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THE MODERATING EFFECTS OF GENDER ON FACTORS AFFECTING THE INTENTION TO USE MOBILE LEARNING

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ABSTRACT

Aim/Purpose	The main aims of this research are to explore the moderating effects of gender on the relationships of such factors and the intention to use mobile learning, to examine the factors that influence m-learning acceptance in the universities and higher education institutions (HEI) in Iraq, and to investigate the influence of the intention to use on the actual use of mobile learning in (HEI).
Background	Over recent decades, mobile learning has played an increasingly important role in the teaching and learning process, especially for higher education. As such, acceptance and use of mobile learning has become a topic of interest within the education sector. In this regard, UTAUT is one of the widely used models for examining users' intention for use and acceptance of information technology.
Methodology	A survey method was used in this study involving a sample of 323 participants recruited from several universities in Iraq.
Contribution	This study has made significant contributions to the advancement of m-learning in Iraq by developing a mobile learning model that can help guide practitioners to promote and facilitate the use of such an approach in universities.
Findings	The findings showed that gender moderated the relationships of social influence (SI), effort expectancy (EE), and performance expectancy (PE) with respondents' intention to use m-learning. In addition, the findings confirmed the perceived enjoyment, performance expectancy (PE), effort expectancy (EE), self-efficacy (SE), and social influence (SI) had significant direct effects on intention to use m-learning. Furthermore, the respondents' intention to use or behavioral intention had a significant impact on the actual use of m-learning.

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Recommendations for Practitioners	It is vital for university management and practitioners to encourage students about the advantages of mobile learning in higher education institutions. In Iraq, the research in mobile learning is still very new and there are few studies have analyzed the gender effect on the mobile technology acceptance in learning. This study provides a roadmap of the gender effect on variables that could influence mobile learning acceptance in higher education institutions in Iraq.
Recommendations for Researchers	The gender moderation effect on the factors that influence the mobile learning acceptance is important, thus the new researchers are advised to examine the gender effect on other factors that could influence mobile learning acceptance. Moreover, cross-nation studies are needed to further validate the findings of this research because it was conducted from the perspective of a developing nation where mobile learning is still in its infancy. Future studies may broaden the research to examine additional potential elements, such as the quality of services in future models, which can help enhance the understanding of learners' acceptance and continuous usage of mobile learning as well as to improve the utility of UTAUT.
Impact on Society	The use of mobile learning has increased in its importance for higher education around the globe, including Iraq. Clearly, mobile learning has been pervasively used in education throughout the world due to the Covid-19 pandemic. During this time, students were required to study at home for months as per governments' orders in order to avoid being affected by the virus. With mobile learning, students were able to continue their studies; otherwise, they would have missed the academic year. Academic staff and administrators should therefore encourage and employ mobile learning for instruction, student communication, and exam administration.
Future Research	Given that the UTAUT model was used in higher educational settings for this research, it is advised to look into its application in corporate settings to see if comparable results can be repeated or not. More research is advised to look at the moderating effects of demographic factors, such as age and place of origin, in order to shed more light on students' adoption of mobile learning in HEIs in developing nations.
Keywords	Iraq, M-learning acceptance, gender moderator, HEI

INTRODUCTION

The objective of this study is to examine the gender moderation effect on the variables that influence the acceptance of m-learning and investigate the factors that influence the m-learning acceptance in the higher education institutions (HEI) in Iraq. Mobile learning is becoming a crucial part of education in a bid to promote learning interactions (Izkair & Lakulu, 2021). Mobile learning has certainly been proven to be the most effective teaching strategy for informal education when compared to other methods (Izkair et al., 2020). ICT is an effective tool for advancing formative objectives since it is a powerful enabler for boosting communication and information sharing (Alharmoodi & Lakulu, 2020). The rapid and expanding development of ICT and mobile technologies has led to the development and widespread adoption of new applications and innovative services. Thus, the analysis of the variables that may affect instructors' intentions to employ mobile learning in HEI is critical from a teaching standpoint (Althunibat, 2015).

Most universities in Iraq have some barriers to educational advancement, and practitioners need innovative technologies to meet these challenges, such as the strength of ICT infrastructure and internet connection to promote improved user satisfaction (Mohammed et al., 2015; Morad, 2019; Wahsh & Dhillon, 2015). According to the literature, mobile learning could be used as a novel technology to

supplement traditional education. Mobile devices with print-based interfaces offer more comfort, mobility, and convenience compared to personal computers (Neumann & Neumann, 2014) that are suited for younger users, require less effort, and promote continuity and spontaneous learning (Kukulska-Hulme, 2009). In this regard, M. Mohamad et al. (2012) identified the affordances of flexible, efficient applications that were able to assist underperforming learners by supporting individualized learning environments. Moreover, such novel applications can help support many learning styles, both formal and informal (A. J. Mohamad et al., 2016). Over recent years, numerous organizations have focused their efforts on helping their clients take advantage of the rapidly developing computerized technology (A. J. Mohamad & Lakulu, 2017).

In this study, the factors affecting acceptance of m-learning are identified, these factors will be used to determine whether gender significantly affects acceptance levels by means of a questionnaire administered to 323 participants selected from several universities in Iraq. Moreover, this research will investigate the influence of m-learning acceptance on the m-learning actual use.

RELATED WORKS

The focus of purposeful mobile learning usage, mobile learning challenges and UTAUT Model as well as the variables that influence the behavioral intention to utilize mobile learning is discussed in this section. This section also elaborates the effects of gender on the relationships between such variables and intention to use mobile learning.

THE ACCEPTANCE OF M-LEARNING

By including educators in the learning process, one of the pillars of integrating modern innovations into the e-learning strategy is gaining their acceptance. To help realize this, it is crucial to understand the key factors influencing technological acceptance so that their impacts can be assessed, measured, and predicted more precisely (Sánchez-Prieto et al., 2016).

THE ACCEPTANCE AND USAGE

According to a study by Mohammadi (2015) that focused on earlier studies using TAM, intention is defined as the likelihood that a person would use an information system. It has been identified as the most important variable pertaining to technology acceptance. Additionally, the intention to use is seen as a crucial component in really putting new innovations to use (F. D. Davis, 1989). Practically, it is difficult to anticipate that a particular attitude toward a modern innovation will also result in the use of that innovation. However, several studies, such as those of Iqbal and Bhatti (2017), and Martins et al. (2014) showed a positive relationship between intention to use and actual use of innovation.

MOBILE LEARNING CHALLENGES

The transition of e-learning into mobile learning that takes into account their integration process entails the influences of difficulties in the process of transformation additionally. The possible difficulties could be the compatibility flaws within the database, educational issues, mobile devices penetrating capability, customer acceptance, pressures encountered at open and social levels, and many other problems. Even the lecturers may feel reluctant to adapt to the imperatives of mobile innovation as its use in learning encounters requires additional effort (Abu-Al-Aish & Love, 2013; Althunibat, 2015).

The effective performance of mobile learning setting also requires a diversity of talented people in using the mobile device in an arrangement to access educational materials provided by mobile learning, and is ready for using services of the mobile learning. If higher education institutions fail to cope with the difficulties of mobile learning implementation, important problems with the

acceptance of learners in the mobile learning usage are likely to arise. Chen and Denoyelles (2013) discussed this issue that despite the existing research extent of mobile learning approach in universities.

Therefore, issues of mobile learning implementation require examining, like students' acceptance. This study is based on identifying the variables that influence mobile learning acceptance as experienced by the students at university. The research analyzes the current investigations conducted in this regard (Althunibat, 2015).

Mobile learning is widely used in well-established countries in term of infrastructure and internet connection as well as the facilitating conditions that help in using the technology. However, when it comes to the developing countries and in particular to Iraq, the use of mobile learning is minimal and this is due to several issues such as the perception of students about the benefit and the ease of using mobile learning as well as the strength of the infrastructure and the internet connection and user satisfaction (Mohammed et al., 2015; Morad, 2019; Wahsh & Dhillon, 2015).

Smartphones can do many of the functions of a computer and their usage in everyday life activities is obvious. Nevertheless, in Iraq, the adoption of technology is still in the range of 20% and students have preference to the traditional method (Al-Azawei & Alowayr, 2020; Alsswey et al., 2020; Okai-Ugbaje et al., 2020). For this reason, the study will attempt understanding the factors that lead to the increase in the adoption of mobile learning in Iraqi higher education institutions, and investigate the gender effect on the relationships of some factors on m-learning acceptance in HEI.

Review of the UTAUT Model in Mobile Learning Acceptance

Abu-Al-Aish and Love (2013) study mentioned the various models that have been developed to investigate the intention and acceptance of individuals for adoption of modern innovations in the information systems at the world. F. D. Davis (1989) attempted to identify the reasons why individuals acknowledge the innovation of data.

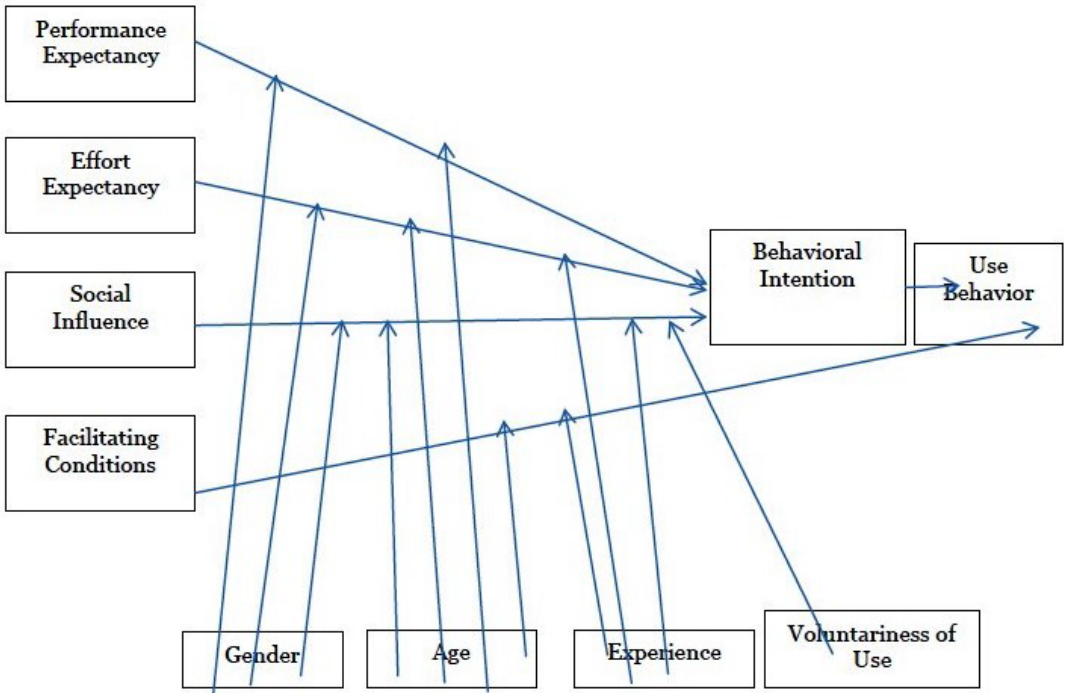

Figure 1: The UTAUT Model (Venkatesh et al., 2003)

Technology acceptance model (TAM) is the most widely used model in the area of technology adoption (F. D. Davis et al., 1989). The concept of TAM is to provide a theoretical base to clarify the

effect of external factors (i.e., training, computer self-efficacy, objective system design features) on attitude toward use, internal beliefs, behavioural intentions, and actual use of systems. Another well-known and modern model in acceptance of the information technology is the "unified theory of acceptance and use of technology" (UTAUT). This model was proposed by Venkatesh et al. (2003) and seeks to consolidate and empirically compare components from different innovation acceptance models in innovation acceptance. Figure 1 shows The UTAUT model.

The UTAUT has four determinants of IT user behaviour and four moderators that are found to moderate the influence of the four determinants on the user behaviour and behaviour intention. UTAUT theorizes that effort expectancy, performance expectancy, facilitating conditions and social influence are direct determinants of behaviour intention or user behaviour.

The moderating variables (age, gender, voluntariness of use and experience) are crucial for influencing the behaviour of various customers groups (see Figure 1). Venkatesh et al. (2003) showed that UTAUT has the capability to demonstrate about 70% of variance in the intention. It has been shown that UTAUT outperforms the previous models (Venkatesh et al., 2003). Moreover, it could give a valuable device for supervisors to evaluate the success of the modern innovation (Ibrahim & Jaafar, 2011).

Variables Selected for the Research

Previous investigations have found various variables, such as performance expectancy, effort expectancy, social influence, quality of service, perceived enjoyment, and self-efficacy, are significant determinants of technology acceptance. Table 1 shows the six variables selected for this study along with related prior research for each variable, and the studies of the gender moderation effect.

Table 1: Factors affecting the intention to use m-learning and the gender moderation effect

No.	Independent Factors	Studies
1	Performance expectancy	Abu-Al-Aish & Love, 2013), (Chaka & Govender, 2017), (Huan et al., 2015), (Milošević et al., 2015)
2	Effort expectancy	(Abu-Al-Aish & Love, 2013), (Chaka & Govender, 2017), (Huan et al., 2015), (Milošević et al., 2015),
3	Social influence	(Briz-Ponce et al., 2017), (Chaka & Govender, 2017), (Huan et al., 2015), (Sabah, 2016), (Tan et al., 2014)
4	Quality of Service	(Abu-Al-Aish & Love, 2013), (Althunibat, 2015), (Huan et al., 2015), (Milošević et al., 2015)
5	Perceived enjoyment	(Y. M. Cheng, 2015), (Huan et al., 2015), (Poong et al., 2017)
6	Self-efficacy	(Huan et al., 2015), (Mohammadi, 2015)
7	Gender moderation effects	(Alasmari, 2020), (Camilleri, 2019), (Y. S. Cheng et al., 2011), (J. L. Davis & Davis, 2007), (Ghalandari, 2012), (Morris & Venkatesh, 2000), (Ong & Lai, 2006), (Sun & Zhang, 2006), (Wang et al., 2009), (Zhang, 2005), (Zhou & Xu, 2007).

Variables Influencing Mobile Acceptance:

Many studies have been discussed and investigated that focused on the mobile learning acceptance to identify the important factors or variables that influence the m-learning acceptance. From the literature review, 12 studies have been selected, which include the factors that influence mobile learning acceptance. In this study, six factors were chosen that affect the intention to use mobile learning in HEI in Iraq.

This section will show the six variables that could affect the intention to use mobile learning or the mobile learning acceptance. These factors lead to the first research hypotheses of this study, the factors influencing acceptance of m-learning.

Performance expectancy

Users' levels of acceptance and use of new technology that will help them succeed in their work are described as performance expectancy (Alshammari, 2021; Venkatesh et al., 2003).

"H1: Performance expectancy has a significant and positive effect on intention to use mobile learning."

Effort expectancy

According to a study by Milošević et al. (2015), effort expectancy is regarded as a vital element of information systems that demonstrates the degree of certainty of mastering an innovation (Marchewka & Kostiwa, 2007). Additionally, effort expectancy is defined as the degree of comfort associated with system usage (Alshehri et al., 2020; Venkatesh et al., 2003).

"H2: Effort expectancy has a significant and positive effect on intention to use mobile learning."

Social influence

In terms of modern innovation and social effect, social influence can be defined as the extent to which a person's perception of the use of a modern innovation is dependent on other people's perceptions of its significance (Venkatesh et al., 2003).

"H3: Social influence has a significant and positive effect on intention to use mobile learning."

Quality of services

According to a study by (Milošević et al., 2015), most definitions of quality of services place a strong emphasis on the client's comprehension and satisfaction with the services received. The client's demand for service quality was described in (Parasuraman et al., 1988) study as what the client believed would provide him or her with this advantage rather than what it actually did. As cited in a study by (Azeez & Lakulu, 2018), Shareef et al. (2014) and Al-Hubaishi et al. (2017) attempted to set the standards for the quality of mobile services, which saw the latter defining quality standards from a quality perspective.

"H4: Quality of services has a significant and positive effect on intention to use mobile learning."

Perceived enjoyment

According to a study by (Poong et al., 2017), ICT and PC use have changed over the past decades from being mostly used for work to combining work and leisure activities. This huge leap in use has been fascinated by the advancement of innovation, which has resulted in smaller and cheaper PCs as well as greater computer mobility. In this respect, (Alrfooh & Lakulu, 2020) assert that perceived enjoyment is an important factor that has a significant impact on leaners' intentions to use mobile learning.

"H5: Perceived enjoyment has a significant and positive effect on intention to use mobile learning."

Self-efficacy

Self-efficacy could be characterized as a person's belief in the value of utilizing a certain technology or system. According to Abbad et al. (2009), a user's perception of his or her ability to engage in particular behaviors, such as the ability to carry out particular obligations, can be described as self-efficacy (Ali & Arshad, 2016). Without a doubt, prior research has shown that a user's acceptance of information and communication technology is strongly influenced by their level of computer self-efficacy (ICT).

"H6: Self-efficacy has a significant and positive effect on intention to use mobile learning."

Actual usage and acceptance

According to Mohammadi (2015), intention (which has been identified as one of the significant determinants of actual use in earlier studies) is defined as the likelihood that a person will use an information system. In order for a modern breakthrough to be actually used, its approval is crucial (F. D. Davis, 1989). Clearly, the practical application of a given innovation depends on the user's behavioral intention toward that innovation (F. D. Davis et al., 1989; Iqbal & Bhatti, 2017).

"H7. Intention to use has a significant and positive effect on actual use of mobile learning."

Moderating Effects of Gender

In past studies, such as those of Ong and Lai (2006) and Wang et al. (2009), gender differences were examined in relation to factors influencing the acceptance of m-learning and e-learning., earlier studies on the gender differences in attitudes toward and acceptance of mobile learning frameworks yielded contradictory results. Previous studies on the use of mobile learning in various contexts, such as businesses, colleges, and schools, found that male users had significantly more favorable perceptions of mobile learning and e-learning than female users (e.g. Ong & Lai, 2006; Zhou & Xu, 2007).

By contrast, several researchers, including J. L. Davis and Davis (2007) and Zhang (2005), noted there are no differences in gender regarding such perceptions. Other studies have produced contradicting findings regarding gender's moderating influences on the variables that affect technology acceptance. For example, male behavioral intentions were strongly influenced by perceived usefulness, as shown in studies by (Morris & Venkatesh, 2000; Sun & Zhang, 2006), whereas female behavioral intentions were significantly impacted by perceived ease of use, as found in a study by (Ong & Lai, 2006).

According to Camilleri (2019), performance expectancy appears to be a strong determinant of the adoption of mobile learning, and the intensity of the relationship varies by gender, being more significant for males and younger respondents. Moreover, the association between effort expectancy and acceptance was moderated by gender, with older respondents and female respondents placing greater importance on this factor. However, those effects tend to fade over time.

According to Y. S. Cheng et al. (2011), gender was a significant moderator that affected the relationship between behavioral intention and social influence, and it particularly affected young females, where the association was stronger. It would seem that when a tool for mobile learning is offered, young females would be more likely to have a stronger intention to use it than males. Therefore, it is recommended that male students and older students should motivate themselves more to improve their behavioral intention to use mobile learning.

According to Ghalandari (2012), gender had moderating effects on the relationships between social influence, effort expectancy, and performance expectancy with users' acceptance. According to Alasmari (2020), female academics regarded mobile learning as an easy means to access resources and course materials whenever and wherever they chose, as well as a tool to complete assignments and make up for missed lectures.

"H8: Gender is a moderating variable affecting the influence of performance expectancy on intention to use mobile learning."

"H9: Gender is a moderating variable affecting the influence of effort expectancy on intention to use mobile learning."

"H10: Gender is a moderating variable affecting the influence of social influence on intention to use mobile learning."

RESEARCH METHODOLOGY

Research methodology is crucial because it directs a methodical investigation of a phenomenon. It offers the researcher a suitable step-by-step procedure to aid in achieving the research objectives.

QUANTITATIVE RESEARCH APPROACH

The proper selection of research subjects by the researcher is the first step in conducting a quantitative study. In this quantitative study the researchers use self-administered questionnaires for individuals, which have been verified through a variety of tests (Choy, 2014; Dudwick et al., 2006). Of course, according to the research gap, it is the basic for creating a particular framework (Husain et al., 2017). They are 323 completed surveys.

QUESTIONNAIRE DEVELOPMENT

In the first stage of data gathering and management, Iraqi students and academics in HEIs who had experience with mobile learning were surveyed. The target audiences were three public universities in central Iraq. Sections A, B, and C made up the three sections of the questionnaire. The demographic information of the respondents, such as gender and educational level, was gathered through Section A. While Section B sought respondents' opinions on the benefits of mobile learning, Section C gathered information relating to the research constructs. See the appendix of this research in the end of this study that has 38 questions, each factors has 3-5 questions. Figure 2 shows the survey development.

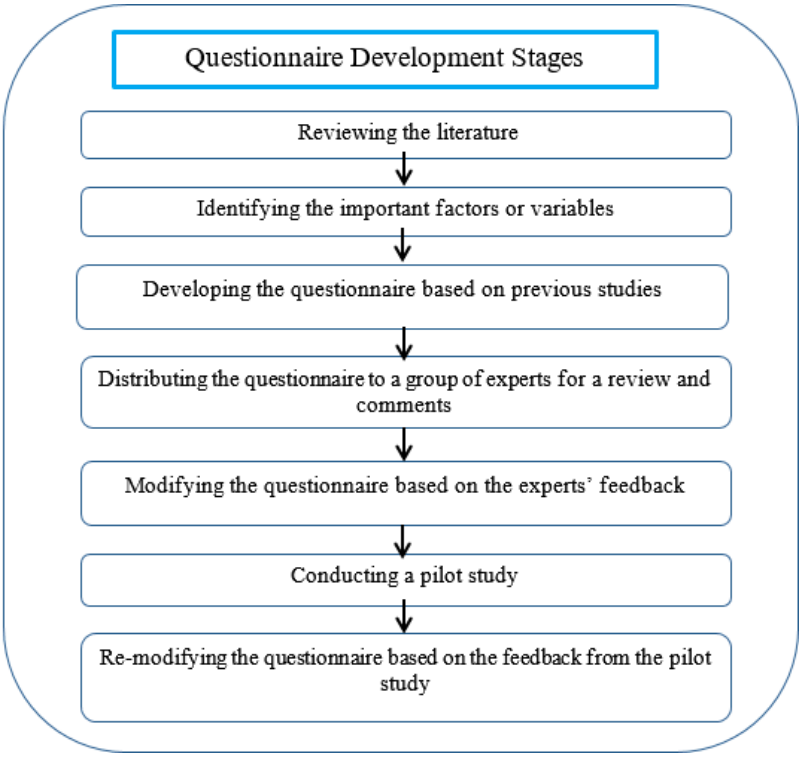

Figure 2: The questionnaire development stages

Data Analysis

The survey data elicited from 323 complete questionnaires were analyzed using SPSS statistical software and the AMOS program to yield descriptive statistics (means and frequencies) and inferential statistics. To make sure the analysis would produce accurate results, missing data, normality, and multi-collinearity were verified beforehand (Yin, 2009). Specifically, the AMOS program was used for data analysis to test the research hypotheses.

Research Hypotheses

In this study, seven research hypotheses were formulated to examine the direct relationships between the study constructs. Also, another three research hypotheses were developed to examine the moderating effects of gender on the relationships between performance expectancy, effort expectancy, and social influence with the intention to use mobile learning. Table 2 summarizes all the 10 research hypotheses of this study.

Table 2: Research Hypotheses

#	**Hypotheses**
1.	"H1: Performance expectancy has a significant and positive effect on intention to use of mobile learning"
2.	"H2: Effort expectancy has a significant and positive effect on intention to use of mobile learning"
3.	"H3: Social influence has a significant and positive effect on intention to use of mobile learning"
4.	"H4: Quality of services has a significant and positive effect on intention to use mobile learning"
5.	"H5: Perceived enjoyment has a significant and positive effect on intention to use mobile learning"
6.	"H6: Self-efficacy has a significant and positive effect on intention to use mobile learning"
7.	"H7. Intention to use has a significant and positive effect on actual use of mobile learning"
8.	"H8: Gender is a moderating variable affecting the influence of performance expectancy on intention to use mobile learning"
9.	"H9: Gender is a moderating variable affecting the influence of effort expectancy on intention to use mobile learning"
10.	"H10: Gender is a moderating variable affecting the influence of social influence on intention to use mobile learning"

Model Validation

Ten experts with experience in m-learning and information technology were given a second questionnaire to complete in order to verify that the mobile learning model of this study was valid. These experts were lecturers from several institutions in Malaysia and Iraq. The experts were specifically chosen because of their vast expertise in the field of and deep interest in mobile learning. The researcher gave the experts a briefing on the variables, objectives, and developed model of the study. The objective of the second questionnaire was to collect comments and suggestions from the experts to help verify the validity of the variables that were used to create the model for this study. Table 3 shows the demographic background of the experts selected in this study.

Table 3: The demographic background of experts

Experts	Position	University	Expertise	Years of Experience
Expert 1	Associate Professor	University of Babylon-Iraq	Information Technology	More than 20 years
Expert 2	Senior Lecturer	University of Babylon-Iraq	Information Technology	More than 15 years
Expert 3	Professor	University of Technology – Iraq	Information System	More than 25 years
Expert 4	Associate Professor	Sultan Idris Education University – Malaysia	Mobile Learning	More than 20 years
Expert 5	Associate Professor	Almustaqbal University College- Iraq	Mobile Learning & E-Governance	More than 15 years
Expert 6	Senior Lecturer	University of Technology – Iraq	Mobile Learning	More than 10 years
Expert 7	Associate Professor	University of Babylon-Iraq	Information System	More than 20 years
Expert 8	Senior Lecturer	University of Technology – Iraq	Information System	More than 10 years
Expert 9	Associate Professor	Sultan Idris Education University – Malaysia	Mobile Learning	More than 15 years
Expert 10	Professor	University of Babylon-Iraq	Information Technology	More than 22 years

DATA ANALYSIS AND FINDINGS

In this study, the SPSS and AMOS statistical software were used for analyzing the data gathered from the survey.

MISSING VALUES

The frequency analysis carried out on all the items entered into SPSS was used to look at missing values. Hair et al. (2017) state that a response should be deleted if its missing values are greater than 15%. However, mean score values can be used to replace missing values that are under 15%. There were no missing values for any of the survey responses in this study, according to the results of the frequency analysis in SPSS. This was mostly attributed to the use of online questionnaires, which prevented respondents from sending incomplete questionnaires. Additionally, every question had the word "required" next to it. With 323 survey responses obtained from the respondents, the response rate was therefore calculated to be 100%.

NORMALITY

Both (Hair et al., 2017) and (Pallant, 2016) note that there are two methods for determining normality. The first method is to check the skewness and kurtosis. Since this method is widely accepted and the values of kurtosis and skewness are less than 2, it can be concluded that the data of this study were normally distributed (George & Mallery, 2008). The second method used involved examining the histograms of the study variables.

A bell-shaped pattern is an example of a normal distribution. Table 4 displays the skewness and kurtosis of the data, with values for skewness that were less than 2 and between -.030 and -.525 in range. Additionally, the range of kurtosis values is below 2 and lies between .415 and 1.128.

Table 4: The Analysis of Normality

Factor	Skewness1 <±2	Kurtosis1 <±2
"Social Influence"	-.182	-.680
"Perceived Enjoyment"	-.216	-.929
"Effort Expectancy"	-.374	-.536
Quality of Service	-.525	-.805
Performance Expectancy	-.323	-.762
Self-Efficacy	-.251	-.959
Intention to Use	-.030	-1.128
Actual Use	-.137	-.922
Standard error of Skewness	.137	
Standard error of Kurtosis		.274

The distribution of the data was normal, as shown in Table 2, supporting the assumption that the data were normally distributed. Additionally, the histogram of each variable was examined visually, which revealed a bell-shaped distribution of the data.

Demographic Profile of Respondents

Table 5 summarizes the demographic profiles of the respondents in terms of gender, age grouping, educational background, and length of time utilizing mobile learning. Descriptive statistics, such as means and standard deviations, are also displayed in the table.

The gender breakdown of the study's respondents is shown in Table 5 below. It shows that 165 respondents, or 52.5% of them, were men and 149 respondents, or 47.5%, were women. This suggests that the study had a nearly equal representation of both genders.

Table 5: Demographic profiles of respondents

Variable	Label	Frequency	Percent	Mean	Std
Gender	Male	165	52.5	1.47	.500
	Female	149	47.5		
"Age" (years)	"19-26"	37	11.8	2.62	.988
	"27-34"	110	35.0		
	"35-42"	114	36.3		
	"43-50"	40	12.7		
	">50"	13	4.1		
Education	Bachelor	97	30.9	2.56	1.144
	Diploma	13	4.1		
	Master	135	43.0		
	PhD	69	22.0		
Experience (years)	"0-4"	171	54.5	1.48	.549
	"5-8"	135	43.0		
	"9-12"	8	2.5		

Structural Models

The third level of the SEM-AMOS program, which comprises three levels, deals with structural models. The structural model was tested using the SEM approach, which was also utilized to look at each hypothesis's significance levels and path coefficients (Sabah, 2016). At this point, the hypotheses were tested, showing the values of the model's R-square. The structural model for this investigation is shown in Figure 1. As a dependent variable with an R-square of 0.60, intention to use can be explained by the independent variables, namely PE, SI, satisfaction, perceived enjoyment, personal inventiveness, FC, self-efficacy, EE, and quality of service, for 60% of the variance.

The study's dependent variable, intention to use (ITU), had an R-square of 0.6, meaning that the study's independent variables, including perceived enjoyment (PE), personal innovativeness (SI), satisfaction, self-efficacy (FC), quality of service, and effort expectancy, explained 60% of the variance in ITU. The R-square for AU was 0.44 as well, indicating that ITU accounted for 44% of the variance of actual use.

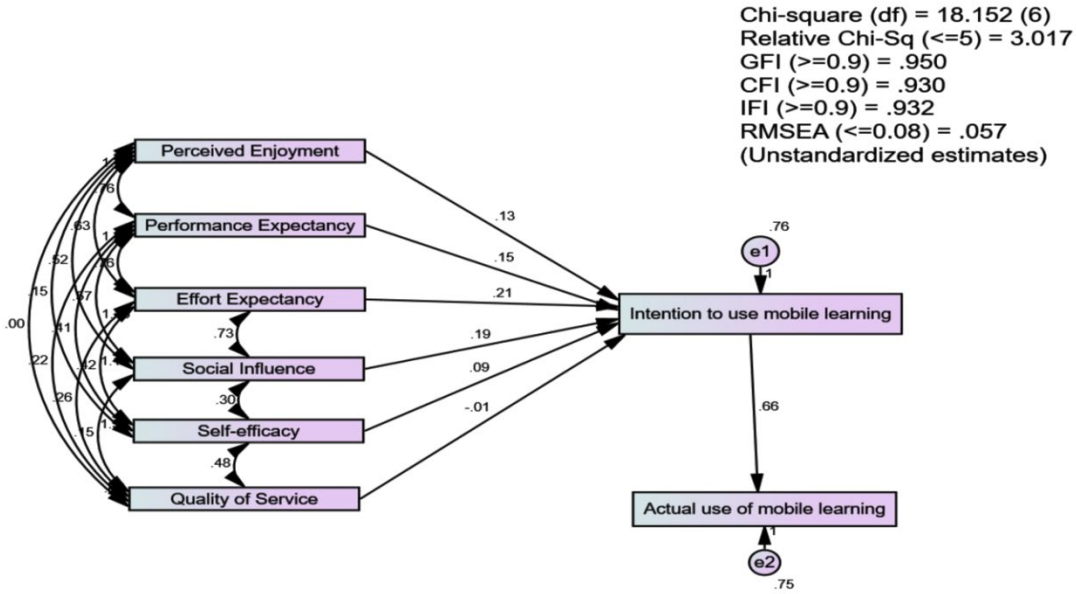

Figure 3: Structural Model of Direct Effect

The aforementioned R-square values were deemed acceptable by Hair et al. (2017). R-square values between 0.25 and 0.50 are considered good, while those between 0.50 and 0.75 are regarded as exceptional. Figure 3 shows the structural model for the current investigation that was applied in Iraq. In this study, the mean score values were utilized to examine the indirect and direct effects of the independent variables. This approach is in line with other studies that used the mean score values to examine structural models, including those of Hair et al. (2010), Awang (2014), and Lowry and Gaskin (2014).

Hypotheses Testing

The study comprised seven research hypotheses that dealt with direct effects of the independent variables and three research hypotheses that focused on the moderating effects of gender. In the sections that follow, the discussion of the latter hypotheses is preceded by a discussion of the former hypotheses.

Direct Effects of the Independent Variables

The findings of testing the first seven research hypotheses are summarized in Table 6 in terms of path, degree of significance (P), estimate (B), critical ratio (C.R.) or t-value (T), and standard error (S.E.). According to (Hair et al., 2010), the p-value (also known as significance level) must be lower than 0.05 and the C.R. must be higher than 1.96 in order to accept a hypothesis (Awang, 2014).

Table 6: The Findings of Direct Influence for Hypotheses

"IV"	**"Path"**	**"DV"**	**"P"**	**"Estimate (B)"**	**"C.R."**	**"S.E."**	**"H"**	**"Out-come"**
"PE"	--->	"ITU"	.002	.152	3.096	.048	"H17"	"Ac-cepted"
"EE"	--->	"ITU"	***	.206	4.216	.048	"H26"	"Ac-cepted"
"SI"	--->	"ITU"	***	.196	3.806	.052	"H34"	"Ac-cepted"
"QOS"	--->	"ITU"	.798	-.012	-.256	.046	"H46"	"Re-jected"
"PEN"	--->	"ITU"	.021	.118	2.316	.051	"H58"	"Ac-cepted"
"SE"	--->	"ITU"	.030	.090	2.165	.042	"H64"	"Ac-cepted"
"ITU"	--->	"AU"	***	.661	15.811	.041	"H73"	"Ac-cepted"

Legend: ITU: intention to use; PE: performance expectancy; EE: effort expectancy; SI: social influence; QOS: quality of service; PEN: perceived enjoyment; SE: self-efficacy; and AU: actual use.

Testing the Moderating Effects of Gender

The gender of the respondents, from which the data were spilt into male and female categories, was proposed as the moderator in this study. The number of men was 165, while the number of women was 149. Accordingly, two structural models were developed for the analysis, with the first being constrained while the second being unconstrained. Comparisons of chi-square test values were made between the constrained and unconstrained models, indicating that there was a significant moderating effect if the difference in such values was more than 3.84 (Awang, 2014). The chi-square test is a nonparametric test that is employed for two distinct purposes: (a) testing the null hypothesis that there is no association between two or more groups, populations, or criteria (i.e., determining the independence between two variables); and (b) determining the likelihood that the observed data distribution matches the expected distribution (i.e., determining the goodness-of-fit). Categorical data analysis is done using it (e.g. male or female students, etc.) (Rana & Singhal, 2015). The following sections discuss the moderating effects of gender on the relationships between SI, EE and PE with ITU.

Moderating Effect of Gender on the Relationship Between Performance Expectancy and Intention to Use

The eighth research hypothesis, H8, postulates that gender moderates the impact of performance expectancy (PE) on intention to use mobile learning (ITU) in Higher Education Institution (HEH) in Iraq. Specifically, this hypothesis states that gender is a moderating variable affecting the influence of performance expectancy on intention to use mobile learning in higher education institutions (HEI). Table 7 summarizes the results of the Chi-square test in testing this research hypothesis based on the constrained and unconstrained models for females.

Table 7: Results of Chi-square test of the models for the relationship between PE and ITU for females

"Type1 of model/high"	"P"	"CMIN"	"CMIN/DF"	"DF"	"NPAR"	"Model"
Constrained	.000	107.805	10.781	10	56	"Defaults models"
		.000		0	66	"Saturated models"
	.000	726.747	13.214	55	11	"Independences models"
Unconstrained	.400	9.414	1.046	9	57	"Defaults models"
		.000		0	66	"Saturated models"
	.000	726.747	13.214	55	11	"Independences models"

The difference in the Chi-square values of the unconstrained and constrained models was examined to test the significance of the moderating effect of gender, as summarized in Table 8. It is evident that there was a significant moderating effect of gender on the relationship between PE and ITU for females as the difference between the chi-square values was more than 3.84.

Table 8: Result of moderating effect of gender on the relationship between PE and ITU for females

"High"	"Unconstrained Model"	"Constrained model"	"Chi-square differences"	"Result of moderation"	"Result of hypothesis"
"Chi-square"	9.414	107.805	98.391	Significant	Accepted
"DF"	9	10	1		
"GFI"	.989	.908			
"CFI"	.999	.954			
"IFI"	.999	.964			
"RMSEA"	.018	.257			
"Chi-square/df"	1.046	10.781			
"H8: Gender is a moderating variable affecting the influence of performance expectancy on intention to use of mobile learning"					Accepted

Table 9 summarizes the results of the Chi-square test in testing this research hypothesis based on the constrained and unconstrained models for males.

Table 9: Chi-square test results of the models involving PE and ITU for males

"Type of model/low"	"P"	"CMIN"	"CMIN/DF"	"DF"	"NPAR"	"Model"
Constrained	.000	143.248	14.325	10	56	"Defaults models"
		.000		0	66	"Saturated models"
	.000	745.057	13.546	55	11	"Independences models"
Unconstrained	.000	33.370	3.708	9	57	"Defaults models"
		.000		0	66	"Saturated models"
	.000	745.057	13.546	55	11	"Independences models"

Table 10 shows the results of moderating effect of gender on the relationship between performance expectancy and intention to use mobile learning for males. As shown, the difference in the Chi-square values was 109.878, which is greater than 3.84, thus providing the evidence to support this research hypothesis.

Table 10: Result of moderating effect of gender on the relationship between PE and ITU for males

"Low"	"Unconstrained Model"	"Constrained model"	"Chi-square differences"	"Result of moderation"	"Result of hypothesis"
"Chi-square"	33.370	143.248	109.878	Significant	Accepted
"DF"	9	10	1		
"GFI"	.968	.905			
"CFI"	.965	.907			
"IFI"	.967	.919			
"RMSEA"	.128	.285			
"Chi-square/df"	3.708	14.325			
"H8: Gender is a moderating variable affecting the influence of performance expectancy on the intention to use mobile learning"					Accepted

The unconstrained paths (PE on ITU) for males and females were looked into in order to determine whether the effects of the moderator were significant or not, as shown in Table 11. As shown, the moderating effects were highly significant for both genders, as the significance values (p-values) of both paths were less than .05. Therefore, there was strong evidence to accept the eight research hypothesis, H8, of the study.

Table 11: The significance of the moderator for the relationship between PE and ITU

"Model"	"IV"	"Path"	"DV"	"P"	"Estimate"	"C.R."	"S.E."	"Outcome"
Female	PE	--->	ITU	.024	.161	2.265	.071	Accepted
Male	PE	--->	ITU	.042	.140	2.034	.069	Accepted

MODERATING EFFECT OF GENDER ON THE RELATIONSHIP BETWEEN EFFORT EXPECTANCY AND INTENTION TO USE

The ninth research hypothesis, H9, of this study proposes that gender is a moderator for the relationship between effort expectancy (EE) and intention to use (ITU). Specifically, it is expressed as gender is a moderating variable affecting the influence of effort expectancy on intention to use mobile learning. Table 12 summarizes the results of Chi-square test in testing this research hypothesis based on the constrained and unconstrained models for females.

Table 12: Results of Chi-square test of the models for the relationship between EE and ITU for females

"Type of model/high"	**"P"**	**"CMIN"**	**"CMIN/DF"**	**"DF"**	**"NPAR"**	**"Model"**
Constrained	.000	108.753	10.875	10	56	"Defaults models"
		.000		0	66	"Saturated models"
	.000	726.747	13.214	55	11	"Independences models"
Unconstrained	.400	9.414	1.046	9	57	"Defaults models"
		.000		0	66	"Saturated models"
	.000	726.747	13.214	55	11	"Independences models"

Table 13 summarizes the results of the moderating effect of gender. As shown, it is clear that there was a significant moderating effect of gender on the relationship between EE and ITU for females as the difference between the chi-square values was more than 3.84.

Table 13: Result of moderating effect of gender on the relationship between EE and ITU for females

"High"	**"Unconstrained Model"**	**"Constrained model"**	**"Chi-square differences"**	**"Result of moderation"**	**"Result of hypothesis"**
"Chi-square"	9.414	108.753	99.339	Significant	Accepted
"DF"	9	10	1		
"GFI"	.989	.908			
"CFI"	.999	.953			
"IFI"	.999	.962			
"RMSEA"	.018	.258			
"Chi-square/df"	1.046	10.875			
"H9: Gender is a moderating variable affecting the influence of effort expectancy on intention to use mobile learning"					Accepted

Table 14 summarizes the results of Chi-square test in testing this research hypothesis based on the constrained and unconstrained models for males.

Table 14: Results of Chi-square test of the models for the relationship between EE and ITU for males

"Type of model/low"	"P"	"CMIN"	"CMIN/DF"	"DF"	"NPAR"	"Model"
Constrained	.000	124.901	12.490	10	56	"Defaults models"
		.000		0	66	"Saturated models"
	.000	745.057	13.546	55	11	"Independences models"
Unconstrained	.000	33.370	3.708	9	57	"Defaults models"
		.000		0	66	"Saturated models"
	.000	745.057	13.546	55	11	"Independences models"

Table 15 shows the results of moderating effect of gender on the relationship between effort expectancy and intention to use mobile learning for males. As shown, the difference in the Chi-square values was 91.531, which is greater than 3.84, indicating that the moderating effect was significant.

Table 15: Result of moderating effect of gender on the relationship between EE and ITU for males

"Low"	"Unconstrained Model"	"Constrained model"	"Chi-square differences"	"Result of moderation"	"Result of hypothesis"
"Chi-square"	33.370	124.901	91.531	Significant	Accepted
"DF"	9	10	1		
"GFI"	.968	.908			
"CFI"	.965	.933			
"IFI"	.967	.944			
"RMSEA"	.128	.265			
"Chi-square/df"	3.708	12.265			
"H9: Gender is a moderating variable affecting the influence of effort expectancy on intention to use mobile learning"					Accepted

The unconstrained paths (EE on ITU) for males and females were examined to determine whether the effects of the moderator were significant or not, as shown in Table 16. As indicated, the moderating effects were highly significant for both genders, as the significance values (p-values) of both paths were less than .05. Therefore, there was strong evidence to support the ninth research hypothesis, H9, of the study which is H9: Gender is a moderating variable affecting the influence of effort expectancy on intention to use mobile learning.

Table 16: The significance of the moderator for the relationship between EE and ITU

"Model"	"IV"	"Path"	"DV"	"P"	"Estimate"	"C.R."	"S.E."	"Outcome"
Female	EE	--->	ITU	.000	.220	3.354	.066	Accepted
Male	EE	--->	ITU	.007	.196	2.700	.073	Accepted

MODERATING EFFECT OF GENDER ON THE RELATIONSHIP BETWEEN SOCIAL INFLUENCES AND INTENTION TO USE

The tenth research hypothesis of this study states that gender is a moderator for the relationship between social influence (SI) and intention to use (ITU). Specifically, it is expressed as gender is a moderating variable affecting the influence of social influence on intention to use mobile learning. Table 17 summarizes the results of Chi-square tests in testing this research hypothesis based on the constrained and unconstrained models for females.

Table 17: Results of Chi-square test of the models for the relationship between SI and ITU for females

"Type1 of model/high"	**"P"**	**"CMIN"**	**"CMIN/DF"**	**"DF"**	**"NPAR"**	**"Model"**
Constrained	.000	86.536	8.654	10	56	"Defaults models"
		.000		0	66	"Saturated models"
	.000	726.747	13.214	55	11	"Independences models"
Unconstrained	.400	9.414	1.046	9	57	"Defaults models"
		.000		0	66	"Saturated models"
	.000	726.747	13.214	55	11	"Independences models"

Table 18 summarizes the results of the moderating effect of gender. As shown, it is clear that there was a significant moderating effect of gender on the relationship between SI and ITU for females as the difference between the chi-square values was 77.122, which is more than 3.84

Table 18: Result of moderating effect of gender on the relationship between SI and ITU for females

"High"	**"Unconstrained Model"**	**"Constrained model"**	**"Chi-square differences"**	**"Result of moderation"**	**"Result of hypothesis"**
"Chi-square"	9.414	86.536	77.122	Significant	Accepted
"DF"	9	10	1		
"GFI"	.989	.922			
"CFI"	.999	.986			
"IFI"	.999	.993			
"RMSEA"	.018	.227			
"Chi-square/df"	1.046	8.654			
"H10: Gender is a moderating variable affecting the influence of social influence on intention to use mobile learning"					Accepted

Table 19 summarizes the results of Chi-square tests in testing this research hypothesis based on the constrained and unconstrained models for males.

Table 19: Chi-square test results of the models involving SI and ITU for males

"Type of model/low"	"P"	"CMIN"	"CMIN/DF"	"DF"	"NPAR"	"Model"
Constrained	.000	139.099	13.910	10	56	"Defaults models"
		.000		0	66	"Saturated models"
	.000	745.057	13.546	55	11	"Independences models"
Unconstrained	.000	33.370	3.708	9	57	"Defaults models"
		.000		0	66	"Saturated models"
	.000	745.057	13.546	55	11	"Independences models"

Table 20 shows the results of moderating effect of gender on the relationship between effort expectancy and intention to use mobile learning for males. As shown, the difference in the Chi-square values was 105.729, which is greater than 3.84, indicating the moderating effect was significant.

Table 20: Result of moderating effect of gender on the relationship between SI and ITU for males

"Low"	"Unconstrained Model"	"Constrained model"	"Chi-square differences"	"Result of moderation"	"Result of hypothesis"
"Chi-square"	33.370	139.099	105.729	Significant	Accepted
"DF"	9	10	1		
"GFI"	.968	.905			
"CFI"	.965	.913			
"IFI"	.967	.924			
"RMSEA"	.128	.281			
"Chi-square/df"	3.708	13.910			
"H10: Gender is a moderating variable affecting the influence of social influence on intention to use mobile learning"					Accepted

The unconstrained paths (SI on ITU) for males and females were examined to determine whether the effects of the moderator were significant or not, as shown in Table 21. As indicated, the moderating effects were highly significant for both genders, as the significance values (p-values) of both paths were less than .05. Therefore, there was strong evidence to support the tenth research hypothesis, H10, of the study.

Table 21: The significance of moderators for the relationship between SI and ITU

"Model"	"IV"	"Path"	"DV"	"P"	"Estimate"	"C.R."	"S.E."	"Outcome"
Female	SI	--->	ITU	.011	.201	2.532	.079	Accepted
Male	SI	--->	ITU	.010	.174	2.265	.068	Accepted

Figure 4 shows the moderating effects of gender on the relationships between the independent variables (PE, EE, and SI) and intention to use m-learning in HEIs in Iraq.

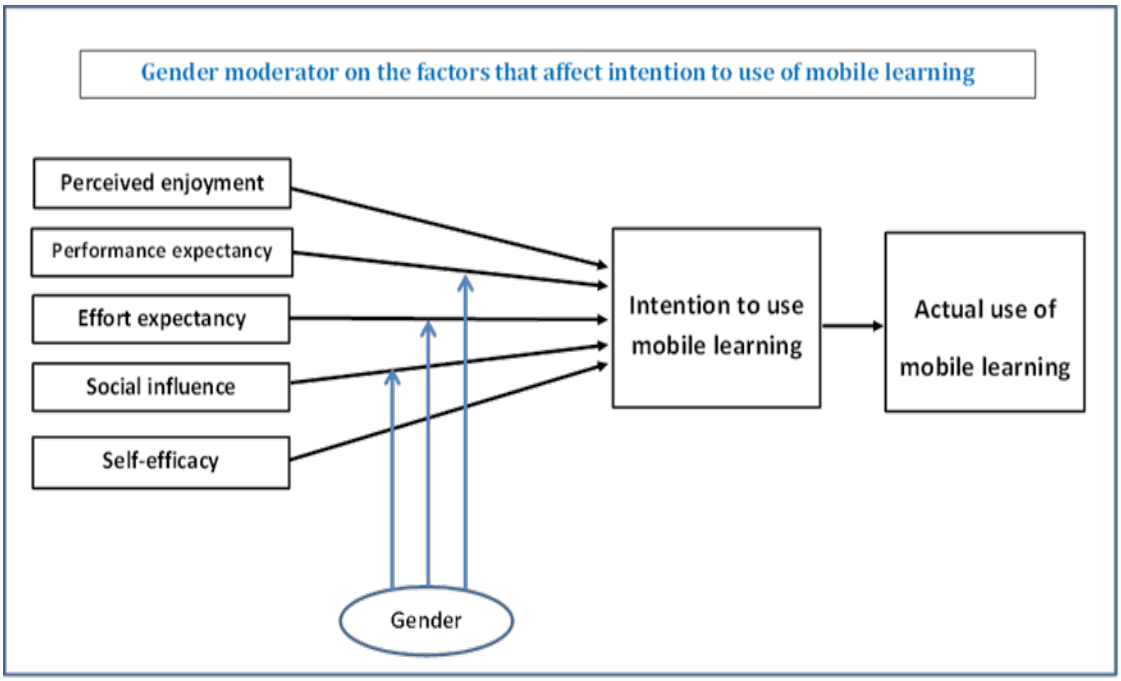

Figure 4. Moderating effects of gender on the relationships between the independent variables (PE, EE, and SI) and intention to use m-learning

DISCUSSION

This section discusses the results obtained in this study. The main three objectives of this research are to explore the moderating effects of the gender on the relationships of such factors and the intention to use mobile learning, examine the factors that influence m-learning acceptance in higher education institutions (HEI) in Iraq, and to investigate the influence of the intention to use on the actual use of mobile learning in HEI. The result of this study confirmed that gender moderated the effect of "Performance expectancy", "Effort Expectancy" and "Social Influence" on the intention to use (ITU) of mobile learning. See Figure 4 for more explanation. In addition to that, from six proposed factors in this study, five factors only are identified as influencing factors on intention to use mobile learning in HEI in Iraq, the factors are "Effort Expectancy", "Performance expectancy", "Social Influence", "Perceived Enjoyment", and "Self-efficacy", while this study discovered that "Quality of Service" is not affected on intention to use mobile learning. This study confirmed that intention to use is positively influencing the actual use mobile learning in HEI in Iraq.

DIRECT EFFECTS

Seven research hypotheses that focus on the direct effects of the independent variables were developed for this study. According to Hair et al. (2010), and Awang (2014), a research hypothesis will be accepted if the significance level, or p-value, is less than 0.05 and the critical ratio, C.R., is more than 1.96.

Performance expectancy and intention to use

The finding of hypothesis testing for the first research hypothesis was found to be significant and positive (B=0.151, C.R.=3.097, P=0.002). Therefore, the first hypothesis, or H1, of this study, which states that performance expectancy (PE) has a significant and positive effect on intention to use mobile learning, was accepted. This finding is consistent with those of previous studies (Abu-Al-Aish & Love, 2013; Chong et al., 2011; Milošević et al., 2015; Venkatesh et al., 2003; Wang et al., 2009),

suggesting that performance expectancy (PE) has the strongest influence on intention to use mobile learning. Essentially, this means that it is deemed to be the most significant predictor of the intended behavior of learners in mobile learning. (Milošević et al., 2015).

Effort expectancy and intention to use

The second research hypothesis, H2, states that effort expectancy (EE) has a significant and positive effect on intention to use mobile learning. The finding of hypothesis testing for H2 was found to be significant and positive (B=0.205, C.R.=4.217, P<0.001), thus supporting the researcher with the evidence to accept the second research hypothesis. Such a finding signifies that EE has a strong influence on intention to use mobile learning among Iraqi university students. This finding is consistent with the findings of previous studies (Chong et al., 2011; Liu et al., 2010; Marchewka & Kostiwa, 2007; Venkatesh et al., 2003; Wang et al., 2009), underscoring the assertion that EE is a significant determinant of students' intention to use mobile learning.

Social influences and intention to use

The third research hypothesis, H3, of this study posits that social influence (SI) has a significant impact on the intention to use mobile learning. The results of the hypothesis testing were observed to be significant and positive (B=0.195, C.R.=3.807, P0.001), indicating that the intention to use m-learning among the respondents was heavily influenced by SI. This result effectively emphasizes that SI is a strong predictor of students' intentions to adopt mobile learning in Iraqi universities, thus supporting the study's third research hypothesis. This result concurs with the findings of earlier studies, demonstrating that social influence plays a substantial role in determining a user's behavioral intention to use new, novel innovations (Harrison et al., 1997; Venkatesh & Davis, 2000). From an educational perspective, social influence influences students' intentions to use mobile learning in a positive way (Ali & Arshad, 2016).

Quality of services and intention to use

The fourth research hypothesis, H4, of this study predicts that the influence of quality of service on the intention to use mobile learning is positive and significant. The result of hypothesis testing showed that the prediction was not true. This result showed that the C.R. of the effect was -0.256, which is less than 1.96, and the p-value was 0.798, which is greater than 0.05, indicating that the influence of quality of service on intention to use mobile learning among Iraqi universities was not significant, thus providing no evidence to support the fourth research hypothesis. Clearly, this finding conflicts with those of other studies, which revealed that service quality had a moderate impact on the intention to utilize mobile learning (Almaiah & Alismaiel, 2019) and was a deciding factor for that intention (Abu-Al-Aish & Love, 2013; Al-Zoubi, 2016; Chong et al., 2011; Park et al., 2012; Ramayah et al., 2010).

Perceived enjoyment and intention to use

When a person performs or participates in an activity because he or she is interested in it, this is referred to as perceived enjoyment (Moon & Kim, 2001). Numerous studies have demonstrated that behavioral intention to utilize mobile services, including mobile learning, is significantly influenced by perceived enjoyment (Huang et al., 2007; Wang et al., 2009). Making learning activities more enjoyable can therefore help to encourage greater adoption and use of m-learning among students. Perceived enjoyment was also treated as one of the independent variables of this study due to its strong impact on behavioral intention (Huan et al., 2015). The fifth research hypothesis, H5, posits that perceived enjoyment has a significant influence on the intention to use m-learning among Iraqi university students. The finding of hypotheses testing showed this hypothesis could be supported (B=0.118, C.R.=2.316, P=0.021), as the p-value is less than 0.05. As demonstrated, perceived enjoyment significantly influenced respondents' intentions to employ mobile learning, thus supporting the fifth research hypothesis. This finding runs parallel with the findings of earlier studies, such as that

of (Poong et al., 2017), who found that perceived enjoyment was a significant factor directly impacting the intention to utilize mobile learning.

Self-efficacy and intention to use

The sixth research hypothesis, H6, of this study states that self-efficacy has a positive effect on intention to use mobile learning. The result of hypothesis testing showed the direct effect of the former on the latter was significant and positive (B=0.090, C.R.=2.165, P=0.030). This finding verified that self-efficacy was a significant predictor of intention to use m-learning among the Iraqi respondents, thus providing the evidence to support the sixth research hypothesis of the study. This finding is consistent with those of previous studies, including that of Mohammadi (2015), which observed self-efficacy was a significant variable that affected the intention of learners to use and adopt mobile learning. The acceptance of the sixth research hypothesis was further supported by other studies of various mobile learning contexts, including those of Al-Harbi (2011), Chen and Tseng (2012), Chiu and Tsai (2014), Chu (2010), Kao et al. (2011), Kreijns et al. (2013), Lee et al. (2011), Liang et al. (2011), Mahat et al. (2012), Ozdamli and Uzunboylu (2015), and Park et al. (2012), who collectively assert that self-efficacy and intention to use mobile learning are closely related.

Actual use and intention to use

The seventh research hypothesis, H7, predicts that actual use is affected significantly and positively by intention to use m-learning among the Iraqi university students. The finding of hypothesis testing showed that the direct effect of intention to use on actual use of mobile learning was positive and significant (B=0.660, C.R.=15.812, P<0.001). As such, this finding provides strong evidence to support the seventh research hypothesis of the study. This finding is consistent with that of a study by Iqbal and Bhatti (2017), who found individuals' actual behaviors were heavily influenced by their intentions to use new technology. Additionally, several earlier studies, including that of Martins et al. (2014), indicated a positive association between the two constructs.

Moderating Effects of Gender

To investigate the moderating effects of gender on the correlations between the research constructs, two models—one constrained and the other unconstrained—were developed. The dataset was divided into two datasets for the analysis, one for females and the other for males. The Chi-square test is typically employed to compare the outcomes of constrained versus unconstrained models. Based on the difference in Chi-square values between the two models, the moderating effects are confirmed. According to Awang (2014), a significant moderating effect is indicated by a difference in such values that is more than 3.84. The following sections discuss the results of the Chi-square tests carried out in this study to analyze the moderating effects of gender on the correlations between PE, EE, and SI with ITU.

Moderating effect of gender on the relationship between performance expectancy and intention to use

The eighth research hypothesis, H8, posits that gender moderates the influence of performance expectancy (PE) on intention to use m-learning (ITU) among Iraqi university students. The significance of such an effect was analyzed by examining the unconstrained and constrained paths of PE on ITU for females and males. As revealed, the estimates for both paths for female and male respondents were significant. As such, the eight research hypothesis of this study was supported, indicating that gender moderated the effect of PE on ITU. This result supports earlier research's findings (Camilleri, 2019; Venkatesh et al., 2003) that showed performance expectancy was a key predictor of intention to use new technologies in many contexts, with the relationship between the two constructs being stronger for men and younger users. Additionally, the results of Afonso et al. (2012), who found that

performance expectancy had a significant positive impact on usage intention, particularly for men as compared to women, are in line with this study.

Moderating effect of gender on the relationship between effort expectancy and intention to use

The study's ninth research hypothesis, H9, posits that gender is a significant moderator for the relationship between effort expectancy (EE) and intention to use mobile learning. The results of testing this hypothesis showed that there were significant effects of EE on intention to use mobile learning for both females and males. In other words, the effects of EE on respondents' intentions to adopt mobile learning were strongly moderated by gender, thus supporting the ninth research hypothesis of the study. This finding is in line with those of other studies (Camilleri, 2019; Venkatesh et al., 2003), which showed that effort expectancy had an impact on behavioral intention and that this relationship was moderated by gender, especially for female respondents. This finding is also consistent with that of a study by Dulle and Minishi-Majanja (2011), who found that gender was a significant moderator that moderated the influence of effort expectancy on respondents' behavioral intention.

Moderating effect of gender on the relationship between social influences and intention to use

The tenth research hypothesis predicts that gender is a moderating variable affecting the influence of social influence (SI) on intention to use mobile learning. The results of testing this hypothesis showed that the moderating effect of gender on the relationship between SI and intention to use mobile learning was significant. In other words, among Iraqi university students, gender moderated the impact of SI on their propensity to adopt mobile learning, thus supporting the study's tenth research hypothesis. This result is consistent with that of Sabah (2016), who found significant gender disparities in how users perceive SI. Additionally, this result is in line with those of previous studies, such as Morris et al. (2005), Ong and Lai (2006), Tarhini et al. (2014), and Terzis and Economides (2011). Overall, this finding suggests that women are more likely than men to be influenced by the opinions of others and to succumb to peer pressure. From the perspective of learning, female students will be more inclined to use mobile learning if they perceive others think they should use.

CONCLUSION

The main objectives of this study are to investigate the gender moderating effect on the relationships of such factors and the intention to use m-learning, to examine the factors that influence m-learning acceptance in the universities and higher education institutions (HEI) in Iraq, and to investigate the influence of the intention to use on the actual use of mobile learning in (HEI). The findings demonstrated that among Iraqi university students' gender significantly moderated the influences of effort expectancy, performance expectancy, and social influence on students' intentions to adopt mobile learning. Moreover, the research revealed the five constructs– perceived enjoyment, effort expectancy, performance expectancy, social impact, and self-efficacy – are important determinants of intention to use mobile learning. However, the construct 'quality of services' was shown to have no significant impact. The results also clarified that the actual use of mobile learning was significantly influenced by the intention to use it.

Through this study, several contributions can be made to the field of technology acceptance by highlighting the crucial factors influencing university students' intentions to use m-learning in higher education institutions (HEIs) in Iraq. For the purpose of encouraging students and other users to consider mobile learning as an effective learning technique in education, several recommendations were made to institutions and practitioners. Given the dearth of studies in this area in developing nations, especially those in the Middle East, this study helped provide more empirical support to the existing literature, thereby enhancing the body of knowledge on technological adoption.

In view of the inherent limitations of this study, future studies can be carried out to better understand the acceptance of mobile learning among students in HEIs in developing countries by focusing on the moderating effects of other demographic variables, such as place of origin and age, on the relationships of the aforementioned determinants and students' intentions to use such a learning approach (Gan, 2016; Kim et al., 2015).

REFERENCES

Abbad, M. M., Morris, D., & de Nahlik, C. (2009, April). Looking under the bonnet: Factors affecting student adoption of e-learning systems in Jordan. *International Review of Research in Open and Distance Learning*, *10*(2), 1–25. https://files.eric.ed.gov/fulltext/EJ844015.pdf

Abu-Al-Aish, A., & Love, S. (2013). Factors influencing students' acceptance of m-learning: An investigation in higher education. *International Review of Research in Open and Distance Learning*, *14*(5), 82–107. https://www.proquest.com/openview/9fcbbd4d4865d1213713850565dccc14/1

Afonso, C. M., Roldán, J. L., Sánchez-Franco, M., & Gonzalez, M. D. la O. (2012, May). The moderator role of Gender in the Unified Theory of Acceptance and Use of Technology (UTAUT): A study on users of electronic document management systems. *Proceedings of the 7th International Conference on Partial Least Squares and Related Methods* (pp. 1–8). Houston, Texas, USA: Universidad de Sevilla. https://core.ac.uk/download/pdf/161255008.pdf

Alasmari, T. M. (2020). Can mobile learning technology close the gap caused by gender segregation in the Saudi educational institutions? *Journal of Information Technology Education: Research*, *19*, 655–670. https://doi.org/10.28945/4634

Al-Azawei, A., & Alowayr, A. (2020). Predicting the intention to use and hedonic motivation for mobile learning: A comparative study in two Middle Eastern countries. *Technology in Society*, *62*, 101325. https://doi.org/10.1016/j.techsoc.2020.101325

Al-Harbi, K. A. S. (2011). e-Learning in the Saudi tertiary education: Potential and challenges. *Applied Computing and Informatics*, *9*(1), 31–46. https://doi.org/10.1016/j.aci.2010.03.002

Alharmoodi, B. Y. R., & Lakulu, M. M. B. (2020). Transition from e-government to m-government: Challenges and opportunities – case study of UAE. *European Journal of Multidisciplinary Studies*, *5*(1), 61-67. https://doi.org/10.26417/453fgx96c

Al-Hubaishi, H. S., Ahmad, S. Z., & Hussain, M. (2017). Exploring mobile government from the service quality perspective. *Journal of Enterprise Information Management*, *30*(1), 4–16. https://doi.org/10.1108/JEIM-01-2016-0004

Ali, R. A., & Arshad, M. R. M. (2016). Understanding intention to use mobile learning: A perspective of the extended unified theory of acceptance and use of technology. *International Journal of Advanced and Applied Sciences*, *3*(7), 81–88. https://doi.org/10.21833/ijaas.2016.07.013

Almaiah, M. A., & Alismaiel, O. A. (2019). Examination of factors influencing the use of mobile learning system: An empirical study. *Education and Information Technologies*, *24*(1), 885–909. https://doi.org/10.1007/s10639-018-9810-7

Alrfooh, A. M., & Lakulu, M. M. B. (2020). The effect of electronic educational assessment environment (navigation and content) on students' intention to use mobile based assessment from motivational perspective view. *International Journal of Advanced Trends in Computer Science and Engineering*, *9*(1), 440–453. https://doi.org/10.30534/ijatcse/2020/61912020

Alshammari, S. (2021). Determining the factors that affect the use of virtual classrooms: A modification of the UTAUT model. *Journal of Information Technology Education: Research*, *20*, 117–135. https://doi.org/10.28945/4709

Alshehri, A., Rutter, M. J., & Smith, S. (2020). The effects of UTAUT and usability qualities on students' use of learning management systems in Saudi tertiary education. *Journal of Information Technology Education: Research*, *19*, 891–930. https://doi.org/10.28945/4659

Alsswey, A., Al-Samarraie, H., El-Qirem, F. A., & Zaqout, F. (2020). M-learning technology in Arab Gulf countries: A systematic review of progress and recommendations. *Education and Information Technologies*, *25*(4), 2919–2931. https://doi.org/10.1007/s10639-019-10097-z

Althunibat, A. (2015). Determining the factors influencing students' intention to use m-learning in Jordan higher education. *Computers in Human Behavior*, *52*, 65–71. https://doi.org/10.1016/j.chb.2015.05.046

Al-Zoubi, M. I. S. (2016). Factors that influence mobile learning acceptance in higher education institutions in Dubai. *Account and Financial Management Journal*, *1*(6), 392–400. http://everant.org/index.php/afmjh/article/view/226

Awang, Z. (2014). *A handbook on structural equation modeling for academicians and practitioner* (1st ed.). Bandar Baru Bangi: MPWS Rich Resources. https://www.academia.edu/34981086/A_Handbook_on_SEM_Overview_of_Structural_Equation_Modeling_SEM

Azeez, N. D., & Lakulu, M. M. (2018). Evaluation framework of m-government services success in Malaysia. *Journal of Theoretical and Applied Information Technology*, *96*(24). http://www.jatit.org/volumes/Vol96No24/10Vol96No24.pdf

Briz-Ponce, L., Pereira, A., Carvalho, L., Juanes-Méndez, J. A., & García-Peñalvo, F. J. (2017). Learning with mobile technologies – Students' behavior. *Computers in Human Behavior, 72*, 612–620. https://doi.org/10.1016/j.chb.2016.05.027

Camilleri, M. A. (2019, February). Exploring the behavioral intention to use e-government services: Validating the unified theory of acceptance and use of technology. In: P. Kommers, Tomayess Issa, Theodora Issa, P. Isaías, & W. Hui (Eds.), *Proceedings of the International Conferences Internet Technologies & Society 2019 and Sustainability, Technology and Education 2019* (pp. 27–34). Hong Kong: International Association for Development of the Information Society (IADIS). https://doi.org/10.33965/its2019_2019011004

Chaka, J. G., & Govender, I. (2017). Students' perceptions and readiness towards mobile learning in colleges of education: A Nigerian perspective. *South African Journal of Education, 37*(1), 1–12. https://doi.org/10.15700/saje.v37n1a1282

Chen, B., & Denoyelles, A. (2013, October 07). Exploring students' mobile learning practices in higher education. *EDUCAUSE Review*. https://er.educause.edu/articles/2013/10/exploring-students-mobile-learning-practices-in-higher-education

Chen, H. R., & Tseng, H. F. (2012). Factors that influence acceptance of web-based e-learning systems for the in-service education of junior high school teachers in Taiwan. *Evaluation and Program Planning*, *35*(3), 398–406. https://doi.org/10.1016/j.evalprogplan.2011.11.007

Cheng, Y. M. (2015). Towards an understanding of the factors affecting m-learning acceptance: Roles of technological characteristics and compatibility. *Asia Pacific Management Review, 20*(3), 109–119. https://doi.org/10.1016/j.apmrv.2014.12.011

Cheng, Y. S., Yu, T. F., Huang, C. F., Yu, C., & Yu, C. C. (2011). The comparison of three major occupations for user acceptance of information technology: Applying the UTAUT model. *iBusiness*, *03*(02), 147–158. https://doi.org/10.4236/ib.2011.32021

Chiu, Y. L., & Tsai, C. C. (2014). The roles of social factor and internet self-efficacy in nurses' web-based continuing learning. *Nurse Education Today*, *34*(3), 446–450. https://doi.org/10.1016/j.nedt.2013.04.013

Chong, J. L., Chong, A. Y. L., Ooi, K. B., & Lin, B. (2011). An empirical analysis of the adoption of m-learning in Malaysia. *International Journal of Mobile Communications*, *9*(1), 1–18. https://doi.org/10.1504/IJMC.2011.037952

Choy, L. T. (2014). The strengths and weaknesses of research methodology: Comparison and complimentary between qualitative and quantitative approaches. *IOSR Journal of Humanities and Social Science*, *19*(4), 99–104. https://doi.org/10.9790/0837-194399104

Chu, R. J. C. (2010). How family support and Internet self-efficacy influence the effects of e-learning among higher aged adults – Analyses of gender and age differences. *Computers and Education*, *55*(1), 255–264. https://doi.org/10.1016/j.compedu.2010.01.011

Davis, F. D. (1989). Perceived usefulness, perceived ease of use, and user acceptance of information technology. *MIS Quarterly*, *13*(3), 319–340. https://doi.org/10.2307/249008

Davis, F. D., Bagozzi, R. P., & Warshaw, P. R. (1989). User acceptance of computer technology: A comparison of two theoretical models. *Management Science*, *35*(8), 982–1003. https://doi.org/10.1287/mnsc.35.8.982

Davis, J. L., & Davis, H. (2007). Perceptions of career and technology and training and development students regarding basic personal computer knowledge and skills. *College Student Journal*, *41*(1), 69–79. https://eric.ed.gov/?id=EJ765406

Dudwick, N., Kuehnast, K., Jones, V. N., & Woolcock, M. (2006). *Analyzing social capital in context: A guide to using qualitative methods and data*. Washington, DC: World Bank Institute. https://documents1.worldbank.org/curated/en/601831468338476652/pdf/389170Analyzin11in1Context01PUBLIC1.pdf

Dulle, F. W., & Minishi-Majanja, M. K. (2011). The suitability of the unified theory of acceptance and use of technology (UTAUT) model in open access adoption studies. *Information Development*, *27*(1), 32–45. https://doi.org/10.1177/0266666910385375

Gan, C. (2016). An empirical analysis of factors influencing continuance intention of mobile instant messaging in China. *Information Development*, *32*(4), 1109–1119. https://doi.org/10.1177/0266666915591298

George, D., & Mallery, P. (2008). *SPSS for Windows step by step: A simple guide and reference: A simple guide and reference fourth edition (11.0 update)*. https://wps.ablongman.com/wps/media/objects/385/394732/george4answers.pdf

Ghalandari, K. (2012). The effect of performance expectancy, effort expectancy, social influence and facilitating conditions on acceptance of e-banking services in Iran: The moderating role of age and gender. *Middle-East Journal of Scientific Research*, *12*(6), 801–807. http://idosi.org/mejsr/mejsr12(6)12/8.pdf

Hair, J. F., Jr., Black, W. C., & Babin, B. J. (2010). *Multivariate data analysis: A global perspective* (7th ed.). Pearson Education.

Hair, J. F., Jr., Hult, G. T. M., Ringle, C. M., & Sarstedt, M. (2017). *A primer on partial least squares structural equation modeling* (2nd ed.). Sage Publications.

Harrison, D. A., Mykytyn, P. P., Jr., & Riemenschneider, C. K. (1997). Executive decisions about adoption of information technology in small business: Theory and empirical tests. *Information Systems Research*, *8*(2), 171–195. https://doi.org/10.1287/isre.8.2.171

Huan, Y., Li, X., Aydeniz, M., & Wyatt, T. (2015). Mobile learning adoption: An empirical investigation for engineering education. *The International Journal of Engineering Education*, *31*(4), 1081-1091. https://dialnet.unirioja.es/servlet/articulo?codigo=6925070

Huang, J. H., Lin, Y. R., & Chuang, S. T. (2007). Elucidating user behavior of mobile learning: A perspective of the extended technology acceptance model. *The Electronic Library*, *25*(5), 585–598. https://doi.org/10.1108/02640470710829569

Husain, N. M., Lakulu, M. M., & Sarkawi, S. (2017). The need for a competency model of programming teachers: A need analysis survey. *International Journal of Scientific and Research Publications*, *7*(6), 265–269. https://www.ijsrp.org/research-paper-0617.php?rp=P666491

Ibrahim, R., & Jaafar, A. (2011). User acceptance of educational games: A revised unified theory of acceptance and use of technology (UTAUT). *World Academy of Science, Engineering and Technology*, *5*(5), 557–563. https://publications.waset.org/3234/user-acceptance-of-educational-games-a-revised-unified-theory-of-acceptance-and-use-of-technology-utaut

Iqbal, S., & Bhatti, Z. A. (2017). What drives m-learning? An empirical investigation of university student perceptions in Pakistan. *Higher Education Research and Development*, *36*(4), 730–746. https://doi.org/10.1080/07294360.2016.1236782

Izkair, A. S., & Lakulu, M. M. (2021). Experience moderator effect on the variables that influence intention to use mobile learning. *Bulletin of Electrical Engineering and Informatics*, *10*(5), 2875–2883. https://doi.org/10.11591/eei.v10i5.3109

Izkair, A. S., Lakulu, M. M., & Mussa, I. H. (2020). Intention to use mobile learning in higher education institutions: Review paper. *International Journal of Education, Science, Technology, and Engineering*, *3*(2), 78–84. https://doi.org/10.36079/lamintang.ijeste-0302.157

Kao, C. P., Wu, Y. T., & Tsai, C. C. (2011). Elementary school teachers' motivation toward web-based professional development, and the relationship with Internet self-efficacy and belief about web-based learning. *Teaching and Teacher Education*, *27*(2), 406–415. https://doi.org/10.1016/j.tate.2010.09.010

Kim, M. K., Chang, Y., Wong, S. F., & Park, M. C. (2015). The effect of perceived risks and switching barriers on the intention to use smartphones among non-adopters in Korea. *Information Development*, *31*(3), 258–269. https://doi.org/10.1177/0266666913513279

Kreijns, K., Van Acker, F., Vermeulen, M., & Van Buuren, H. (2013). What stimulates teachers to integrate ICT in their pedagogical practices? The use of digital learning materials in education. *Computers in Human Behavior*, *29*(1), 217–225. https://doi.org/10.1016/j.chb.2012.08.008

Kukulska-Hulme, A. (2009). Will mobile learning change language learning? *ReCALL*, *21*(2), 157–165. https://doi.org/10.1017/S0958344009000202

Lee, Y. H., Hsieh, Y. C., & Ma, C. Y. (2011). A model of organizational employees' e-learning systems acceptance. *Knowledge-Based Systems*, *24*(3), 355–366. https://doi.org/10.1016/j.knosys.2010.09.005

Liang, J. C., Wu, S. H., & Tsai, C. C. (2011). Nurses' Internet self-efficacy and attitudes toward web-based continuing learning. *Nurse Education Today*, *31*(8), 768–773. https://doi.org/10.1016/j.nedt.2010.11.021

Liu, Y., Li, H., & Carlsson, C. (2010). Factors driving the adoption of m-learning: An empirical study. *Computers & Education*, *55*(3), 1211–1219. https://doi.org/10.1016/j.compedu.2010.05.018

Lowry, P. B., & Gaskin, J. (2014). Partial least squares (PLS) structural equation modeling (SEM) for building and testing behavioral causal theory: When to choose it and how to use it. *IEEE Transactions on Professional Communication*, *57*(2), 123–146. https://doi.org/10.1109/TPC.2014.2312452

Mahat, J., Ayub, A. F. M., Luan, S., & Wong. (2012). An assessment of students' mobile self-efficacy, readiness and personal innovativeness towards mobile learning in higher education in Malaysia. *Procedia – Social and Behavioral Sciences*, *64*, 284–290. https://doi.org/10.1016/j.sbspro.2012.11.033

Marchewka, J. T., & Kostiwa, K. (2007). An application of the UTAUT model for understanding student perceptions using course management software. *Communications of the IIMA*, *7*(2), Article 10. https://doi.org/10.58729/1941-6687.1038

Martins, C., Oliveira, T., & Popovič, A. (2014). Understanding the internet banking adoption: A unified theory of acceptance and use of technology and perceived risk application. *International Journal of Information Management*, *34*(1), 1–13. https://doi.org/10.1016/j.ijinfomgt.2013.06.002

Milošević, I., Živković, D., Manasijević, D., & Nikolić, D. (2015). The effects of the intended behavior of students in the use of m-learning. *Computers in Human Behavior*, *51*(Part A), 207–215. https://doi.org/10.1016/j.chb.2015.04.041

Mohamad, A. J., & Lakulu, M. M. (2017). A framework of mobile educational application for kindergarten early reading. *The International Journal of Multimedia and Its Applications*, *9*(4/5/6), 113–119. https://doi.org/10.5121/ijma.2017.9610

Mohamad, A. J., Lakulu, M., & Samsudin, K. (2016). The development of mobile application for kindergarten early reading: Challenges and opportunities. *Journal of Engineering and Applied Sciences*, *11*(3), 380–383. https://docsdrive.com/pdfs/medwelljournals/jeasci/2016/380-383.pdf

Mohamad, M., Maringe, F., & Woollard, J. (2012). Mobile learning in Malaysian schools: Opportunities and challenges of introducing teaching through mobile phones. *International Journal for E-Learning Security*, *2*(1), 133–137. https://doi.org/10.20533/ijels.2046.4568.2012.0017

Mohammadi, H. (2015). Social and individual antecedents of m-learning adoption in Iran. *Computers in Human Behavior*, *49*, 191–207. https://doi.org/10.1016/j.chb.2015.03.006

Mohammed, M. A., Huda, I., & Maslinda, M. N. (2015). Electronic information sharing between public universities and ministry of higher education and scientific research: A pilot study. *Journal of Theoretical and Applied Information Technology*, *77*(2), 151–163. http://www.jatit.org/volumes/Vol77No2/1Vol77No2.pdf

Moon, J. W., & Kim, Y. G. (2001). Extending the TAM for a World-Wide-Web context. *Information and Management*, *38*(4), 217–230. https://doi.org/10.1016/S0378-7206(00)00061-6

Morad, A. H. (2019). The reality of university education in Iraq: Problems and solutions through adoption of credit hours system. *Engineering and Technology Journal*, *37*(4C), 487–491. https://doi.org/10.30684/etj.37.4C.18

Morris, M. G., & Venkatesh, V. (2000). Age differences in technology adoption decisions: Implications for a changing work force. *Personnel Psychology*, 53(2) 375-403. https://doi.org/10.1111/j.1744-6570.2000.tb00206.x

Morris, M. G., Venkatesh, V., & Ackerman, P. L. (2005). Gender and age differences in employee decisions about new technology: An extension to the theory of planned behavior. *IEEE Transactions on Engineering Management*, *52*(1), 69–84. https://doi.org/10.1109/TEM.2004.839967

Neumann, M. M., & Neumann, D. L. (2014). Touch screen tablets and emergent literacy. *Early Childhood Education Journal*, *42*(4), 231–239. https://doi.org/10.1007/s10643-013-0608-3

Okai-Ugbaje, S., Ardzejewska, K., Imran, A., Yakubu, A., & Yakubu, M. (2020). Cloud-based m-learning: A pedagogical tool to manage infrastructural limitations and enhance learning. *International Journal of Education and Development Using Information and Communication Technology*, *16*(2), 48-67. https://files.eric.ed.gov/fulltext/EJ1268798.pdf

Ong, C. S., & Lai, J. Y. (2006). Gender differences in perceptions and relationships among dominants of e-learning acceptance. *Computers in Human Behavior*, *22*(5), 816–829. https://doi.org/10.1016/j.chb.2004.03.006

Ozdamli, F., & Uzunboylu, H. (2015). M-learning adequacy and perceptions of students and teachers in secondary schools. *British Journal of Educational Technology*, *46*(1), 159–172. https://doi.org/10.1111/bjet.12136

Pallant, J. (2016). *SPSS survival manual: A step by step guide to data analysis using SPSS program* (6th ed.). McGraw-Hill Education.

Parasuraman, A., Zeithaml, V. A., & Berry, L. L. (1988). SERVQUAL: A multiple-item scale for measuring consumer perceptions of service quality. *Journal of Retailing*, *64*(1), 12–40. https://psycnet.apa.org/record/1989-10632-001

Park, S. Y., Nam, M. W., & Cha, S. B. (2012). University students' behavioral intention to use mobile learning: Evaluating the technology acceptance model. *British Journal of Educational Technology*, *43*(4), 592–605. https://doi.org/10.1111/j.1467-8535.2011.01229.x

Poong, Y. S., Yamaguchi, S., & Takada, J. I. (2017). Investigating the drivers of mobile learning acceptance among young adults in the world heritage town of Luang Prabang, Laos. *Information Development*, *33*(1), 57–71. https://doi.org/10.1177/0266666916638136

Ramayah, T., Ahmad, N. H., & Lo, M. C. (2010). The role of quality factors in intention to continue using an e-learning system in Malaysia. *Procedia – Social and Behavioral Sciences*, *2*(2), 5422–5426. https://doi.org/10.1016/j.sbspro.2010.03.885

Rana, R., & Singhal, R. (2015). Chi-square test and its application in hypothesis testing. *Journal of the Practice of Cardiovascular Sciences*, *1*(1), 69-71. https://doi.org/10.4103/2395-5414.157577

Sabah, N. M. (2016). Exploring students' awareness and perceptions: Influencing factors and individual differences driving m-learning adoption. *Computers in Human Behavior*, *65*, 522–533. https://doi.org/10.1016/j.chb.2016.09.009

Sánchez-Prieto, J. C., Olmos-Migueláñez, S., & García-Peñalvo, F. J. (2016). Informal tools in formal contexts: Development of a model to assess the acceptance of mobile technologies among teachers. *Computers in Human Behavior*, *55*(Part A), 519–528. https://doi.org/10.1016/j.chb.2015.07.002

Shareef, M. A., Dwivedi, Y. K., Stamati, T., & Williams, M. D. (2014). SQ mGov: A comprehensive service-quality paradigm for mobile government. *Information Systems Management*, *31*(2), 126–142. https://doi.org/10.1080/10580530.2014.890432

Sun, H., & Zhang, P. (2006). Causal relationships between perceived enjoyment and perceived ease of use: An alternative approach. *Journal of the Association for Information Systems*, *7*(9), 618–645. https://doi.org/10.17705/1jais.00100

Tan, G. W. H., Ooi, K. B., Leong, L. Y., & Lin, B. (2014). Predicting the drivers of behavioral intention to use mobile learning: A hybrid SEM-Neural Networks approach. *Computers in Human Behavior, 36*, 198–213. https://doi.org/10.1016/j.chb.2014.03.052

Tarhini, A., Hone, K., & Liu, X. (2014). The effects of individual differences on e-learning users' behaviour in developing countries: A structural equation model. *Computers in Human Behavior*, *41*, 153-163. https://doi.org/10.1016/j.chb.2014.09.020

Terzis, V., & Economides, A. A. (2011). Computer based assessment: Gender differences in perceptions and acceptance. *Computers in Human Behavior*, *27*(6), 2108–2122. https://doi.org/10.1016/j.chb.2011.06.005

Venkatesh, V., & Davis, F. D. (2000). Theoretical extension of the Technology Acceptance Model: Four longitudinal field studies. *Management Science*, *46*(2), 186–204. https://doi.org/10.1287/mnsc.46.2.186.11926

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425–478. https://doi.org/10.2307/30036540

Wahsh, M. A., & Dhillon, J. S. (2015, December). An investigation of factors affecting the adoption of cloud computing for E-government implementation. *Proceedings of the 2015 IEEE Student Conference on Research and Development (SCOReD 2015)* (pp. 323–328). Kuala Lumpur, Malaysia: IEEE. https://doi.org/10.1109/SCORED.2015.7449349

Wang, Y. S., Wu, M. C., & Wang, H. Y. (2009). Investigating the determinants and age and gender differences in the acceptance of mobile learning. *British Journal of Educational Technology*, *40*(1), 92–118. https://doi.org/10.1111/j.1467-8535.2007.00809.x

Yin, R. K. (2009). *Case study research: Design and methods* (4th ed.). Sage Publications.

Zhang, Y. (2005). Distance learning receptivity: Are they ready yet? *Quarterly Review of Distance Education*, *6*(1), 45-53. https://eric.ed.gov/?id=EJ874988

Zhou, G., & Xu, J. (2007). Adoption of educational technology: How does gender matter? *International Journal of Teaching and Learning in Higher Education*, *19*(2), 140–153. http://www.isetl.org/ijtlhe/pdf/IJTLHE19(2).pdf#page=40

APPENDIX

THE MAIN SURVEY (QUESTIONNAIRE)

Questionnaire Objectives

This questionnaire has these objectives:

- **To explore the moderating effects of gender on the relationships of such factors and intention to use mobile learning.**
- **To identify the factors that influence the intention to use mobile learning in HEI.**
- **To identify the influence of the intention to use on the actual use of mobile learning.**

Section A: Profile of respondents

1. What is your gender?

- Male
- Female

2. What is your age?

- 19-26 years old
- 27-34 years old
- 35-42 years old
- 43-50 years old
- More than 50

3. What is your educational level?

- Bachelor
- Diploma
- Master
- PHD

4. How long have you been using mobile learning?

- 0-3 years
- 4-7 years
- 8-11 years
- 12-15 years
- More than 15 years

Section B: The factors that influence the intention to use mobile learning in HEI.

1. Performance expectancy

5. PE1. I find mobile learning useful for my studies.

Strongly agree Agree Neutral Disagree Strongly Disagree

6. PE2. Using mobile learning would enable me to achieve learning tasks more quickly.

Strongly agree Agree Neutral Disagree Strongly Disagree

7. PE3. Mobile learning could improve my collaboration with classmates.

Strongly agree Agree Neutral Disagree Strongly Disagree

8. PE4. Mobile devices can assist me to receive assignments/home works/quizzes from my lecturers and can also assist me to submit the same to them.

Strongly agree Agree Neutral Disagree Strongly Disagree

9. PE5. Mobile devices can assist my lecturers to upload learning materials to the internet for me and can also assist me to download the same from the internet.

Strongly agree Agree Neutral Disagree Strongly Disagree

2. Effort expectancy

10. EE1. I would find a mobile learning system flexible and easy to use.

Strongly agree Agree Neutral Disagree Strongly Disagree

11. EE2. Learning to operate a mobile learning system does not require much effort.

Strongly agree Agree Neutral Disagree Strongly Disagree

12. EE3. My interaction with the mobile learning system would be clear and understandable.

Strongly agree Agree Neutral Disagree Strongly Disagree

13. EE4. It would be easy for me to become skillful at using mobile learning system.

Strongly agree Agree Neutral Disagree Strongly Disagree

3. Social influence

14. SI1. I would use the mobile learning system if my lecturers recommend and support using it.

Strongly agree Agree Neutral Disagree Strongly Disagree

15. SI2. I would use the mobile learning system if my colleagues will think that I should use it.

Strongly agree Agree Neutral Disagree Strongly Disagree

16. SI3. I would use the mobile learning system if people who are important to me will think that I should use it.

Strongly agree Agree Neutral Disagree Strongly Disagree

17. SI4. I would use the mobile learning system if my college encourages and supports using it.

Strongly agree Agree Neutral Disagree Strongly Disagree

4. Quality of Service

18. QoS1. It is important for mobile learning services to increase the quality of learning.

Strongly agree Agree Neutral Disagree Strongly Disagree

19. QoS2. I would prefer mobile learning services to be accurate and reliable.

Strongly agree Agree Neutral Disagree Strongly Disagree

20. QoS3. It is important for mobile learning to focus on the speed of browsing the internet and obtaining information quickly.

Strongly agree Agree Neutral Disagree Strongly Disagree

21. QoS4. It is important to have a user-friendly interface.

Strongly agree Agree Neutral Disagree Strongly Disagree

5. Perceived enjoyment

22. PEn1. I would find using mobile learning would stimulate my curiosity.

Strongly agree Agree Neutral Disagree Strongly Disagree

23. PEn2. I would find using mobile learning to solve problems would be appealing to me.

Strongly agree Agree Neutral Disagree Strongly Disagree

24. PEn3. I would find using mobile learning would lead to my exploration.

Strongly agree Agree Neutral Disagree Strongly Disagree

25. PEn4. I find using mobile learning to be enjoyable.

Strongly agree Agree Neutral Disagree Strongly Disagree

6. Self-efficacy

26. SE1. I could complete a job or task using a mobile device if someone showed how to do it first.

Strongly agree Agree Neutral Disagree Strongly Disagree

27. SE2. I am confident in using mobile learning if I have only the online instruction for reference

Strongly agree Agree Neutral Disagree Strongly Disagree

28. SE3. I am confident in using mobile learning even if there is no one around to show me how to use it

Strongly agree Agree Neutral Disagree Strongly Disagree

29. SE4. I am confident in using mobile learning even if I have never used such a system before

Strongly agree Agree Neutral Disagree Strongly Disagree

Section C: The intention to use mobile learning and the actual use mobile learning in HEI.

7. Intention to use mobile learning

30. ITU1. I plan to use mobile learning in my studies.

Strongly agree Agree Neutral Disagree Strongly Disagree

31. ITU2. I predict that I will use mobile learning frequently.

Strongly agree Agree Neutral Disagree Strongly Disagree

32. ITU3. I intend to increase my use of mobile services in the future.

Strongly agree Agree Neutral Disagree Strongly Disagree

33. ITU4. I will enjoy using mobile learning systems.

Strongly agree Agree Neutral Disagree Strongly Disagree

34. ITU5. I would recommend others to use mobile learning systems.

Strongly agree Agree Neutral Disagree Strongly Disagree

8. Actual use of mobile learning

35. AU1. I frequently access the course website/learning management system using a mobile device.

Strongly agree Agree Neutral Disagree Strongly Disagree

36. AU2. I frequently access course material (pdf file/PowerPoint presentation) using a mobile device.

Strongly agree Agree Neutral Disagree Strongly Disagree

37. AU3. I frequently send SMS/MMS messages to my classmates regarding class contents/information.

Strongly agree Agree Neutral Disagree Strongly Disagree

38. AU4. I frequently receive a message (SMS/MMS) from my university related to classes and/or university announcements.

Strongly agree Agree Neutral Disagree Strongly Disagree

Thank you very much for your time and effort in fulfilling this research endeavor.

AUTHORS

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