A THEORETICAL DISCUSSION OF FACTORS AFFECTING THE ACCEPTANCE OF M-LEARNING BY INTEGRATING IS SUCCESS MODEL WITH TAM MODEL

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ABSTRACT

The There have been tremendous developments in different industry fields, including the higher education sector. In fact, such sector has been considered as one of the sectors that attracted the special focus of the government. There are several benefits of M-learning that are attractive to both educator and learner circles, with the top advantage being its mobility. In other words, M-learning allows users to exchange information at any time and at any location, removing the issue of locality and traveling to access learning. However, M-learning in the institutions of higher learning is still in its infancy and tangible M-learning initiatives have yet to be set up in the sector. Added to this, the factors impacting the acceptance of such technology are still ambiguous. This study provides advanced knowledge by explaining the importance, adaption strategies and determinants of mobile Learning in the higher education. This in turn would play an important role in increasing the acceptance level of M-learning among universities.

Keywords: *Higher Education, Information and Communication Technology, Electronic Learning, Mobile Learning, Technology Acceptance Model, Information Systems Success Model*

1. INTRODUCTION

In this day and age, higher education can no longer be viewed as a luxury but a necessity to national, social and economic development[1]. In this regard, community colleges are responsible for the facilitation of educational development and in developing countries, there is a notable increase of at least 20% in enrolment when it comes to primary education, and this has led to increased demand for the subsequent education (tertiary education). Notwithstanding this development, there still exists educational inequality in developing countries primarily because of the lack of access to it brought about by poverty, location, technology and ethnicity factors[2]. Additionally, in the context of developing nations, higher education remains largely inaccessible in comparison to their developing counterparts[3]. Hence, there is a need in the former countries to use suitable strategies to maximize the enrolments in higher education in order to become competitive players in the global knowledge economy. Failure to do so would ostracize them from the rest of the world owing to the required skills needed that they are unable to provide[3]. Innovative technologies have brought on transformative mechanisms that work towards

enhancing our life quality[4] and the same goes for education, where stakeholders are attempting to promote innovative pedagogical practices via technology use.

The increasing growth of Information and Communication Technology (ICT) and the Internet revolution has been significantly impacting the service delivery modes in the current global digital environment and these are exemplified by e-learning, e-government, e-commerce, e-health, e-business, e-banking, and the like. In this background, the world education field has significantly evolved through the use of e-learning that employs several technologies to enhance content quality[5]. E-learning refers to the use of communication technologies and information in the education field to provide services that improves the outcome of in the academic circles[5]. In the current times, e-learning systems are viewed as technologies that bring about competitive advantage in institutions of higher learning as it minimizes costs and attracts potential students to satisfy their educational requirements[6]. In fact, e-learning has reformed traditional mode of education into something that is versatile and efficient in the developed countries. Nevertheless, this learning

mode is still under used and in remains in its infancy in the developing economies [7].

In colleges and universities, the dynamic proliferation of mobile devices and wireless networks makes higher education a suitable environment to establish e-learning[8]. Added to the above, the advent of the Internet and mobile technology in the 21st century have consistently reshaped the social picture by basically influencing the different aspects of communication, socialization and information exchange. In relation to this, information access and use have been largely affected by the mobile devices adoption (e.g., portable computers, mobile phones, tablets, and other such devices). This change, in turn, affects the user experience throughout the use of different screens, technologies and channels[9]. In the case of mobile devices, they provide enriching variety of communication and collaboration potential that are required in developing knowledge[10].

The Information and Communication Technology (ICT) developments, specifically mobile technology is viewed as the top technology that has brought about a novel paradigm that could be invaluable to institutions of higher learning[11]. Literacy skills can be gained and maintained and information can be access constantly via mobile technologies. Such technologies are affordable, can be disseminated and they have the potential to reach out of reach groups, offering them with access to both learning and overall development[12]. Mobile technologies have been utilized for learning by

enabling users to access the system of teaching and learning[13]. Trends introduced by these technologies have opened avenues into mobile learning (m-learning) and its assessment. Literature indicates the use of mobile devices as a learning tool[14].

Moreover, M-learning is not just an integration of mobile and learning[15], but also a subset of e-learning. It refers to distance learning that concentrates on learning across context using mobile devices. It is using mobile devices to support teaching and learning processes and is one of the top critical technological distance-learning environments in the institutions of higher learning[16]. It can offer different techniques including, ubiquitous learning, lifelong learning, just-in-time learning, personalized learning, contextual learning, situated learning, collaborative learning, rich media learning, micro learning, immersive learning, asynchronous/synchronous learning[17, 18]. This type of technology assisted learning offers extensive access to mobile device networks and the potential to learn notwithstanding time differences of separation of place, compared to other learning services that hinge on user location[16].

According to other studies in literature like Chaka and Govender [19], technologies like e-learning and m-learning are capable of facilitating learning and teaching processes, and resolving the issue of poor access to education. The differences between the two types of learning are tabulated in Table 1

Table 1: The differences between M-learning and E-learning

M-learning	E-learning
Using wireless communication devices such as smart phones and cell phones, PCs and PDAs	Using fixed, wireless devices such as PCs,
Access the Internet at anywhere and anytime	Access to Internet is made available via telephone service
Bluetooth and information retrieval (IR) technologies are used to exchange books and files between learners.	it is difficult to transfer books and files between individual learners
It offers users more protection that learners use their own devices to connect with others	Communication channels have low levels of protection
easy to pass between learners	It is hard to pass devices through learners
Storage applications used in e-learning are more effective than ones used in mobile learning.	

Source: Zouhair, et al. [20]

There are several benefits of M-learning that are attractive to both educator and learner circles, with the top advantage being its mobility[12, 21]. In other words, M-learning allows users to exchange information at any time and at any location, removing the issue of locality and traveling to access learning. Also, M-learning interaction occurs between students or between students and teachers

or between students and content [22]. Learners are encouraged by interaction to exchange ideas, information and knowledge [23]. M-learning also enables students to integrate education and enjoyment through a set of edutainment tools including E-book, E-drawing, educational games, and the like, which alleviates the pressures of

learning and studying as explained by Ali and Arshad [24].

In majority of developing economies, issues faced by postgraduate and undergraduate students remain rampant based on the social and economic circumstances. More often than not, such issues lie in commuting to and from universities as a result of which M-learning has become the most suitable solution[10]. However, because M-learning is still in its infancy in majority of countries and it is still perceived as something novel that people are still unaware or wary of it[15]. More importantly, there has been minimal proportion of relevant literature in developing countries that focuses on M-learning compared to developed ones. This is due to the popularity of mobile communication and Internet connectivity in the latter – in the former, on the other hand, M-learning use is still scarce[25, 26].

2. HIGHER EDUCATION IN JORDAN

In Jordan, the higher education sector plays a major role in the development process in different levels and aspects. In the past 20 years, the higher education sector in the country has experienced dynamic development and progress manifested in the increased establishments of higher education institutions and increased enrolled students, members of the faculty, administrative and academic staff, and the expenditure size. Despite Jordan's limited financial resources, higher education has always been the country's top priority owing to its major role in the promotion of the citizens' economic, social and knowledge development[27].

Moreover, higher education in Jordan is covered under the oversight of the Ministry of Higher Education and Science, and the Council of Higher Education as the entity of coordination. The first public university in the country is the University of Jordan that was established in 1962. Since 1989, several private universities have been established[28]. In the current times, the numbers of institutions are; 10 public universities, 20 private universities and 2 regional universities. Both professional and academic education are offered by the universities are the bachelor, higher diploma, masters and PhD levels. Aside from universities, Jordan also boasts of numerous community colleges providing higher professional education programs[28].

Jordan's higher education sector has experienced high growth in the past 30 years, primarily because of the demographic shift owing to the natural growth in population and to the crises in the region that led to the influx of refugees into the country[29]. In turn, these have led to the increase in higher education demand, with rates of enrolment for bachelors and graduate studies notably increasing – this corresponded to the establishment of additional higher educational institutions[29]. Moreover, universities in Jordan also has quite a number of international students and as of 2007, international students accounted for 10% of the students in the country's higher education institutions[30]. Responding to the increasing enrolment rate, Jordan launched corresponding initiatives, via which students, who failed to meet the qualifications for higher education, can still avail of through a higher tuition fee[31]. Such initiative enrolled around 20% of students in higher education institutions throughout the country in 2007 alone[31].

In a short time, the ICT has permeated the education sector as an effective educational tool promoting dramatic changes in teaching and learning and allowing students' productive work. However, the teacher's role in technology fitted classrooms is more crucial than ever before [32]. ICT can transform the nature of education in terms of enhancing design work of teachers, improving students and teachers' roles in learning and teaching and assisting in facilitating collaborative learning surroundings. Despite these advantages, ICT use in developing nations are still lagging owing to several hindrances[33].

3. INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) IN JORDAN

Educational technology or ICT used in education is oriented towards technology application in teaching and a lot more[34]. According to Ely [35], educational technology refers to the systematic design and use of hardware and software to realize specific aims and developing nations depend on ICTs in their organizations for competitive advantage in the global marketplace. In fact, ICT has been successful in lessening transactional costs, eradicating barriers created by distance and improving activities management in organizational departments [36]. ICT is a broad term that covers the entire technologies employed in manipulating and relaying information as evidenced in literature[37, 38].

Furthermore, the ICT use among firms is increasing as demanded by the knowledge-based economy. Consequently, firms largely depend on ICT solutions to improve businesses [39] and ICTs are now a part and parcel of firms' processes, structures and products throughout public sectors,

firms and even the whole society[40]. The progress in the ICT use has positively impacted the development of the economy and has permeated day-to-day life of people[41]. In Jordan, ICT has gone through significant development in light of prevalence and services diversity, investment volume and use its use in both sectors (public and private). This has led to the technological development that has impacted different life aspects (economy, society and education)[42]. More recently, in 2017, Jordan Education Initiative (JEI) was set up with the primarily aim of precipitating education reform via innovation and integration of ICT in education sector to provide value to the relevant stakeholders (students, teachers, education system) and to create a knowledge economy.

It is without a doubt that Jordan's higher education sector plays a key role in the national economic growth as individuals hold ample educational needs and interests to transform themselves into global competitive workers[29]. Nevertheless, the technologies adoption in the Middle Eastern region is still lagging compared to the North American, European and other regions[43]. ICT adoption and use in the Middle Easter region has not been extensively examined by practitioners or academics and many of the countries in this area are still lacking in terms of their technologies acceptance and acceptance readiness[43, 44] because they do not have the knowledge, skills, motivation and interests in ICT use at work[45].

4. ELECTRONIC LEARNING (E-LEARNING) IN JORDAN

E-learning refers to using Internet-based programs in instruction, with the help of pedagogical tools as a part of providing a formal education program[46]. The E-learning development stemmed from the development of ICT in education, owing to the requirement to provide education and training to the large masses[47]. It is a type of learning where individuals learn efficiently and effectively, eradicating the requirement of attending the learning institution in a physical sense, but sticking to the traditional learning aspects through virtual trainers and academics[48]. In this regard, physical seminars and lectures have been replaced by virtual ones, with E-learning demanding more and more teaching and learning activities as evidenced in literature[48, 49].

In the field of education, Jordan has proven itself as one of the fastest developing university systems on a global scale. In the current times, 4.6% of the population is enrolled in a higher education program, with the system serving more than 300,000 students, and the rate is expected to increase over the years[50].Although the trend is acknowledged, the current development in higher education is placing pressure on the education system of the country. Along with the country's brain drain, according to some estimates, the response to the rising educational requirements in the nation calls for the recruitment of 6000 academic staff in the coming four years[50]. To meet the demand for higher education, E-learning continues to proliferate and based on evidence it may be the answer to the mentioned issue.

According to the Jordanian Ministry of Higher Education and Scientific Research (MoHESR), the Royal Message in the Higher Education Development Forum (HEDF), and the Jordanian National ICT Agenda should be adopted in the country's universities to enhance the process of education[51]. Hence, enhancing the teaching and learning quality in the universities is the primary aim behind the higher education leadership[52].

Moreover, the National Commission of Human Resources Development (NCHRD) was established by the government in April 2014, and King Abdullah II patronized its recommendations in the national conference in September 2016. This was followed by the ratification of the higher education strategy in the conference and its approval by the higher education council. This strategy primarily aims to boost the use of technologies among students, academic staff and universities management and to enhance their performance via honing of skills, knowledge and capabilities[51]. But this strategy is still in the infant development phase and the integration of e-learning into the teaching processes is still facing ample difficulties[48, 51, 53]. Hence, the factors that affect the use of E-learning system have to be considered among institutions.

5. MOBILE LEARNING (M-LEARNING) IN JORDAN

The increasing use of mobile phones in Jordan is quite noticeable and it was proposed that by the end of 2012, the rate of penetration would be 140%, with researchers showing that additional growth is expected [54]. With regards to smartphone users transacting online, in Jordan they constitute around 41% in comparison to the worldwide 21.3%[55]. Also, the prevalence of interactive websites offering research data on consumers' online behaviour in Jordan provide information to professionals, entrepreneurs and developers of mobile apps. This

is a significant shift of media use and information where 90% of the citizens use mobile devices as reported byAlqatan [37] andPingdom [56].

More importantly, mobile phone technology and smart technology is one of the top relevant achievements in the current era, with such technologies integrated to daily lives of people, in office, home and abroad[57].Mobile technology functions at any time and place, through wireless connections. Meanwhile, Smartphone technologies and mobile applications are invaluable for users as they provide information to the public at large. New applications are launched daily, enabling users the opportunity for their use and in the Arab region, Jordan has made leaps and bounds in terms of successful IT sector development. IT has transformed the education sector and M-learning has been made popular throughout the years via Smartphone technology coupled with cloud computing[58].

According to past studies[59], Jordan has experienced significant developments and boost in mobile telecommunication infrastructures because of the government's commitment. Armed with developed ICTs and mobile telecommunications, Jordan's education sector and universities are on the way to improving learning and educational environments[60]. Along with this progress, the development of new mobile devices, M-learning has become a new trend in the institutions of higher learning in the country[60]. Jordanian citizens are extensively using mobile phone devices with a rate of penetration of more than 140% in 2013 as reported by the Telecommunications Regulatory Commission (TRC). In light of mobile Internet users aged between 18 and 29, Jordan ranked second among the Arab countries, with the rate constituting around 95%[61]. Also, mobile learning applications look promising when it comes to offering learning activities to students in Jordanian universities[62].

Despite these statistics, M-learning is still in its first developmental phases and higher education M-learning initiatives have yet to be set up[63, 64]. This necessitates more studies to be conducted on the factors that influence the M-learning adoption and acceptance in Jordan [63].

There are many solid reasons behind the choice of focusing on Jordanian institutions of higher learning in this study and they are elaborated under this section. First, Jordan has experiencing several issues in its economy that resulted from lack of financial resources and these cover low productivity, low exports and considerable public and private spending on consumer and capital

goods purchases. This, in turn, has led to consistent and significant trade balance deficit and high leveraging of external funds (grants and loans)[65]. This is compounded by the fact that Jordan cannot depend on its natural resources to bring about economic development as such resources are limited. This drove the country to search for other resources to use[37].

Additionally, in order to accomplish excellent and qualified workforce that can counter the lack of natural resources, Jordanians have been inclined towards education, resulting in high rates of literacy. Jordanian people hold university education in high regard, if not a compulsory achievement and this has led to the establishment of needs in the country, and the region[66]. Employing ICT for development and driven by the importance of education, Jordan has begun setting up several initiatives of M-learning in schools and universities.

The second reason lies in the fact that Jordan is a developing country that has strict measures of IT adoption and IS applications to promote awareness of the Internet and this has naturally resulted in many IT and IS firms according to the Ministry of Information and Communication Technologies (MICT), as mentioned byAl Bakri [67] andAlqatan [37]. In relation to this, Jordanians use of mobile technology has dramatically increased, with significant learners bypassing their personal computers and directly utilizing mobile devices[63, 68].

This is exemplified by the fact that several wireless Internet connections in Jordan is increasing in use and is deemed to be a major factor in M-learning promotion and use. In a related study, Al-Adwan, et al. [63] related that are 5.6 million Internet users constituting 74% of the population, 1.3 million subscribers to mobile broadband, 377,269 fixed telephone lines constituting 5.1% of the population, with approximately 11 million users of mobile devices (147%). These statistics indicate that Jordanian mobility use is dynamically increasing. Supported by the use of advanced technologies in mobile semiconductors (flash memory) and the extensive proliferation of sophisticated wireless communication types (3G/4G and WiMax), M-learning establishment in Jordan can never be as feasible[63, 68].

In the period from 2015-2020, mobile connections are expected to increase to 2 million, bringing improved mobile penetration and adding approximately 2,000 new employment positions and contributions of U.S.310 dollars in 2020 in the form of GDP (INTAJ and MoICT Statistics, 2013). This is aligned to the cumulative increase of

U.S.$1.2 billion to the country's GDP and 7,000 additional jobs[69]. Shihab, et al. [70] related that fee payments and recurring tax of Jordanian mobile operators indicate more than 50% of revenues from the market, and in other words, digital inclusion and technology have become a major aim of the government.

M-learning in Jordan is however still in its developing stage and tangible initiatives serving its implementation in the institutions of higher learning have yet to be established as explained byAl-Adwan, et al. [63] andMomani, et al. [64].

6. SIGNIFICANCE OF THE STUDY

This study is significant in that its findings can be invaluable to developing M-learning model to work as a guide for the educators' acceptance of M-learning among universities in Jordan. This type of learning in higher education is still at its infancy, as a result of which the concepts and instructional issues related to it are still evolving, and calling for extensive research[63]. Shedding light on educators' acceptance of mobile technology use, information service and communication technology is required for the successfully establishment of information relevant to academics, organizations, and libraries for instruction. However, prior to investing the limited funds in the development of M-services and its content, the institution has to take factors influencing students' technology acceptance into consideration as failure to accept M-technology could mean failure of technology to seek and relay information, making investments for naught.

The popularity of M-learning in developing countries has experienced an incline and thus, in this study, Jordanian universities are used as the basis for obtaining knowledge concerning the rivers of M-learning acceptance. The findings of this study are expected to be benchmarked to other contexts and countries that are desirous of leveraging M-learning. The determination of factors influencing behavioural intention towards M-learning use is also pertinent to business in the long-run, with the discovery of the top factors invaluable for the future of universities. Information on such factors and their impact on behavioural intention towards M-learning acceptance in institutions are of specific importance as it can be used as a guide to fashioning M-learning applications in this particular environment.

The research findings are also expected to contribute to literature on whether or not the examined constructs obtained from TAM, social influence and facilitating conditions from UTAUT,

informational quality, system quality and service quality from IS success model, and perceived playfulness and self-management of learning from literature predict intention towards M-learning use in the educators' perspective.

This study can be the platform among which future studies regarding M-learning acceptance and adoption in the Jordanian economic sectors can be built on. The research findings can provide insight into the perceptions of educators of the mobile strategies used in M-learning that will enable researchers, software developers and marketers of universities to come up with solutions addressing the perceptions of educators, as a result of which, M-learning trending universities can leverage the relevant technology. Added to the above, the research can guide future researches and help firms in decision-making when it comes to decreasing issues of M-learning acceptance among universities.

Lastly, the study findings are expected to assist community colleges in that they will furnish administrators, educators and librarians with the information they need to determine students' intention to use and their actual use of M-learning tools to obtain academic content in the contexts of colleges and universities.

7. TECHNOLOGY ACCEPTANCE THEORIES AND MODELS

Researchers evidenced that majority of organizations are using IT and investing in them, with some incurring losses and in this regard, several technology acceptance models have been developed and used to examine the acceptance of IT.

Because of its current infancy phase in the higher education, M-learning has yet to be extensively examined in light of the factors influencing its acceptance among universities. Hence, in this study, the proposed model considers behavioural intention as opposed to actual use behaviour as the dependent variable. The related theories in this context are discussed in the next sub-sections to provide a complete picture to the examination.

7.1 Technology Acceptance Model (TAM)

As an information system theory, TAM posits that way users accept and use new technology and based on the model, when users are faced with new technology, several factors affect their use (how and when) decision[71]. Additionally, TAM is the top extensively utilized model when it comes to technology and M-learning adoption in literature –

it focuses on the behaviour of users in higher education[4, 72]. The model's validity and reliability have been confirmed in technology

acceptance and use studies, in multiple contexts and using varying study samples (see Figure 1).
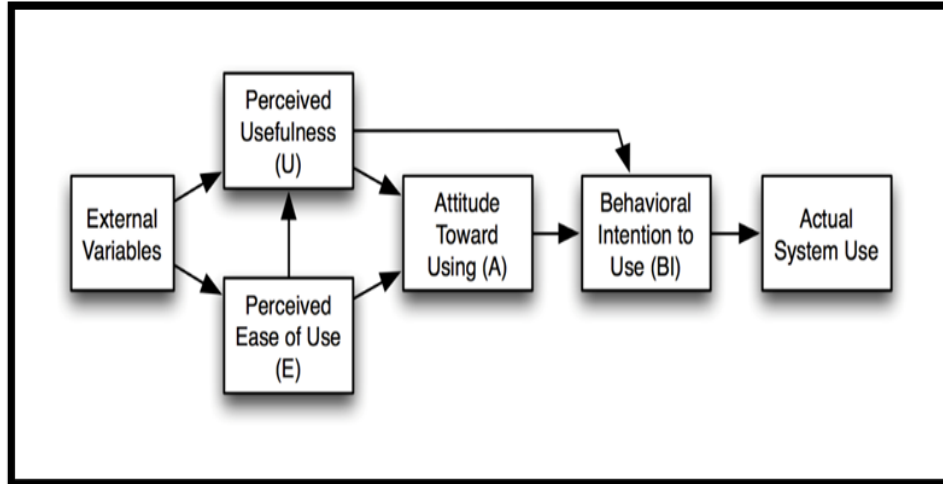

Figure 1: Technology acceptance model [71]

TAM highly depends on factors when explaining behavioral intention (attitude towards the use, perceived ease of use and perceived usefulness of technology) (see Table 2).

Table 2: Definitions of the constructs in TAM [73]

NO	Variable	Describe
1	Perceived usefulness	"The degree to which a person believes that using a particular system would enhance his or her job performance".
2	Perceived ease of use	"The degree to which a person believes that using a particular system would be free of effort".
3	Attitude toward using the system	"the degree of evaluative affect that an individual associate with using the target system in his job".

TAM has been used frequently as a theoretical framework analyzing the factors related with mobile technologies adoption. The external variables of the model consist of two primary internal beliefs in technology use namely, perceived ease of use (PEOU) and perceived usefulness (PU). The behavioral inclination towards technology use, and the influence of perceived ease of use and usefulness on the actual technology use has been evidenced to be mediated.

The use of TAM among researchers has garnered several researchers to confirm its validity and to carry out its systematic meta-analysis as a result of which, evidence shows that the top TAM strength lies in its generalizability throughout extensive technologies and contexts[74]. Nevertheless, majority of studies in this caliber have been conducted in the developed nations, with developing ones left behind when it comes to technology models explaining adoption, acceptance

and use of technology[37]. Literature calls for more studies on models explaining technology acceptance determinants in the Arab countries business sectors[74].

More importantly, TAM is a highly cited model and its extensive acceptance is owed to its robust theoretical assumption and practical effectiveness[75]. Therefore, in the present study, the author employed TAM to determine answers to the research questions and to achieve the study objectives. TAM is first and foremost, characterized by its robust nature, its strength and its parsimony, because of which it has been expansively utilized to examine acceptance of users[76]. Second, TAM was developed primarily to examine the acceptance of IS and technology among users[77] and third, it was utilized to shed light into IS user behavior. Several researchers have tested and confirmed its reliability[78]. Lastly, TAM is used in the present

researcher as it is the most appropriate model to be used in the study context (developing nation) [37].

7.2 Unified Theory of Acceptance and Use of Technology (UTAUT) Model

The UTAUT was developed by Venkatesh as a technology acceptance model based on user acceptance of information technology, towards a unified view. Its objective is to shed light on the intentions of users of IS and their behavioral usage (see Figure 2)[79]. The model's development resulted from the integration of eight predecessors, with the aim of examining adoption of IT. The eight theories are TRA[80], HAT [76], Motivation Model [81], TPB[82], C-TAM-TPB[83], Model of PC Utilization (MPCU)[84], Innovation Diffusion Theory (IDT)[85] and Social Cognitive Theory (SCT)[86]. Judging from the combination of the above eight theories, UTAUT can be deemed as an extensive theory encompassing additional factors to shed light into adoption of technology. Venkatesh, et al. [79] indicated that the strengths of the preceding theories were considered to assist in explaining users' technology use. UTAUT was ratified in a longitudinal study and the findings showed that 70% of variations in use intention were successfully explained[79].
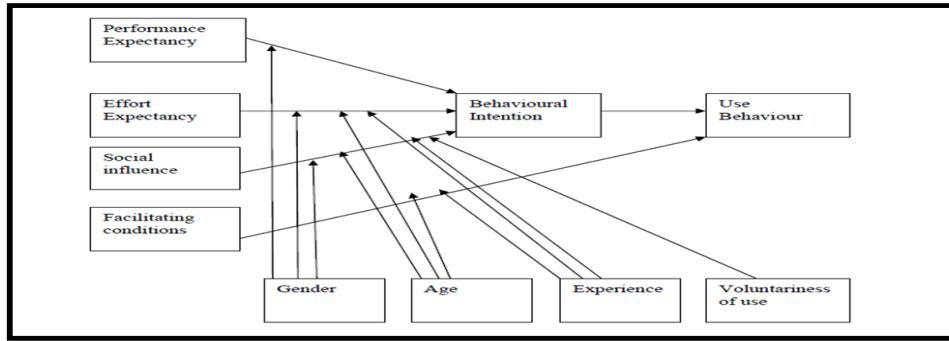

Figure.2: Unified theory of acceptance and use of technology (UTAUT) model[79]

According to the results obtained from the balance test, the theory outperformed the individual theories that comprise it (eight theories) in terms of clarification of IT use intentions. The model provides insight into users' intentions and behaviour when it comes to IS use, with the help of four main factors (performance expectancy, effort expectancy, social influence and facilitating conditions). The factors are examined in decision making when it comes to behaviour and user intention, with the expectation that their effects on intention and use behaviour are mediated by sex, age, experience and voluntariness of use[79].

The UTAUT proposes the degree of user's intention towards system acceptance and use [79]. Table 2 provides a summary of the UTAUT model and the constructs definitions.

Table 3: Definitions of the constructs in UTAUT[79]

Variable	Describe
Performance expectancy	"The degree to which an individual believes that using the system will help him or her to attain gains in job performance".
Effort expectancy	"The degree of ease associated with the use of the system".
Social influence	"The degree to which an individual perceives that important others believe he or she should use the new system".
Facilitating conditions	"The degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system."

The UTAUT have been frequently utilized by researchers in studying M-learning adoption and among the different theories and models, UTAUT has been evidenced as the top adopted model in M-learning[26, 87]. According to this line of study, demographic characteristics of age and gender are not significant to M-learning acceptance[88, 89]. For this reason, the moderating variables were not examined in many of the UTAUT studies in M-learning case[16, 19, 26, 87, 89-94] and because of this, the moderating role of the demographic characteristics is not examined in the present study.

7.3 The De Lone and Mc Lean's IS Success (D&M IS success) Model

The IS success model proposed by De Lone and Mc Lean, referred to aptly as the De Lone and Mc Lean model is an information systems theory seeking to provide an in-depth understanding of successful IS through the identification, description and explanation of the relationships among six critical success dimensions and the evaluated IS. The IS Success Model is deemed to be a conceptual model categorizing success measures into six dimensions on the basis of the IS process model's significant cause and effect relationships as illustrated in Figure 3. The relationships show the flow of causality in the direction of that mimics the process of information as illustrated by Buhalis and Peters [95].

The dimensions of the IS model hold the basis of assessing the effectiveness of IS realm and the model is considered to be the top extensively assessed model in terms of IS [96]. The six variables in the IS success models are system quality, information quality, use, user-satisfaction, individual impact and organizational impact. Individually and in combination, system quality and information quality affect use and user satisfaction, while system quality, information quality, information system use and user-satisfaction in combination jointly impact both individuals and organizations. Added to this, IS success model explains the differences between IS aspects and features as determinants of satisfaction. Hence, the degree of user satisfaction and use has direct impacts on individual's performance, and in turn, the performance of the organization as a whole[97].
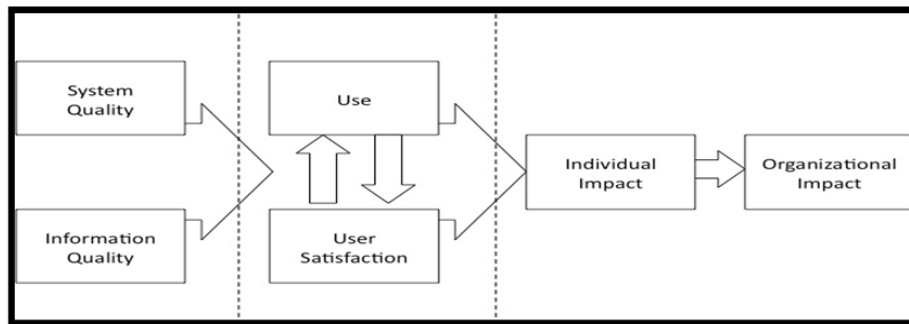

Figure 3: D&M IS success model [97]

The six dimensions of IS success model[98]include the following; the first is system quality that measures the characteristics of M-learning system and addresses the quality of usability, availability, reliability, adaptability and time of response (downloading duration). The second dimension is information quality that gauges the content issues of M-learning and addresses the quality of personalization, currency, relevance, reliability, comprehensiveness, ease of understanding and security in obtaining trust through online transactions.

The third dimension is service quality and this represents the overall support from the service provider and the presence/absence of such support from the IS department, the organizational unit or the firm outsourcing to an internet service provider[99]. The fourth dimension is intention to use and it gauges the experience of using and navigating website, retrieving information and interactions, while the fifth dimension is user satisfaction – a variable measuring the customers' opinions of the M-learning system. It covers the whole experience of the customers ranging from information retrieval, purchase, payment to service receipt.

The last dimension in the IS success model is net benefits and this maintains the balance between positive and negative effects of M-learning on the relevant stakeholders such as customers, suppliers, markets, employees, organizations and the whole society. Several studies used the IS success model in evaluating successful e-learning [100], online learning system [101], M-commerce [37] and M-learning [102]. The model has also been widely employed in the field of IS.

8. REVIEW OF RELEVANT PREVIOUS STUDIES

Studies dedicated to M-learning in Jordanian universities are of three types, with the first being the studies discussed in the preceding section. The second type provides reviews on the interpretations of extended studies and the third offers perceptions, opinions, conclusions and interpretations common

to the studies[103]. Prior studies review assist in the identification of studies, the relationship between them, the degree of examination and the new research avenues. This is directed towards determining the gap in literature in terms of studies that address new research problems and under this section, the author provides a summary of relevant studies dedicated to M-learning to highlight the gaps.

Based on the literature review that covers mobile learning (refer to Table 4 and Table 5 in Appendix A), M-learning adoption is the best solution to several challenges plaguing educational organizations. Nevertheless, there are barriers in implementing M-learning in Arab developing countries;

First, in spite of the many benefits of mobile learning for universities both public and private, especially as it relates to enhanced knowledge retention and increased users' engagement whether students or employees, there are issues to overcome whether technical, pedagogical or administrative. ALKsasbeh, et al. [104] states that although learners use mobile phones extensively, there has been a lack of wide spread usage of mobile learning in educational context. The reasons were mainly technical, stemming from the screen size of the mobile devices and the cost of mobile services.

Second, the Arab region is left behind when it comes to mobile learning adoption compared to developed countries owing to several reasons. Moreover, the majority of prior studies on mobile learning were conducted in developed countries. There are a limited number of studies that were conducted in developing countries, with even fewer studies conducted in Arab countries, such as Jordan. Educational organizations are considered to be especially fragile due to changes in the market caused by mobile learning usage. Therefore, investigating mobile learning adoption by educational ordinations in Arab developing countries, such as Jordan, is regarded as an emerging area of study that needs to be addressed.

Third, the reviewed literature shows that attitude, perceived usefulness and perceived ease of use from TAM model, social influence and facilitation conditions from UTAUT model, service quality, system quality and information quality from IS success model, and self-management and perceived playfulness have an impact on the adoption of mobile learning. However, there is a general lack of studies that have focused on identifying the factors that play a role in mobile learning adoption in Arab developing countries. There are also limited number of studies that examined the level of impact that these factors have on M-learning acceptance in educational environment. Moreover, the reviewed literature showed that various models and theories were applied to study mobile learning adoption. It is worth mentioning that none of these models and theories have integrated TAM, TTF, IS models, self-management and perceived playfulness to explain mobile learning acceptance in Arab developing countries. Thus, it is necessary to develop a comprehensive framework to better explain mobile learning adoption in such specific context.

In Jordan, researches that have been dedicated to the acceptance of M-learning in Jordan are still rare. Added to this, the few prevalent studies have focused on the student's perceptions and overlooked the perceptions of educators. Furthermore, there is dire need to investigate educators' perceptions of m-learning in Jordan, and determine whether there are potential differences compared to students' perceptions [63]. Therefore, the current study addresses these limitations and fills the gap in the literature by developing a comprehensive framework that includes that most significant potential factors that may influence decision makers to adopt the M-learning application in Jordan, as a developing country.

9. RESEARCH HYPOTHESES

This section explains the transformation of the theoretical findings into formal research hypotheses. In other words, the research hypotheses are developed on the basis of the literature findings in this study, as presented in Figure 4;
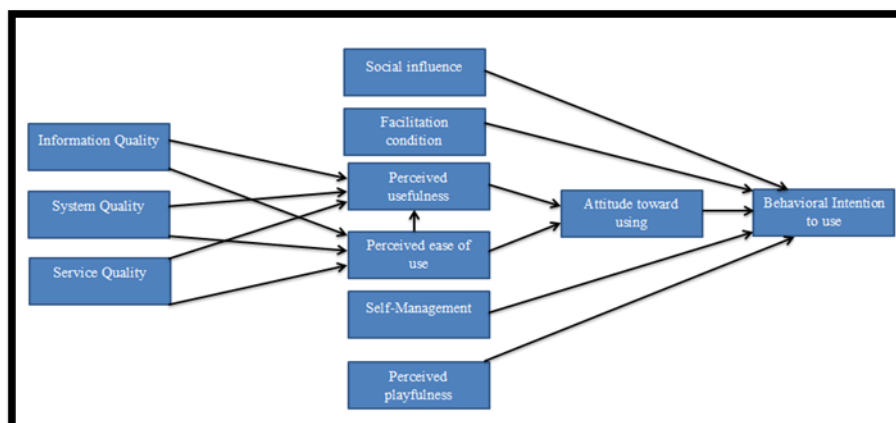
Figure 4: The proposed research model

8.1 Perceived Usefulness

Davis [80] defined perceived usefulness as the level to which and individual is convinced that a specific system's use would improve his/her performance on the job. It is the level to which Jordanian universities employees believe that M-learning use would improve their performance. Perceived usefulness in M-learning indicates that the system is found useful by the users as it allows them to access information in a timely manner and at any location and device[105].

In a related study, Altrad [72] revealed a significant correlation between perceived usefulness and behavioural intention towards M-learning use in the context of Malaysia. They evidenced that individuals who are convinced of the M-learning usefulness, will have a higher inclination towards its use in lieu of traditional learning. Additionally, effort expectancy (perceived usefulness) is a determinant of acceptance of M-learning in the case of Saudi Arabia [16] and in the Iraqi context [92]. Along with the above mentioned studies, Bakhsh, et al. [106] and Amornkitpinyo, et al. [11] revealed that in M-learning acceptance, perceived usefulness (PU) influences ATT. Further studies are required to determine the effect of perceived usefulness on M-learning and thus, the present study hypothesizes that;

H1: Perceived usefulness will positively influence on the attitude of individuals towards using M-learning.

8.2 Perceived Ease of Use

According to Davis [80], perceived ease of use is the level to which an individual believes that a specific system use is effort-free. In other words, using a technology (e.g., M-learning) would be free of physical and mental effort. The user may believe that an innovation (M-learning) helps in his work, but in using mobile technology, the user may experience difficulty. In the use of M-learning in community colleges, it is likely that effort expectancy will have a strong influence on behaviour in the initial and early phases of mobile use in institutions of higher learning or the library content and such effort expectancy decreases as time passes as higher experience is obtained after a period of time [105].

Several studies in literature reported the significant influence of effort expectancy (perceived ease of use) on user intention towards M-learning use in Malaysia [72], in the case of Saudi Arabia [16], in the case of India[107] in the case of Turkey [108] and in the context of Iraq [92]. In the study of Ali and Arshad [24], effort expectancy was examined in M-learning acceptance among students and it was found that they will accept the system if they are convinced of its ease of use. Similarly, Bakhsh, et al. [106] and Amornkitpinyo, et al. [109] reported the influence of perceived ease of use (PEOU) on ATT in M-learning acceptance. Nevertheless, studies of this caliber are still scarce and thus, this study proposes that;

H2: Perceived ease of use will positively influence on the attitude of individuals towards using M-learning.

8.3 Social Influence

Social influence is the level to which and individual perceives that others near to him think that he/she should use the new technology [79]. Social influence was defined by Casey and Wilson-Evered [110] as the user's views of social advantage from the IT application usage. Three constructs are used in UTAUT to encapsulate the

social influence concept, namely subjective norm in TRA, TAM2, TPB and C-TAM-TPB, social factors in MPCU and image in IDT [79]. Several effects of social influence have been evidenced among lecturers, instructors, parents and peers in M-learning cases. Social influence strongly impacts the intention of students to use M-learning in the pedagogical surroundings [111].

Social influence represents the effect of teachers, parents, and peers on the students' intention towards accepting and using M-learning. It also affects the behavioural intention more strongly in the initial and early phases of M-learning and will lessen as time passes with more experience (Donaldson, 2011). Literature shows that social pressure relates to the intention of the individual towards new technology adoption or acceptance[112]. This construct is the best determinant of overall behaviour or intention towards new technology adoption [113].

Moreover, Chaka and Govender [19] found social influence to have a significant positive correlation with behavioural intention (BI) towards M-learning use in Nigerian colleges. Similarly, in Jordan, Alshraideh and Al-Shrida [114] indicated a positive social influence-intention towards M-learning acceptance relationship among students. Therefore, the present study proposes the following hypothesis for testing;

H3: Social influence will positively influence on the behavioural intention to use M-learning.

8.4 Facilitating Conditions

Facilitating conditions (FC) refers to the level to which and individual is convinced that organizational and technical infrastructure are prevalent to support system use [79]. Three constructs are used in UTAUT from prior models to represent facilitating conditions and they are behavioural control from TPB and C-TAM, facilitating conditions (MPCU) and compatibility from IDT [115].

A potential barrier in mobile learning acceptance is lack of technology skills, particularly if training is not provided (e.g., in the case of museum patrons). Specifically, the use of Pocket PCs for museum tours delivery, 70% of the visitors self-supported spending longer in exhibit tours, 45% found difficulty in technology use, specifically aged visitors[105, 116].

The literature review reveals that student and staff training for M-learning in Naismith, et al. [117] study is a significant predictor of effective M-technology use. Several studies found that facilitating conditions significantly and positively influenced the intention towards M-learning use of students [118, 119]. Other studies like Concannon, et al. [120] laid stress on the importance of the provision of guidance and technical support to students in engaging with learning technologies. Based on the above discussion, this study proposes that;

H4: Facilitating Conditions will positively influence on the behavioural intention to use M-learning.

8.5 Self-Management

Self-management learning is the level to which the user perceives that he/she is self-disciplined in managing his/her learning [121]. Users are required to self-learn in M-learning and develop skills for the deployment of the system. Moreover, successful learning depends on the control of the learning of the activities of learning, exploring and experimenting, making queries and taking part in collaborative arguments[122]. The learning surroundings in the classroom facilitate the student learning and when students gradually surpass this base, self-management in learning is crucial to successful learning (Donaldson, 2011).

Along a similar line of study, self-management learning was found to positively affect the students in Petra University, Jordan, in their adoption of M-blackboard[64]. In Saudi Arabia, Badwelan, et al. [16] related that learning self-management significantly influences behavioural intention towards M-learning use. On the basis of the above discussion of literature findings, this study proposes that as following.

H5: Self-management will positively influence on the behavioural intention to use M-learning.

8.6 Perceived Playfulness

Perceived playfulness is one of the primary factors that influence learning engagement, using new teaching innovations and technology [123]. According to Agarwal and Karahanna [124], perceived playfulness provides intrinsically motivates the complete absorption of individuals in technology. Perceived playfulness in TAM is deemed to be an intrinsic motivation factor [125], with an intrinsic motivator bringing about the engagement of the individual in the activity due to his/her interest [126].

In the same line of study, Masrek and Samadi [119] reported that perceived playfulness of learning is a major determinant of intention towards M-learning adoption in the U.S. institutions of higher learning. Also, in the U.S., Donaldson

(2011) found perceived playfulness of learning to significantly determine behavioural intention towards M-learning use. Added to this, in Pakistan, Iqbal and Qureshi [127] revealed the construct to significantly impact behavioural intention towards M-learning use. Therefore, this study proposes the following hypothesis for testing;

H6: Perceived playfulness will positively influence on the behavioural intention to use M-learning.

8.7 Information Quality, System Quality and Service Quality

Information quality is the quality of information produced by the system [97]. Information quality has been gauged in literature in various ways and it has been referred to as the quality of report contents generated by the IS. It is measured through different dimensions namely, accuracy, completeness, currency, efficiency, relevance, scope, and timeliness of information [128]. Information quality in M-learning is the quality of learning content (i.e., lectures, courses, assignments, images and quizzes). It reflects the primaryAlmaiah and Man [129] element that plays a core role in successful M-learning applications as it contributes to the full engagement of learning experience among students. Information quality was also referred to by as the styles and formats of learning in the form of audio, video and animation as well as the contents of collaborative learning in share and send learning content files.

More importantly, system quality is one of the top deemed IS success dimensions (DeLone & McLean, 1992) and it is defined as the IS measure itself. It has been gauged through several ways in IS studies (e.g., access convenience, system flexibility, system integration and time of response (Bailey & Pearson, 1983) as well as reliability, time of response, ease of use and ease of learning [130].

Generally speaking, service quality is the users' expectations of satisfaction in receiving good service levels. High-quality services indicate the way service providers satisfy the expected standards among users and it is generally determined by the feelings of the users. Moreover, service quality is frequently considered as a major index of information system success [131]. It is obtained through the comparison of expectations and provided service [132]. In M-learning, students possess individual needs that they look forward to meet via M-learning applications given by the university management. Thus, service quality has a key role in successful use of M-learning applications among students in universities.

In Ahn, et al. [133] study examined the influence of three quality types on user acceptance of web retailing site using 492 participants. They found system quality, information quality, and service quality to significantly affect perceived ease of use and perceived usefulness. Added to this, Cho, et al. [134] examined the factors affecting the intentions of users to continually utilize E-learning. The findings indicated that system functionality and interface design significantly and positively impact both perceived ease of use and perceived usefulness. In relation to the above studies, Al-Debei [135] examined quality factors influence on behavioural intention of Jordanian students to use university sites. They revealed that information quality significantly affected perceived usefulness and perceived ease of use. This study adds to literature by proposing the following hypotheses to be tested;

H7: Information quality will positively influence perceived usefulness to accept M-learning.

H8: System quality will positively influence perceived usefulness to accept M-learning.

H9: Service quality will positively influence perceived usefulness to accept M-learning.

H10: Information quality will positively influence perceived ease of use to accept M-learning.

H11: System quality will positively influence perceived ease of use to accept M-learning.

H12: Service quality will positively influence perceived ease of use to accept M-learning.

8.8 Perceived Ease of Use, Perceived Usefulness and Attitude towards Using

Individual's attitude (ATT) is his/her positive or negative belief concerning the performance of specific behaviour and it is a main influencing factor of technology use. According to Davis, et al. [71], it mediates between PU, PEOU and BI. It is perceived that the higher its significance to PU and PEOU in technology-based systems, the more likely that the students will harbour positive attitude towards adoption the technology. The original TAM proposes that perceived usefulness and perceived ease of use influence the attitude of users towards technology use, and is a determinant of their use intention or adoption.

Furthermore, TAM posits a significant positive perceived usefulness-perceived ease of use relationship. In other words, if a user finds ease of use in technology, he will likely harbour a positive attitude towards using it. This is supported by several M-learning studies [75, 136]. Also, both

recent studies of Bakhsh, et al. [137] and Amornkitpinyo, et al. [109] revealed the influence of attitude on behavioural intention of individuals towards M-learning usage. Therefore, the following hypotheses are tested in this study;

H13: Perceived ease of use will positively influence perceived usefulness in the acceptance of M-learning.

H14: Attitude will positively influence the behavioral intention to accept M-learning.

10. LIMITATIONS AND IMPLICATIONS FOR FUTURE RESEARCH

This paper theoretically investigated the influence of factors on behavioural intention to use m-learning application in educational context in Jordan as developing country. Similar to any social science research, the present one has several limitations that include; firstly, further research is necessary to assess the applicability as well as the significance of the proposed model applied to accept m-learning in universities in others developing countries. Secondly, the models used in the study include Davis' TAM [71] and UTAUT model [138] partially, and thus it is recommended that future research adopt other relevant theories like the TTF. Also, other variables not included in the study, may impact the same. Finally, we encourage this research work will be more beneficial if it is expanded in the future to test the relationships in our suggested model by using the empirical data or other techniques.

11. CONCLUSION

This study discussed the mobile learning applications required by the Institutions of higher education at the present time and examines the determinants of learner acceptance in the context of Jordan. The study enhances the current body of knowledge on M-learning and its determinants inn such Institutions. It is hoped that this study motivates further researches dedicated to learner's acceptance on M-learning applications among higher education Institutions. It is important to keep in mind that the present study is still a theoretical discussion of a research to improve the knowledge of M-learning applications among higher education Institutions in order to provide insight into consumer acceptance on mobile learning providers. Further empirical research in the context of higher education Institutions is still needed to recover the deficiency in the knowledge regarding the issues found in the new research field.

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APPENDEX

Table 4: A Review Of Existing Literature Pertaining To This Study

Title	Author & Year	Scope	Gaps/ Future Work
A Systematic Review on Mobile Learning in Higher Education: The African Perspective	[3]	Africa	First, the number of studies on mobile learning in higher education is growing rapidly, even though there are still very few high-quality studies to provide evidence for its effectiveness. Second, a few challenges remain which require attention if mobile learning is to be fully integrated within higher education institutions in developing countries, particular in Africa. Third, future research to conduct longer and bigger scale studies exploring the impact of mobile learning in higher education in developing countries, particular in African context since the majority of the studies were characterised by short duration. Moreover, studies should utilise the existing mobile learning and other educational technology related frameworks to provide a lens through which study results can be analysed and interpreted.
Determine Factors Influencing Mobile Learning Acceptance in Higher Education Institution of Malaysia: Online Based Learning	[72]	Malaysia	
Determinants of Mobile Learning Adoption in Higher Education Setting	[26]	Malaysia	In this study, there are several limitations associated with the conduct of this study. Firstly, is the choice of students that was confined to one university only. Future study should consider extending the scope of population by taking students of other universities. Secondly, besides the six independent variables, there are other variables that could be examined. Other potential variables that could be explored are individual or environmental factors
Instructor Acceptance of Mobile Learning in Saudi Arabia: A Case Study of Hail University	[87]	Saudi Arabia	The population sample utilised in this research may explain the discrepancy with existing research, which has typically found the UTAUA variables of facilitating conditions and social influence as affecting behavioural intent. This is because university-level educators' opinions were being investigated rather than learners, as in the majority of previous research. Consequently, a random sampling method focused on a bigger population should form the basis of future studies into mobile learning and tutor acceptance.
Mobile Learning Technology Acceptance Among Saudi Higher Education Students	[139]	Saudi Arabia	First, UTAUT needs to be rephrased and rewritten to fit the educational context. Second, the addition of new constructs should be aligned properly with the current model of UTAUT. Third, more research is needed to confirm the validity and reliability of this construct addition into UTAUT. Finally, Future research could include private universities students to explore the difference between acceptance behavior of mobile learning technology in these two different settings.

The Concept Framework of Structural Equation model of Mobile Cloud Learning Acceptance for Higher Education Students in the 21st Century	[140]	Thailand	It is important for the educational institutions to make the infrastructure preparation that concerns the network system for internet and learning material access to improve the 21st century lessons in the form of mobile cloud learning
Students' perceptions and readiness towards mobile learning in colleges of education: a Nigerian perspective	[19]	Nigeria	It is recommended that a broader investigation into the acceptance of m-learning in colleges of education in Nigeria be undertaken with a view to ascertaining other factors that could account for more variance.
Factors Influencing the Acceptance of M-Learning by Students of Higher Education in Morocco	[8]	Morocco	
Predictive Path Model for Mobile Learning Applications	[107]	India	First, this study does not investigate actual usage but rather prediction of use through invention. Although this is a limitation, the causal link between intention and actual behaviour has been substantially empirically supported through prior research. Second, participants self-reported their answers to the research instrument. Bias effects could be present. Third, the research model was limited to investigating the external variables as exogenous variables where they cannot act as mediators. This resulted in the exclusion of the construct Learning Management (for usefulness) and Supportive, Content Based and Collaborative (for ease of use) from the predictive model. Finally, the study is limited geographically to University of Mumbai, India
Effects of Social Constructivist Mobile Learning Environments on Knowledge Acquisition: A Meta-Analysis	[141]	Theoretical	There is an urge to work within the limits of mobile devices and to consider breaking down tasks as to match mobile technologies environment. Moreover, Mobile learning should be distinguished from e-learning. Recent researches still define mobile learning as a mobile form of e-learning.
An Exploratory Study in Nursing Education: Factors Influencing Nursing Students' Acceptance of Mobile Learning	[142]	The Armed Forces Hospital in Saudi Arabia.	Even though this study has some challenges and limitations in sampling selection of participants, such as gender, course and cultural background, it provides a significant result on which to base a proposed m-learning framework that will be carried out using a case study and validation process. The factor analysis explains the factors that influence the deployment of the m-learning activity. The overall findings reveal an important implication for policy makers and educational practitioners for designing successful m-learning systems.
Mobile Learning Conceptual Framework For Higher Education in Developing Countries	[10]	Theoretical paper	The Proposed mobile learning framework for higher education could be extended to support other leaning systems. This proposed framework could also be adapted to the new mobility technologies. Also, the proposed framework needs to be tested and experimented on universities in developed or developing countries. By applying this framework in some universities, we can measure the enhancement in the learning process in higher education. Furthermore, many studies should be conducted to determine challenges facing deployment and adoption of mobile learning in Higher

			education
Mobile Learning Usage and Preferences of Vocational Secondary School Students: The cases of Austria, the Czech Republic, and Germany	[9]	Austria, the Czech Republic, and Germany	The available academic and professional research on mobile learning is still rather limited, thereby providing an unexplored area for further research activities.
Mobile learning with gamification and augmented reality in portuguese high education	[143]	Portugal	As future work, it would be interesting to continue our research from the student's point of view, and the reality concerning other countries.
Determining Factors That Influence Students' Intention To Adopt Mobile Blackboard: A Case Study At Petra University, Jordan	[64]	Jordan	----
Technology Acceptance Of Smartphones As Mobile Learning Tools: A Contextual Comparative Study Of Engineering And Education Colleges	[17]	New Zealand	First, New research, therefore, should assess the usability of the Smartphone as a learning device by focusing on learners' interactions with the Smartphone. Second, future research investigating social influence on Smartphone use should incorporate a longitudinal design in order to show changes in the new two factors of social influence as proposed. Third, Future research could consider the importance of the habit construct by studying contexts where the use of technology is not mandatory. Finally, Future studies could assess the contextual comparison of technology acceptance even deeper by delving into the subgroups of each context. In addition, future studies can assess the effect of communication mediums as a new construct on the acceptance of Smartphones for education
Making Mobile Learning Work: Student Perceptions and Implementation Factors	[144]		This was a small study and outcomes are clearly subject to sample size bias. Mobile learning options must be further tested to determine a statistically significant evaluation of student adoption, satisfaction, and performance outcomes. More research is also needed to find the most effective content and design for the mobile learning platform.
Implementation Of Mobile Learning Apps In Malaysia Higher Education Instituitions	[15]	Malaysia	Future works will be on development of the framework of m-learning, the designing of apps, and evaluation on the acceptance of students about the m-learning.
An Analysis Of Mobile Learning Acceptance By College Students	[108]	Turkey	Mobile learning research is rapidly growing and expanding. However, there is limited research on mobile learning in higher education using technology acceptance as the theoretical foundation. Mobile learning research in higher education needs to take heed both of the determinants of student usage and of the resources students wish to access. In addition, more research is needed to determine significance of "self-management of learning" as a predictor.
Perspectives of Students' Behavior Towards Mobile Learning (M-learning) in Egypt: an Extension of the UTAUT Model	[24]	Egypt	This paper provides a roadmap the factors that may affect acceptance of mobile learning in schools by students in Egypt through a proposed model and certain hypotheses. The future work is to test the proposed model by using mobile learning application among students from several schools in Egypt to measure if this model can better explain the students' intention to use mobile technology in learning.

Structural equation model for studying the mobile-learning acceptance	[145]	Spain	Future studies could follow the methodology described here to compare behaviors found in other institutions of higher education.
An empirical analysis of the determinants of mobile instant messaging appropriation in university learning	[146]	South Africa	The study was limited to one institution, one department and one case scenario— which might constrain its broader application. To overcome this limitation, the model should be rolled out and tested on a wider scale— within the context of different universities, faculties and departments. The scope of this study was limited to the quantitative analysis of antecedents of learning using MIM. Future studies may need to establish whether trust is really an issue in such MIM learning environments.
Exploring Chinese International Students' Acceptance Of Mobile Learning	[147]	China	-This study focused solely on Chinese international students' acceptance of mobile learning at public universities in America. Future research could study the acceptance of mobile learning by the international students from other countries. Besides public universities, future research could study international students' acceptance of mobile learning in private universities, community colleges or other types of higher education institutions; -This study only utilized a quantitative approach. Future studies may use both qualitative and quantitative research in order to obtain more detailed results on Chinese international students' acceptance of mobile learning;
Modeling Learners' Readiness to Adopt Mobile Learning: A Perspective from a GCC Higher Education Institution	[94]	The Gulf Cooperation Council (GCC) countries	The participants of the study are from only one university and from the same discipline. Hence, the sample data does not necessarily represent all the students in the university from different disciplines. In future, we plan to collect data from participants with different educational background and from different institutions in the GCC to investigate if their demographic data have substantial influence on the perspective of the learners on M-learning technology. Moreover, instructors have a significant role to motivate students for the adoption of this new technology in higher education. Further investigation should be done to identify the instructors' perception of mobile learning and the challenges that they anticipate in adopting this novel learning method in higher education institutions in Gulf region.
Mobile Learning Practice in Higher Education in Nepal	[148]	Nepal	Future research should include other stakeholders, for example, teachers, principals, and parents. Longitudinal qualitative research and experimental research can examine the effectiveness of supervised and unsupervised mobile learning in this context in future.
Towards Acceptance M-Learning Approach in Higher Education in Saudi Arabia	[16]	Saudi Arabia	The present findings highlight a number of promising directions for future research in the implementation of M-Learning in higher education institutions in Saudi Arabia as informed by student acceptance. For example, what might be the requirements for effective informal e-learning systems, given the cultural issues surrounding women in Saudi Arabian communities? And what other cultural factors might influence levels of adoption and acceptance of M-learning in

			Arabic societies? In pursuing these lines of inquiry, it may be useful to engage with ongoing research in other Arabic societies, given the convergence of education policies between these countries.
Mobile Learning: Challenges for Teachers of Indian Open Universities	[149]	India	Future research should endeavour to identify the ways to remove/ mitigate these challenges. E-learning is already implemented by the institutions with well-established policies. Since m-learning is an offshoot of e-learning, there is a need to research if the existing e-learning policies can be adopted as such or if they need to be looked at again as per the requirement of m-learning. Also, due to rapid change in the technology, new challenges will appear which need to be tracked and dealt with.
An Investigation of University Student Readiness towards M-learning using Technology Acceptance Model	[136]	Rawalpindi/Islamabad Universities	The study is limited in terms of sample size and sample selection. The respondents from only three universities were selected using non-random sampling technique. The second limitation of this study is that we have considered only one factor relating to students (i.e., students' readiness to adopt m-learning) affecting their perceived usefulness and perceived ease of use, whereas practically, there can be several other factors which can effect students perception such as social influence, facilitating conditions and faculty support. It is recommended to increase the sample size in future studies and employ random sampling technique to avoid sampling biasness. It is also recommended to include other factors (as mentioned above) to enhance the predicting capability of the proposed model.
A study of EFL college students' acceptance of mobile learning	[150]	India	Firstly, researchers may include actual use behaviors or other external variables in their future studies that might influence students' behavioral intentions on mobile learning. Secondly, the study investigated tertiary level EFL university students from one university. It was suggested that inclusion of more university students or other mobile devices, systems were strongly suggested for future research. Thirdly, the impact of culture on mobile learning acceptance could be studied in experimental settings. Furthermore, many researchers explored students' behavioural intentions toward mobile learning, but few investigated teachers' behavioural intention on mobile learning. It might be interesting to compare teachers' and students' behavioural intention on mobile learning and teaching. Finally, it can include actual use behaviours or other external variables that affect the acceptance of mobile learning, in order to predict and explain users' acceptance of mobile learning in future studies.
Applying UTAUT to Evaluate the Acceptance of Mobile Learning in Higher Education in Iraq	[92]	Iraq	To a future work it is recommended that studies conducted using qualitative approach. Using an interview with experts or focus group of expert might lead to a great discovery of the factors that influence the acceptance of M-learning. Qualitative studies are needed because the m-learning field is still new and emerging field and a qualitative study can uncover the dimension of this

			phenomenon. In addition, It is recommended for future work to include more variable such as the incentive from the university, the policy of the university, cultural factors, previous experience, and IT knowledge.
Pre-Service Teachers' Acceptance and use of Mobile Learning in Malaysia	[89]	Malaysia	The researchers recommend further investigating in this area with several different populations and sample size, as there is limited literature about pre service teachers' acceptance of the use of mobile learning in a Malaysian context.
Teaching and Learning with Mobile Technology: A Qualitative Explorative Study about the Introduction of Tablet Devices in Secondary Education	[57]	Belgium	only perceptions of the participants are examined in this study, while these results challenge teaching practices and the development of learning materials in future research it would be interesting to investigate the impact of such tablets on teaching and learning practices. Additional empirical research is needed to gain further insight into the impact of modern technology on teaching and learning. Future research will be conducted to answer didactic questions such as: how should tablet devices be implemented in class contexts and does the use of tablet computers increase motivation and achievement among students? Research on this topic is still an unexplored area, requiring further in-depth studies.
The Relationship among Self-Efficacy, Social Influence, Performance Expectancy, Effort Expectancy, and Behavioral Intention in Mobile Learning Service	[151]	South Korea	First, it will be necessary for a longitudinal research to accurately track university students' perceptions of self-efficacy and social influence of mobile learning. Second, the managers should focus on e-learning lifelong education in order to grow mobile learning market. Thus, e-learning lifelong education is needed to consider in the future research of mobile learning. Third, additional studies need to consider individual characteristics to understand how people with different characteristics associate self-efficacy and social influence perceptions or actual use of mobile learning.
A Synthesis of Mobile Learning Research Implications: Agricultural Faculty and Student Acceptance of Mobile Learning in Academia	[152]	Theoretical paper	Further research on what mobile learning means in terms of educational practices, as well as student and teacher acceptance is needed. Understanding acceptance and practice in regards to mobile learning will inform instructors as they try to implement the technology in teaching
Investigating Students' Behavioral Intention Towards Adoption of Mobile Learning in Higher Education Institutions of Pakistan	[91]	Pakistan	Future studies can include the investigation of acceptance of mobile learning among students who are currently using D-learning or E-learning tools in their education. Other technology acceptance models can also be employed in the future to further investigate the determinants affecting the students' acceptance of mobile learning
A Systematic Review of the Critical Factors for Success of Mobile Learning in Higher Education (university students' perspective)	[153]	Theoretical paper	The future focus could be to evaluate the impact of individual success factors on the overall perception of the platform. This would quantify the effect of each success factor in precise statistical terms, and it which would be a relevant basis on which to design and implement future m-Learning.
The Effects of Self-Efficacy and Social Influence on Behavioral Intention in Mobile Learning Service	[154]	South Korea	For future research, it will necessary for a longitudinal research to accurately track university students'' perceptions of self-efficacy and social influence of mobile

			learning
Expanding The Technology Acceptance Model (TAM) to Examine Faculty Use of Learning Management Systems (LMSs) In Higher Education Institutions	[155]	United States	Using a purposive sampling approach, data were collected only from two universities; therefore results of the study may be restricted to the particular settings. Replication of this study in other settings and sample groups would help understanding the implications of this extended TAM. Future researchers should strongly consider evaluating the impact of the three significant external variables (system quality, perceived self-efficacy and facilitating conditions) on acceptance and usage behavior of different populations and different LM
A Review of Models and Frameworks for Designing Mobile Learning Experiences and Environments	[156]	Theoretical paper	Future research can consider systematically analyzing and synthesizing this area of research to provide insight on the models/frameworks of technical development of mobile learning applications and systems. Future research efforts could be directed toward examining the aforementioned contributions/areas as well, which will complement this review and provide a more comprehensive picture of the landscape of models and frameworks for mobile learning design and research.
The fundamental factors that influencing mobile learning acceptance in higher education institution	[90]	Malaysia	Future study can investigate more variables such as age, the Effect on the student's perceived use of mobile learning, and perceived acceptance.
Empirical Analysis on Factors Impacting Mobile Learning Acceptance in Higher Engineering Education	[157]	United States	This research study mainly investigated students' acceptance. Thus, there is a great opportunity to investigate mobile learning acceptance among faculties, which may lead to a better understanding of all aspects of mobile learning. second, a more detailed study of the service quality dimensions could be developed not only for presenting relationship between this factor and mobile learning acceptance but also for the purpose of educational system design and mobile learning application development. Last, future studies could also examine the linkage between students' intention to use mobile learning and actual usage when institutional mobile learning applications have been implemented.
"Get Ready to Mobile Learning": Examining Factors Affecting College Students' Behavioral Intentions to Use M-Learning in Saudi Arabia	[158]	Saudi Arabia	This study focused only on students pursuing their undergraduate and postgraduate degrees. Other research that takes into consideration the views of faculty members is encouraged. Further, examining the phenomenon of M-Learning from other perspectives by utilizing other theories such as Decomposed Theory of Planned Behavior (TPB) or by extending the original UTAUT theory with other important factors such as privacy, security, and culture would contribute to the existing body of knowledge in this domain. Examining the role those demographic variables (such as age and gender) can play in moderating the relationships between the independent variables and the dependent one would also be fruitful and useful

Investigating the Factors Influencing Students' Acceptance of Mobile Learning: The Cave Hill Campus Experience	[159]	Jamaica	future work will incorporate the acceptance perceptions of the university lecturers, who are ultimately responsible for the design and delivery of the courses. In addition, m-learning applications are still at an ascent stage of development within the region, therefore it may be challenging for students to visualize exactly how they can be integrated within the traditional modes of delivery. Hence, a second round of surveys is warranted. This should take place after the technologies have gained traction and public discussions among the key stakeholders about the benefits and challenges of m-learning for education delivery, both from an implementation and pedagogical perspective, have been convened.
Toward mobile learning deployment in higher education	[160]	West London	Future research can work to extend the conceptual model globally to other countries" higher education institutes (particularly developing countries). In this direction, other factors for the model might need to be considered regarding to cultural and economic aspects. Second, The research investigated students" readiness and acceptance toward M-learning. It would be useful to investigate lecturers" readiness and acceptance about Mlearning. This investigation is necessary in order to achieve better understand for all part of M-learning equation. Third, future work can utilize other technology acceptance theories to understand students" needs and the factors that affect their acceptance. Last, evaluation of the conceptual model was conducted among students and lecturers. It would be of great value to involve all stakeholders (i.e. leadership and management, technical support, mobile application designers), to reduce potential bias in the resultant data
Impact of contextuality on mobile learning acceptance: an empirical study based on a language learning app	[161]	Germany	Further external variables in the adoption of the TAM model that have been validated in prior mobile learning studies. Further research may tie in to this and include external variables in the path model that refer to social, cognitive, or environmental factors in the context of mobile learning
Mobile Learning-system usage: Scale development and empirical tests	[102]	Australia	First, is the limited ability to generalise the findings. Online survey was employed, and online surveys are not free of limitations. The lack of personal contact with respondent may affect the response rate in web-based surveys more than in other type of surveys. In addition, a higher sample size would lead to make the conclusion more general. Further research may investigate the role of other variables, including users' characteristics, and adding more variables to the original constructs found in the models used for this research. A systematic research may also extend this exploratory study.
Investigating attitudes towards the use of mobile learning in higher education	[162]	Oman and UAE	As a future direction, we are interested to improve the instrument, sampling approach and conduct the same research within the other universities in the other countries in the Arab Gulf region, such as Bahrain, Kuwait and Qatar. Increasing the number of educators will be taken into concern.

			Interviews and focus groups will be considered in collecting the data. According to the results of this study, our next step is to implement M-learning in some of the Arab Gulf region universities that have been participated in this study. Consequently, other surveys will be conducted for examining the students and educators' attitudes.
Predicting the drivers of behavioral intention to use mobile learning: A hybrid SEM-Neural Networks approach	[163]	Malaysia	This study collected data in Malaysia and thus precluding the generalization of the findings to other countries. To more fully reflect on the intention to adopt m-learning, it recommended a cross-country comparison studies for future research. Second, future studies may include the additional variables to better understanding the intention to adopt m-learning.
Technology acceptance and actual use with mobile learning: first stage for studying the influence of learning styles on the behavioral intention	[164]	Mexico	Future studies should expand to different universities and should examine additional academic fields. Furthermore, future studies should also examine the Bring Your Own Device (BYOD) environment while the conditions in the universities will evolve and the students will be allowed to bring their own devices. More findings should be addressed under this condition.
investigation of pre-service teachers' mobile learning readiness levels and mobile learning acceptance levels	[165]	Turkey	Future studies can be conducted to examine pre-service teachers' attitudes towards mobile learning and perceptions about mobile learning. How students' perceptions on mobile learning applications and mobile learning devices and also attitudes towards using mobile learning and instruction through mobile learning are in need of further study. In addition, future studies can be conducted with instructors to analyse instructors' mobile learning acceptance and mobile learning readiness. The readiness and acceptance level of mobile learning of instructors can affect the performance and attitudes of students towards mobile learning.
Exploring the Moderating Role of Perceived Flexibility Advantages in Mobile Learning Continuance Intention (MLCI)	[166]	China	First, findings and implications drawn from this study should be applied with caution, mainly due to the limited data available. Moreover, it is necessary that suppliers of mobile technology, one of the important stakeholders, should be further incorporated into future mobile learning studies in order to gain insights from different stakeholders. Third, due to age differences, it is possible that mobile learning effectiveness and efficiency could be subject to change. Accordingly, more studies should be conducted to investigate the role of the age variable in subsequent mobile learning studies.

Table 5: Summary Of Literature Review On Factors Affecting The Behavioural Intention In Mobile Learning (M-Learning)

Title	Author & Year	Independent Variables	M	Dependent Variables
Determine Factors Influencing Mobile Learning Acceptance in Higher Education Institution of Malaysia: Online Based Learning	[72]	-Readiness -Culture -The cost of service -Compatibility -Perceived Ease of Use -perceived usefulness		-Behavioural Intention To Use -Use behaviour
Determinants of Mobile Learning Adoption in Higher Education Setting	[26]	-Performance expectancy -Effort expectancy -Self-management of learning -Perceived playfulness -Facilitating condition -Social influence		-Intention to adopt
Instructor Acceptance of Mobile Learning in Saudi Arabia: A Case Study of Hail University	[87]	-Performance Experience (PE). -Effort Expectancy (EE) -Social Influence (SI) -Facilitating Conditions (FC)		-Behavioural intention (BI).
Technology Acceptance Of Smartphones As Mobile Learning Tools: A Contextual Comparative Study Of Engineering And Education Colleges	[17]	-Performance Experience (PE). -Effort Expectancy (EE) -Social Influence (SI) -Facilitating Conditions (FC) -Hedonic Motivation (HM) -Price Value (PR) -Habit	-Context -Gender -Education Level	Behavioural intention (BI).
Mobile Learning Technology Acceptance Among Saudi Higher Education Students	[139]	-Performance Experience (PE). -Effort Expectancy (EE). -Social Influence (SI). -Facilitating Conditions (FC). -Mobile Learning Technology Characteristics (MLTC). -Self-Management of Learning (SML).	-Gender -Age -Electronic learning experience	-Behavioural Intention to use M-learning technology (BI) -Use Behaviour of M-learning technology (UB)
The Concept Framework of Structural Equation model of Mobile Cloud Learning Acceptance for Higher Education Students in the 21st Century	[140]	-Basic Digital Literacy -Information Quality -Social Cloud -Perceived Ease of Use -Perceived Usefulness		-Satisfaction -Actual Use
Students' perceptions and readiness towards mobile learning in colleges of education: a Nigerian perspective	[19]	-Performance Experience (PE). -Effort Expectancy (EE). -Social Influence (SI). -Mobile Learning Conditions		-Behavioural Intention to use
A study of EFL college	[150]	-Self-efficacy		Behavioral

students' acceptance of mobile learning		-Compatibility -Perceived usefulness -Perceived Ease of use		Intention of use
The Technology Acceptance of Mobile Applications in Education	[4]	Perceived Usefulness Pace of Technological Innovation Technological Anxiety Easy Interaction Perceived Ease of Use Effective		Behavioural Intention of use
Factors Influencing the Acceptance of M-Learning by Students of Higher Education in Morocco	[8]	-Expected performance -Ease of use -Influence of professors -Quality of service -Personal Innovativeness		Intent to use
Predictive Path Model for Mobile Learning Applications	[107]	-Learning management -Supportive -Content-Based -Context-Based -Collaborative -perceived usefulness -perceived ease of use		-Attitude -Behavioural intention to use -System acceptance.
An Exploratory Study in Nursing Education: Factors Influencing Nursing Students' Acceptance of Mobile Learning	[142]	-Performance Experience (PE). -Effort Expectancy (EE). -Social Influence (SI). -Individual innovativeness (II). -Quality of service (QoS)	-Mobile Device Experience. -Student Readiness to use	Behavioural Intention to use
The Structural Equation Model of Behavioral Intention to Use Mobile for Learning in the 21ST Century	[11]	-Convenience -Basic ICT -Social Interaction -Perceived Ease of Use -Perceived Usefulness		-Attitude -Behavioural Intention to use
The Technology Acceptance Model (TAM) and its Application to the Utilization of Mobile Learning Technologies	[75]	-Perceived usefulness (PU) -Perceived ease of use (PEOU)		-The attitudes toward usage (ATU) of a technology
Determining Factors That Influence Students' Intention To Adopt Mobile Blackboard: A Case Study At Petra University, Jordan	[64]	-Self-Management Learning -Cost -Social Influence -Perceived Playfulness -Performance Expectancy -Effort Expectancy -Previous Experience -Facilitating Condition		Intention to adopt
Influential factors for mobile learning acceptance among Chinese users	[167]	-Pedagogical factors -Social influences -Personal innovativeness		-Behavioural Intention to use
Exploring Chinese International Students' Acceptance Of Mobile Learning	[147]	-Performance Expectancy -Effort Expectancy -Social Influence	-Gender -Age -Voluntariness of use	-Behavioural Intention to use

		-Facilitating Conditions	-Experience	
Mobile Learning Usability Evaluation Using Two Adoption Models	[168]	-Task characteristics -Technology characteristics -Perceived usefulness -Perceived ease of use -Perceived enjoyment -Social influence -Individual characteristics -Usability		-Adoption. -Performance enhancement
An Analysis Of Mobile Learning Acceptance By College Students	[108]	-Performance Expectancy -Effort Expectancy -Social Influence -Facilitating Conditions -Self-Management of Learning		-Behavioural Intention to use
Examination of factors influencing students and faculty behavior towards m-learning acceptance An empirical study	[106]	-Technological skills -Self-efficacy -Device features usability -Service affordability and availability -Perceived usefulness -Perceived ease of use -Prior experience (PE)		-Behavioural intention to use -Attitude (ATT)
Perspectives of Students' Behavior Towards Mobile Learning (M-learning) in Egypt: an Extension of the UTAUT Model	[24]	-Performance Expectancy -Effort Expectancy -Social Influence -Facilitating Conditions -Mobility -Interactivity -Enjoyment	-Gender -Experience	-Behavioural Intention to use
Mobile Learning Utilization: A Proposed Model to Investigate an Important Predictors of Mobile Learning Utilization and Measure The Role of Behavioral Intention As A Mediator Variable	[169]	-Performance Expectancy(PE) -Effort Expectancy (EE) -Facilitating Condition (FC) -Social Influence (SI) -Mobile Self-Management (SM)		Behavioural Intention (BI) Mobile Learning Utilization (MLU)
An empirical analysis of the determinants of mobile instant messaging appropriation in university learning	[146]	-Perceived ease of Use -Perceived Usefulness -Attitude towards Adoption - Flexible learning (Portability, Collaboration, Cost, Learner Control)		-Adoption -Performance
Modeling Learners' Readiness to Adopt Mobile Learning: A Perspective from a GCC Higher Education Institution	[94]	-Performance Expectancy -Effort Expectancy -Social Influence Learners' creativity Learners' mobility		-Behavioral Intention to use

Mobile Learning Practice in Higher Education in Nepal	[148]	-Personal -Technological -Institutional -Parental -Teachers methodology -Time -Peers -Cost		-Mobile learning practice
Towards Acceptance M-Learning Approach in Higher Education in Saudi Arabia	[16]	-Performance expectancy -Effort Expectancy -Lecturers' Influence -Personal Innovativeness -Self-Management		-Behavioral Intention to use
Mobile Learning Applications' Acceptance Model (MLAAM)	[170]	-Perceived usefulness -Perceived ease of use		-Behavioural intention to use
An Investigation of University Student Readiness towards M-learning using Technology Acceptance Model	[136]	-Students Readiness -Perceived usefulness -Perceived ease of use		-Behavioural intention to use
Factors Influencing Intention to Use Mobile Technologies for Learning among Technical Universities Students	[171]	-Performance expectancy -Effort expectancy -Social influence -Perceived playfulness -Self-management of learning		-Behavioural intention to use
Applying UTAUT to Evaluate the Acceptance of Mobile Learning in Higher Education in Iraq	[92]	-Performance expectancy -Effort expectancy -Social influence -Perceived playfulness -Self-management -Facilitating conditions		-Use Behaviour -Behavioural intention to use
International Dialogues on Education: Past and Present	[172]	-Perceived self-efficacy -Perceived usefulness -Perceived satisfaction -Interactive learning environments -Perceived ease of use -Perceived anxiety		-Behavioural intention to use
Pre-Service Teachers' Acceptance and use of Mobile Learning in Malaysia	[89]	-Performance Expectancy -Effort Expectancy -Social influence -Attitude toward using technology -Facilitating conditions -Self-efficacy -Anxiety		-Behavioural intention to use
Mobile learning adoption from informal into formal: an extended TAM model to measure mobile acceptance among teachers	[93]	-Previous experience. -Perceived enjoyment -Self-efficacy -Facilitating Conditions. -Subjective Norm -Perceived usefulness -Perceived ease of use		-Behavioural intention to use

Factors That Influence On the Acceptance of Mobile Learning Services in the Institutes of Higher Education in Malaysia	[173]	-Service quality (Accessibility, Interface Design, Reliability and Response, Content Quality, Personalization, Security and Privacy) -Perceived usefulness -Perceived ease of use		-Use Behaviour -Behavioural intention to use
The Relationship among Self-Efficacy, Social Influence, Performance Expectancy, Effort Expectancy, and Behavioural Intention in Mobile Learning Service	[151]	-Self-efficacy -Performance expectancy -Social influence -Effort expectancy		-Behaviour intention to use
Investigating Students' Behavioural Intention Towards Adoption of Mobile Learning in Higher Education Institutions of Pakistan	[91]	-Performance Expectancy -Effort Expectancy -Social Influence -Facilitating Conditions -Perceived Playfulness -Self-Management of Learning -Attitude Towards Technology		-Behavioural Intentions to use
The Effects of Self-Efficacy and Social Influence on Behavioural Intention in Mobile Learning Service	[154]	-Self-Efficacy -Performance expectancy -Effect Expectancy -Social Influence -Behavioural Intention		-Behavioural Intentions to use
Expanding The Technology Acceptance Model (TAM) to Examine Faculty Use of Learning Management Systems (LMSs) In Higher Education Institutions	[155]	-System Quality (SQ) -Perceived Self Efficacy (PSE) -Facilitating Conditions(FC) -Perceived Ease of Use (PEOU) -Perceived Usefulness (PU) -Attitude toward Using (ATT)		-Behavioural Intention (BI) -Actual Use (AU)
The fundamental factors that influencing mobile learning acceptance in higher education institution	[90]	-Performance Expectancy (PE) -Effort Expectancy (EE) -Social Influence (SI), Perceived Playfulness (PP) -Self-management of learning (SM)		-Behavioural Intention (BI)
Empirical Analysis on Factors Impacting Mobile Learning Acceptance in Higher Engineering Education	[157]	-Performance expectancy -Effort expectancy -Social influence -Facilitating conditions -Self-efficacy -Ubiquity -Attainment value -Self-management -Service quality		-Behaviour intention -User behaviour -Actual use

		-Perceived enjoyment		
Exploring Determinants for Mobile Learning User Acceptance and Use: An Application of UTAUT	[174]	-Performance expectancy -Effort expectancy -Social influence -Student-centric learning -Hedonic motivation		-Behavioural intention
"Get Ready to Mobile Learning": Examining Factors Affecting College Students' Behavioural Intentions to Use M-Learning in Saudi Arabia	[158]	-Performance Expectancy -Effort Expectancy -Social Influence -Facilitating Conditions		-Behavioural intention
Investigating the Factors Influencing Students' Acceptance of Mobile Learning: The Cave Hill Campus Experience	[159]	-Performance Expectancy -Effort Expectancy -Social Influence -Facilitating conditions	-Age -Gender	-Behavioural intention
Toward mobile learning deployment in higher education	[160]	-Performance Expectancy -Effort Expectancy -Social influence (Lecturers) -Quality of Service -Personal Innovativeness	Mobile devices experience	-Behavioural intention
Reliability and Validity Study of the Mobile Learning Adoption Scale Developed Based on the Diffusion of Innovations Theory	[175]	-Relative Advantage -Compatibility -Trialability -Complexity -Observability		-mobile learning adoption
Impact of contextuality on mobile learning acceptance: an empirical study based on a language learning app	[161]	-Perceived Contextual Value -Perceived usefulness -Perceived ease of use		-Behavioural intention
Factors influencing actual use of mobile learning connected with e-learning	[176]	-Performance Expectancy -Effort Expectancy -Social Influence -Facilitating conditions		-Behavioural intention -Actual behaviour
Mobile Learning-system usage: Scale development and empirical tests	[102]	-Performance Expectancy -Effort expectancy -Social Influence -Information Quality -System Quality -User Satisfaction -Information Satisfaction -System Satisfaction		-Behavioural intention to use -Lecturer Attitude (LT)
Predicting the drivers of behavioral intention to use mobile learning: A hybrid SEM-Neural Networks approach	[163]	-Personal innovativeness in information technology -Social influences -Perceived usefulness -Perceived ease of use -Control variables		-Behavioural intention to use

Technology acceptance and actual use with mobile learning: first stage for studying the influence of learning styles on the behavioural intention	[164]	-Performance Expectancy -Effort Expectancy -Social Influence -Satisfaction -Performance	-Experience -Learning style	-Behavioural intention to use -Use Behaviour -Use continuance
investigation of pre-service teachers' mobile learning readiness levels and mobile learning acceptance levels	[165]	-Performance Expectancy -Effort Expectancy -Attitudes Towards Technology		-Behavioural intention to use
Exploring the Moderating Role of Perceived Flexibility Advantages in Mobile Learning Continuance Intention (MLCI)	[166]	-Perceived usefulness -Subjective norm -Self-Management		-Behavioural intention to use
Factors Influencing Students' Intention to Use M-learning	[177]	-Performance expectancy -Effort Expectancy -Social Influence -Facilitating Condition -Self-management of Learning -Perceived Playfulness -Voluntaries of use		-Behavioural intention to use
Applied the Technology Acceptance Model to Survey the mobile-learning adoption behaviour in Science Museum	[178]	-Learning motivation -Job relevance -Learning efficiency -User characteristics -Perceived usefulness -Perceived ease of use		-Attitude -Behavioural intention to use