

members, 4 IT experts and developers at five Jordanian universities and 2 policy-makers at the Ministry of Higher Education of Jordan. The faculty members were from different departments of Information Technology School such as Information Systems and Software Engineering, who are currently using the e-learning system at five Jordanian universities, as shown in Table 2. Thus, the participants in this study could help us to answer all questions related to the research questions and objectives, in order to obtain more detailed and meaningful understanding of the research problem from the main source at a particular point of time as suggested by Patton [30]. The interviewees were the right persons, who could answer all questions related to the challenges and factors that affect the adoption of e-learning system in Jordanian universities, and they are well familiar with all issues related to the current e-learning initiative.

According to Quick and Hall [27], the sample size in qualitative research is usually a range (4-50) due to the large volume of data collected. Furthermore, they described the sample is to be selected based on appropriateness (participants) and adequacy (Data collected). Corbin and Strauss [28] also suggested, five or six hour interview would provide sufficient data to lead to saturation. Furthermore, participants should be well utilized to become the best representatives and have knowledge of the research topic. With regard to data, they should be adequate and provide a rich description of the phenomenon [29]. Based on that, 32 e-learning experts participated in the interview, therefore, it can be said that the sample size in this study adequately satisfies the suggested requirements [27], [29].

3.5 DATA ANALYSIS

The qualitative data obtained during the interview was analyzed using the thematic analysis technique using the NVivo software. The main purpose of this method is to capture something important from the data collected in relation to the research question. It can be used to generate better insights and findings [31]. For conducting the thematic analysis process for this study, five steps was identified according to Braun and Clarke [32], namely: familiarization with data, generating initial codes, searching for themes, defining and naming themes, and producing the final report. The concept of theme represents something important was captured from the data in relation to the research question. In the thematic analysis process, the researcher categorized the data obtained from the interviewees into three elements subjectively, using the NVivo 10. The process of coding through NVivo started by using descriptive coding as described by Morse and Richards [33], followed by phrases, words, and sentences from the transcript of data, which were labeled using the relevant words related to the factors and challenges of e-learning. In NVivo, codes are called 'nodes, for references to code text' as defined by Jackson and Bazeley [34], and represent a collection of references regarding a specific theme, category, or areas of interest Jackson and Bazeley [34]. Several sub-themes will be then classified for each specific theme, depending on the research topic, as shown in Table 2.

Table 2: Composition of the research sample.

University	Faculty members	IT experts	Policymakers	Total
University of Jordan (UJ)	6	1	-	7
Hashemite University (HU)	4	-	-	4
Al-yarmouk University (AU)	5	1	-	6
Jordan of Science and Technology University (JUST)	3	1	-	4
Al-Balqa'a University (BU)	7	1	-	8
Ministry of Higher Education	-	-	2	2
Total	25	4	2	31

In the selective coding analysis, the researchers have arranged the interview data into global main classifications namely: (1) specific themes namely, factors affecting e-learning system and challenges facing the adoption of

e-learning system, and (2) sub-themes, which emerges as new themes and relationships under the specific themes, as shown in Figure 2.

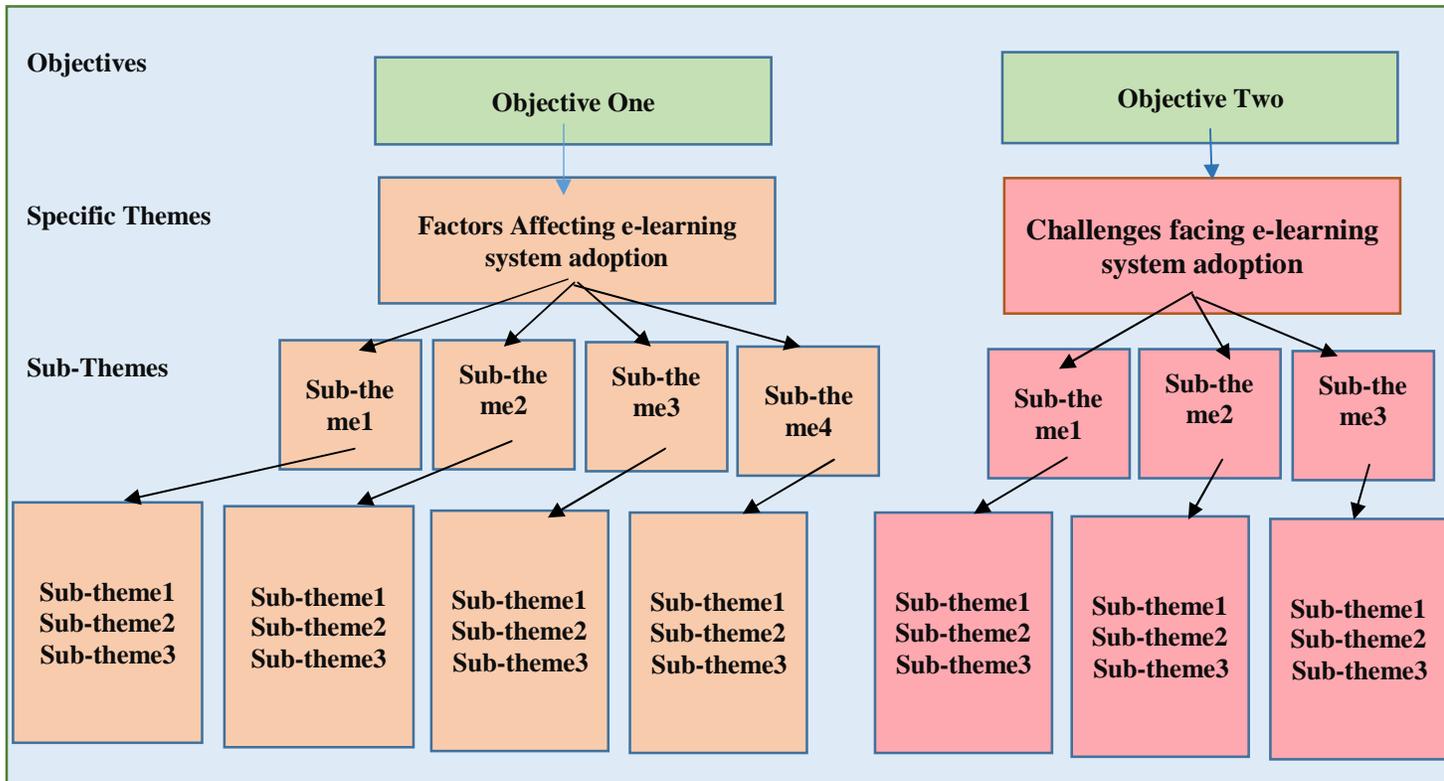


Figure 2: Themes and sub-themes developed from thematic analysis



Figure 3: E-learning system adoption framework

4. THEMATIC FINDINGS OF THE CHALLENGES FACING THE ADOPTION E-LEARNING SYSTEM

This section includes the thematic findings that lead to the identification of the main challenges that affect the successful implementation of e-learning system in Jordanian universities. Figure 3 shows the analysis findings for the e-learning system adoption framework.

(1) Change management issues

As noted by the interviewees, the interviewees agreed that change management is one of the challenging issues, since it touches government policies and legislation, students, and instructors. The interviewees outlined, "We think it is challenging because the university will face a huge resistance to changing the existing situation, and that is why it needs to be properly managed, considering all changes that might happen."

Opposition to change towards accepting e-learning system is an issue since there are students or instructors who prefer the traditional learning and teaching method. The interviewees stated, "Many students and instructors are still reluctant to utilize the e-learning system and this explains the resistance among them, as many students get suspicious about the learning services processed through the system such as submitting assignments, conducting exams and etc. Besides, the issue does not only affect the students, but includes instructors who might believe the alteration to be a menace to their occupations when the system gets changed from traditional teaching to e-learning system."

The interviewees focused on change management from implementation aspects, and they said, "Change management should be divided into two approaches, one purely for change management dealing with procedures and policies, and another one for the management of resistance to change, focusing on the cultural aspects to manage the resistance to change by students and instructors."

(2) E-learning system technical issues

All interviewees agreed that the e-learning system technical factors is one the critical issues that should be addressed, as it could create an obstacle in adoption of the system by many students. The experts outlined: "The current e-learning system is experiencing some potential hurdles regarding accessibility, availability, usability and the e-learning website service quality".

As stated by the interviewees: "It is obvious that when students feel that the e-learning system is friendly and easy to use then he believes that the system is useful and would enhance their performance." The interviewees also added that the "e-learning system is designed to meet students demands. The interviewees agreed that the e-learning system must be easier to use in order to ensure the student's efficacy regarding his/her capacity to use it. They said, "Due to different levels of education among students, there is an issue that some students find the e-learning system not easy to use, and for this reason the university is considering all solutions to make it easy to use, as this factor plays the key role to improve performance, and hence lead the students to feel its usefulness."

(3) Financial support issues

All interviewees confirmed that financial support is one of the obstacles that faces the e-learning projects, because Jordanian universities have limited resources and have a large budget deficit. The interviewees pointed out that: "In case of financial troubles such as the current state of budget deficit, many projects could be detained because the Jordanian government is the sole source of universities financial supports." But, expert 2 "did not show any concern about the financial support since the government already reserved the budget for the current e-learning project in order to avoid any failure, especially to achieve the Vision 2025".

5. THEMATIC FINDINGS OF THE FACTORS AFFECTING E-LEARNING SYSTEM ADOPTION

This section includes the thematic findings that lead to the identification of the main factors that affect the successful implementation of e-learning system in Jordanian universities. Based on the results, the experts stated that the critical factors that needs to be addressed and should be taken in the future plans, which affect the adoption of e-learning system are (1) technological factors, (2) e-learning system quality factors, (3) trust factors, (4) self-efficacy factors and (5) cultural aspects.

(1) Technological factors

According to the experts "technological factors is one of the necessary factors that ensure successful implementation of e-learning system". One of the experts added, "All technological factors should be taken into consideration during the implementation process. For example, if the universities have the necessary hardware and software for adopting e-learning system; but the universities lack the technical skills that are necessary to use those hardware and software, the result might be failure".

In addition, the experts recommended "The physical equipment such as computers, servers and communication networks that must be available to apply e-learning". In addition, "availability of the software applications and operating systems is very important". Experts also stated another important technological factor, which is technical skills and support through the knowledge, understanding and abilities that are used to accomplish tasks related to maintenance and upgrading of the infrastructure of computers, networks, communications, as well as providing support to users when they face technical problems.

(2) E-learning system quality factors

The efficiency and quality of e-learning system was the main topic with the experts as a feasible method for gathering their opinions regarding the main factors that effect on the e-learning system adoption in Jordanian universities.

All experts agreed that: "The current e-learning systems are experiencing some potential hurdles regarding accessibility, availability and usability, especially for those who have less knowledge of the internet." Other experts shared the same perceptions of this factor and advised the universities to look into it seriously, as it could create an obstacle in its implementation and adoption by many students. Another expert stated: "The success of the e-learning system should be measured based on student satisfaction and personalization." The experts also were asked to grasp their views about the current e-learning system and how it is developed as an easy to use system, especially for students who do not have great computer skills. The interviewees confirmed, "The current system is not easy to use by individuals who do not have PC skills; this will lead to system failure".

Expert 3 added, "The current e-learning system is not flexible in terms of its design".

The interviewees (Expert 1 and Expert 2) also mentioned that: "There is significant correlation between ease of use and system adoption, as students could lose confidence in the system if they find it difficult to use".

The experts were then asked about the usefulness of the system and whether the current system is efficient in term of its usefulness. The expert 1 started first and said that the usefulness is related to how an individual feels the system is easy to use. "According to my experience with different IT/IS applications, Usefulness can't be separated from the friendliness of the system. First, the user needs to feel the system is free from effort in order to feel motivated to use it. Then he /she will try to use it to look at it from its usefulness." The same opinion was agreed upon by Expert 3, who added that the current system could be seen useful if students find it meets its purpose. "Users will feel more confident in using the e-learning system if it performs the required learning activities and thus he/she will be motivated to use it in future. So it depends on the student's expectation and satisfaction to assess the system from its usefulness aspect."

Experts 2 and 4 mentioned that if the e-learning system is set up to be compatible with students' needs, then it could be considered useful, and hence adopted and used effectively.

The experts were asked about how reliable the current e-learning system is in terms of its efficiency, performance and security. The experts) confirmed, "A lot of work needs to be done to ensure that the current e-learning system is performing efficiently." Expert1 and Expert 3 added: "We can't guarantee the efficient performance unless it meets and achieves the two main objectives: ease of use and improved online learning services to students."

Finally, the experts agreed, "if the e-learning system meets the students' demands and they feel it is free of any risk then it can be depended and trusted."

Expert 2 stated that:

"Reliability is linked with the system's friendliness and usefulness from the user's perspective, and here it is important to mention that the current system can be called reliable when it reaches the maturity level in terms of usefulness and being free of threats."

(3) Culture factors

According to the experts, culture is a vital factor to increase the rate of e-learning system adoption among students. They stated, "Cultural aspects is one of the critical factors that needs to be addressed in order to ensure that all students will use the e-learning system largely".

ICT literacy is one of the key element that is deliberated by the Higher Education Authority as outlined by the experts:

"One of the factors that should be implemented to increase the use of e-learning system is to increase ICT literacy and skills of e-learning users".

They also outlined in this regard: "If the Higher Education Authority can't alleviate the illiteracy level, then it would become a barrier to achieving the strategic goals with respect to implementing e-learning system."

Another factor that was extracted relating to the cultural aspects is the plan to transform Jordan to an 'e-Society'. The experts described this point as a very significant goal to

achieve Jordan's Vision 2025. The experts outlined that "e-Society should combine all educational institutions together in order to receive a one entity working through e-learning system".

Another important factor is to be connected with students through different social media, as it is the main media and application used in Jordan. The experts stated:

"Social media is the gentlest way to reach students and encourage them to utilize the e-learning system, and also let them use e-learning system directly from the social media applications. Social media can help the universities to better react to students, and will increase students' engagement and improve the e-learning system eventually."

(4) Self-efficacy factors

As noted by the experts, self-efficacy is one of the core elements in determining the adoption of e-learning system in educational institutions. The experts stated, "In order to increase the adoption of e-learning system, it is important to ensure students in Jordanian universities have high self-efficacy in order meet the intended functions, otherwise it's hard to achieve the learning activities through e-learning system if students show low self-efficacy."

In addition, the expert recommended that self-efficacy is one important factor that needs to be considered through "Jordan's Vision 2020". He outlined "All Jordanian universities seek to ensure that all students and instructors use the e-learning system and have full self-efficacy and skills to use the system with the end of 2020".

The experts mentioned that: "Training programs can play a significant role in ensuring high self-efficacy for both students and instructors, and for that reason universities should create some training programs for them to enhance their IT skills, and hence, become more likely to adopt e-learning system".

The experts confirmed that the awareness is key element that motivates the students to use the e-learning system. This factor helps to enhance the self-efficacy for users. They outlined, "The implementation of e-learning systems can't be carried out smoothly without having regular awareness sessions in order to let students feel confident and motivated in using the e-learning system."

(5) Trust factors

According to the experts, "Trust is a vital factor to increase the rate of e-learning system adoption in Jordanian universities". They said, "Universities are always attempting to assure that the e-learning system is trustworthy".

The trust factor includes system protection, information privacy, and system reliability. They added "In order to increase the adoption of e-learning system among students, it is important that universities are always updating the security systems to keep the system fully secure from any types of viruses, and to assure that all learning activities are legally run based on the applied policies and privacy laws."

In this research, the trust of the Internet is the key elements that can play a significant role in ensuring high trust for users. The experts indicated that: "The adoption of e-learning system

relies on that software companies should have the necessary resources to implement electronic services effectively and are capable of securing such systems". In addition, they confirmed, "lack of trust will definitely result into an increase in resistance to adopt e-learning system". In addition, one of the important trust factors that lead to increase the use of e-learning system among students is providing efficient, effective and transparent means of e-learning activities through the e-learning system project, and can surely be secure and free of threats.

6. RESEARCH IMPLICATIONS

This research can be considered an added value to the existing literature, through identifying the main challenges that impede the successful adoption of e-learning system in Jordanian universities. This study provides some important practical insights into the adoption of e-learning system in Jordan. For example, challenges facing the adoption of e-learning are not only limited to the infrastructure issues as mentioned in the previous studies, but also include other such as e-learning system technical issues, change management issues, course design issues, computer self-efficacy and financial support issues. Therefore, the findings of this study offer useful suggestions for policy-makers, designers, developers and researchers, which will enable them to get better acquainted with the key aspects of the e-learning system adoption successfully. First, the university administration and technical support need to offer the necessary technical resources needed to conduct a constant technical maintenance for e-learning system, because sufficient access to e-learning materials without any technical problem or delay will be significantly associated with increasing the adoption of e-learning system successfully. Second, the university administration needs to provide the necessary hardware, software and internet connection, because if the universities are continuously update the necessary technological resources, then instructors and students would be able to implement the e-learning effectively. Third, the e-learning system designers and developers need to develop the e-learning system to be user-friendly, ease of use and simple, because if students and instructors find the e-learning system is easy to use, then they would be able to implement the e-learning system effectively. Fourth, the policy makers in Jordanian universities need to adopt new policies and regulations to promote the adoption of e-learning system among students and instructors. They also need to make some changes in the educational policies in order to ensure flexible moving from traditional learning to e-learning. These changes can take place through top management support, training programs and instructors' adherence to the university rules to use the e-learning system in the teaching process. Fifth, the results can guide the university policymakers to focus on increasing the awareness and knowledge of instructors through conducting training programs on how to use the e-learning system, because the instructors have an important role in motivating the students to use the e-learning system, which in turn affects the teaching performance and students' efficiency. Sixth, the universities need to focus on instilling the culture of e-learning systems

among students through training courses about the usefulness of e-learning systems and develop their IT skills. Because if students have sufficient computer skills and positive attitude towards interact with the e-learning system, this would promote the adoption of e-learning system successfully. Overall, the results of this study offer new insights and suggestions for decision makers to ensure the adoption of e-learning systems successfully.

7. CONCLUSIONS

This paper contributes to critical factors that influence the e-learning system adoption process in Jordanian universities. Such process, which covers all factors of e-learning system that have not been previously examined in Jordanian universities; therefore the findings represent a novel contribution for universities policy makers to review and utilize it for ensuring the successful implementation of e-learning systems. The findings of this research are based on empirical evidence, which identifies the factors that support the adoption of e-learning system, and endorses other researchers' understanding and analysis of the challenges facing the current e-learning systems. Furthermore, the combination of factors in the developed framework in this study as shown in Figure 3, is unique and mostly appropriate for the Jordanian universities. The universities policy makers, designers and developers in Jordanian universities can benefit from the findings in this study, which provide the real picture about the current e-learning systems, and could be taken as a guideline to improve the usage of e-learning systems among students.

In order to answer the research questions, this study employed the interview approach using thematic analysis through NVivo software. The interview was conducted with an official in the Jordan Higher Education Authority, along with four specialists in the development of e-learning systems. The research findings were structured around the two organizing themes, namely, factors affecting e-learning system, and challenges that the e-learning system faces.

Based on the results, the experts stated that the critical factors that affect the adoption of e-learning system and should universities take them into the future plans were: (1) technological factors, (2) e-learning system quality factors, (3) cultural aspects, (4) self-efficacy factors and (5) trust factors. In addition, the results indicated that there are three main challenges that impede the adoption of e-learning system in Jordanian university, namely, change management issues, e-learning system technical issues and financial support issues.

ACKNOWLEDGEMENTS

The authors acknowledge the Deanship of Scientific Research at King Faisal University for the financial support with number 186299.

REFERENCES

- [1] MA. Almaiah, M. Man. **Empirical investigation to explore factors that achieve high quality of mobile**

learning system based on students' perspectives. Engineering science and technology, an international journal. 2016 Sep 1;19(3):1314-20.

<https://doi.org/10.1016/j.jestch.2016.03.004>

[2] G. Mihhailova, (2006). **E-learning as internationalization strategy in higher education: Lecturer's and student's perspective.** *Baltic journal of management*, 1(3), 270-284.

[3] Idris, F. A. A., & Osman, Y. B. (2015, October). **Challenges Facing the Implementation of e-Learning at University of Gezira According to View of Staff Members.** In *2015 Fifth International Conference on e-Learning (econf)* (pp. 336-348). IEEE.

[4] MA. Almaiah, MA. Jalil. **Investigating Students' Perceptions on Mobile Learning Services.** *iJIM*. 2014;8(4):31-6.

<https://doi.org/10.3991/ijim.v8i4.3965>

[5] Naveed QN, Qureshi MR, Alsayed AO, Muhammad A, Sanober S, Shah A. **Prioritizing barriers of E-Learning for effective teaching-learning using fuzzy analytic hierarchy process (FAHP).** In 2017 4th IEEE International Conference on Engineering Technologies and Applied Sciences (ICETAS) 2017 Nov 29 (pp. 1-8). IEEE.

[6] Tarhini A, Masa'deh RE, Al-Busaidi KA, Mohammed AB, Maqableh M. **Factors influencing students' adoption of e-learning: a structural equation modeling approach.** *Journal of International Education in Business*. 2017 Nov 6;10(2):164-82.

[7] El-Masri, M., & Tarhini, A. (2017). **Factors affecting the adoption of e-learning systems in Qatar and USA: Extending the Unified Theory of Acceptance and Use of Technology 2 (UTAUT2).** *Educational Technology Research and Development*, 65(3), 743-763.

[8] Al-Rahmi WM, Yahaya N, Aldraiweesh AA, Alamri MM, Aljarboa NA, Alturki U, Aljeraiwi AA. **Integrating technology acceptance model with innovation diffusion theory: An empirical investigation on students' intention to use E-learning systems.** *IEEE Access*. 2019 Feb 18;7:26797-809.

[9] Salloum SA, Al-Emran M, Shaalan K, Tarhini A. **Factors affecting the E-learning acceptance: A case study from UAE.** *Education and Information Technologies*. 2019 Jan 15;24(1):509-30.

<https://doi.org/10.1007/s10639-018-9786-3>

[10] Al-Gahtani SS. **Empirical investigation of e-learning acceptance and assimilation: A structural equation model.** *Applied Computing and Informatics*. 2016 Jan 1;12(1):27-50.

[11] Almaiah MA, Almulhem A. **A conceptual framework for determining the success factors of e-learning system implementation using Delphi technique.** *Journal of Theoretical and Applied Information Technology*. 2018 Sep 15;96(17).

[12] BELLAAJ M, ZEKRI I, ALBUGAMI M. **The continued use of e-learning system: An empirical investigation using UTAUT model at the University of Tabuk.** *Journal of Theoretical & Applied Information Technology*. 2015 Feb 28;72(3).

[13] Chang CT, Hajiyeve J, Su CR. **Examining the students' behavioral intention to use e-learning in Azerbaijan? The general extended technology acceptance model for e-learning approach.** *Computers & Education*. 2017 Aug 1;111:128-43.

[14] Abdullah F, Ward R. **Developing a General Extended Technology Acceptance Model for E-Learning (GETAMEL) by analysing commonly used external factors.** *Computers in Human Behavior*. 2016 Mar 1;56:238-56.

<https://doi.org/10.1016/j.chb.2015.11.036>

[15] Alhabeeb A, Rowley J. **Critical success factors for eLearning in Saudi Arabian universities.** *International Journal of Educational Management*. 2017 Mar 13;31(2):131-47.

[16] MA. Almaiah, MA. Jalil, M. Man. **Preliminary study for exploring the major problems and activities of mobile learning system: A case study of Jordan.** *Journal of Theoretical & Applied Information Technology*. 2016 Nov 30;93(2).

[17] Eltahir ME. **E-Learning in Developing Countries: Is it a Panacea? A Case Study of Sudan.** *IEEE Access*. 2019 Jul 22;7:97784-92.

[18] Al-araibi AA, Naz'ri bin Mahrin M, Yusoff RC. **Technological aspect factors of E-learning readiness in higher education institutions: Delphi technique.** *Education and Information Technologies*. 2019 Jan 15;24(1):567-90.

<https://doi.org/10.1007/s10639-018-9780-9>

[19] Esterhuysen M, Scholtz B. **Barriers to e-learning in a developing country: An explorative study.** In *Proceedings of the 9th IDIA conference 2015*.

[20] Islam N, Beer M, Slack F. **E-learning challenges faced by academics in higher education.** *Journal of Education and Training Studies*. 2015;3(5):102-12.

[21] Stoffregen JD, Pawlowski JM, Ras E, Tobias E, Šćepanović S, Fitzpatrick D, Mehigan T, Steffens P, Przygoda C, Schilling P, Friedrich H. **Barriers to open e-learning in public administrations: A comparative case study of the European countries Luxembourg, Germany, Montenegro and Ireland.** *Technological Forecasting and Social Change*. 2016 Oct 1;111:198-208.

[22] A. Al-Azawei, P. Parslow, K. Lundqvist, **Barriers and Opportunities of E-Learning Implementation in Iraq: A Case of Public Universities**, *Int. Rev. Res. Open Distrib. Learn.*, vol. 17, no. 5, 2016.

[23] D. Kisanga, G. Ireson, **Barriers and strategies on adoption of e-learning in Tanzanian higher learning**

institutions: Lessons for adopters, *Int. J. Educ. Dev. Using Inf. Commun. Technol.*, vol. 11, no. 2, pp. 126, 2015.

[24] M.A. Al Gamdi, A. Samarji, **Perceived Barriers towards e-Learning by Faculty Members at a Recently Established University in Saudi Arabia**, *Int. J. Inf. Educ. Technol.*, vol. 6, no. 1, pp. 23, 2016.

[25] Myers MD, Avison D, editors. **Qualitative research in information systems: a reader**. Sage; 2002 Jul 25. <https://doi.org/10.4135/9781849209687>

[26] Creswell JW. **A concise introduction to mixed methods research**. SAGE publications; 2014 Mar 31.

[27] Quick J, Hall S. Part two: **Qualitative research**. *Journal of perioperative practice*. 2015 Jul;25(7-8):129-33.

[28] Corbin J, Strauss AL, Strauss A. **Basics of qualitative research**. sage; 2015.

[29] Patton MQ. **Qualitative research**. *Encyclopedia of statistics in behavioral science*. 2005 Oct 15.

[30] Patton MQ. **Qualitative research and evaluation methods**. Thousand Oakes.

[31] Denscombe M. **The Good Research Guide: for small social research projects**.

[32] Braun V, Clarke V. **Using thematic analysis in psychology**. *Qualitative research in psychology*. 2006 Jan 1;3(2):77-101.

[33] Morse J, Richards L. **The integrity of qualitative research**. Morse J, Richards L. Read me first for a user's guide to qualitative method. California: Sage. 2002:23-41.

[34] MA. Almaiah. **Acceptance and usage of a mobile information system services in University of Jordan**. *Education and Information Technologies*. 2018 Sep 1;23(5):1873-95.

[35] MA. Almaiah, MA. Jalil, M. Man. **Extending the TAM to examine the effects of quality features on mobile learning acceptance**. *Journal of Computers in Education*. 2016 Dec 1;3(4):453-85. <https://doi.org/10.1007/s40692-016-0074-1>

[36] MA. Almaiah, OA. Alismaiel. **Examination of factors influencing the use of mobile learning system: An empirical study**. *Education and Information Technologies*. 2019 Jan 15;24(1):885-909.

[37] MA. Almaiah, A. Al Mulhem. **Analysis of the essential factors affecting of intention to use of mobile learning applications: A comparison between universities adopters and non-adopters**. *Education and Information Technologies*. 2019 Mar 16;24(2):1433-68.

[38] AM . Al-Khasawneh, R . Obeidallah. **E-Learning in the Hashemite University: Success Factors for**

Implementation in Jordan. In *Advanced Online Education and Training Technologies 2019* (pp. 135-145). IGI Global.

[39] T. N. Aung and S. S. Khaing, **Challenges of implementing e-learning in developing countries: A review**, in *Genetic and Evolutionary Computing (Advances in Intelligent Systems and Computing)*, vol. 388, T. Zin, J. W. Lin, J. S. Pan, P. Tin, and M. Yokota, Eds. Cham, Switzerland: Springer, 2016.

[40] 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, pp. 10968–10978, 2017. doi:10.1109/ACCESS.2017.2714379.

[41] J. K. Tarus, D. Gichoya, and A. Muumbo, **Challenges of implementing E-learning in Kenya: A case of Kenyan Public Universities**, *Int. Rev. Res. Open Distrib. Learn.*, vol. 16, no. 1, 2015. doi: 10.19173/irrodl.v16i1.1816.

[42] M. M. Mulhanga and S. R. Lima, **Podcast as e-learning enabler for developing countries: Current initiatives, challenges and trends**, in *Proc. 9th Int. Conf. Educ. Technol. Comput.*, Dec. 2017, pp. 126–130. <https://doi.org/10.1145/3175536.3175581>

[43] T. Kenan, C. Pislaru, A. Othman, and A. Elzawi, **The social impact and cultural issues affecting the e-learning performance in Libyan higher education institutes**, *Int. J. Inf. Technol. Comput. Sci.*, vol. 12, no. 1, pp. 50–56, 2013.

[44] H.-R. Chen and H.-F. Tseng, **Factors that influence acceptance of webbased e-learning systems for the in-service education of junior high school teachers in Taiwan**, *Eval. Program Planning*, vol. 35, no. 3, pp. 398–406, Aug. 2012.

[45] Almaiah, M. A., Alamri, M. M., & Al-Rahmi, W. (2019). **Applying the UTAUT Model to Explain the Students' Acceptance of Mobile Learning System in Higher Education**. *IEEE Access*, 7, 174673-174686.

[46] Almaiah, M. A., & Alyoussef, I. Y. (2019). **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*, 7, 171907-171922. <https://doi.org/10.1109/ACCESS.2019.2956349>

[47] Almaiah, M. A., Alamri, M. M., & Al-Rahmi, W. M. (2019). **Analysis the Effect of Different Factors on the Development of Mobile Learning Applications at different stages of usage**. *IEEE Access*.

[48] Almaiah, M. A., & Al-Khasawneh, A. **Investigating the main determinants of mobile cloud computing adoption in university campus**. *Education and Information Technologies*, 1-21. <https://doi.org/10.1109/ACCESS.2019.2963333>