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Factors Determining Student's Perception Towards Mobile Learning: An Empirical Study of Pakistan's Higher Education

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Abstract

The evolution of mobile technology and its widespread use has prompted educators to research the use of mobile phones for education. Students of all ages use mobile phones not only for communication but also for entertainment, storage of data and accessing information. Many activities like photography have shifted to mobile, data storage has moved to mobiles, watching TV/movies is done on mobiles, internet is mostly accessed from mobiles. However, for learning purposes, use of mobile phones seems to be low. In this research, we identify factors that impact the perception of students towards use of mobiles for learning. These factors include 'knowledge on mobile learning', 'learning method issues', 'device issues', 'financial issues' and 'readiness for mobile learning'. Applying Structural Equation Modeling (SEM), a model is presented based on data collected from 200 business and engineering students, through a questionnaire. Exploratory Factor Analysis (EFA) is conducted to examine the reliability and validity of this model. Our findings reveal that all five variables of this study have correlation with 'perception of students', however, 'financial issues' and 'device issues' have been found to create significant impact on student perception. If these two issues are addressed, student perception towards mobile learning would improve.

Keywords: Mobile informatics; M-learning; Structural Equation Modeling; M-learning model

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Introduction

Mobile technology (m-learning) is considered as an extravagant instrument that has been experienced by the world (Yusri, Goodwin, & Mooney, 2015; Annan, Ofori-Dwumfuo, & Falch, 2018), reasons could be its extra-ordinary growth, high-level development in its technicalities and easy access-ability (Alrasheedi & Capretz, 2015; Clarke, 2014). In the past century, the ubiquitous advancement of mobile devices from luxury item to the basic necessity has been witnessed. Due to the rapid development of technology along with the dramatic growth in demand of mobile devices, their cost has been decreased (Al-Fahad, 2009; Moreira, Ferreira, Santos, & Durão, 2018). Owing to various technological competences, these devices have capability of performing multi-functioning tasks (Tayan, 2017), which were previously handled using several devices. Such modern gadgets are known as mobile devices, which deliver extraordinary facilities to the users (Traxler, 2010).

Literature and background of M-Learning (Mobile Learning)

Research on different dimensions of learning is ongoing, whether its traditional approach, blended learning or web-based learning i.e. E-learning (Porter, et al., 2016) however, the new mode of learning, which is m-learning is still to be explored for further advancements in this modern method of learning (Pettersson & Gil, 2010; Moreira, Ferreira, Santos, & Durão, 2018).

Many researches highlighted that mobile wireless technologies are expanding in recent time (Clarke, 2014), boosting extra-ordinary excitement among academics and practitioners as trend in academic environment has been shifted from traditional approaches to m-learning (González et al. , 2017). Now-a-days, alternative teaching and learning methods have been offered by a large number of institutions of higher education in the form of courses which involve mobile technologies (Al-Emran, Elsherif, & Shaalan, 2016).

Numerous researches have explored different dimensions of usability which help to understand the widespread use of mobile learning. Alrasheedi & Capretz (2015) claimed that this latest mobile platform used for learning is being adopted throughout the world at a very rapid speed, and it will grow even further in the future. However, Iqbal & Qureshi (2012) seem to differ and maintain that mobile learning adoption is taking place rather slowly with deliberation. This difference of findings in separate researches is the basis of serious interest among

researchers (Alrasheedi & Capretz, 2015; Annan, Ofori-Dwumfuo, & Falch, 2018). Therefore, the need is there to further explore different aspects of m-learning so that its usage among students and teachers may be facilitated successfully.

There are multiple services which can be accessed thorough mobile devices, which an individual learner may need, without the limitations of time and space (Melhuish & Falloon, 2010). For this reason Annan, Ofori-Dwumfuo, & Falch (2018) have highlighted the preference of m-learning, as it facilitates more flexible delivery of educational services. Moreover, due to comfortable size, light in weight, audio facility and flexibility in the display of texts (Traxler, 2009; Chong, Chong, Ooi, & Lin, 2011), for learners mobile learning can be considered as a 'tool of choice' along with extra-ordinary academic requirements and facilities (Liu, Li, & Carlsson, 2010).

Research conducted in the Arab Open University in Kuwait, reported that students use smartphones in their homes, in their universities, in the public and recreational places, during transportation and even when they are walking. Mainly, they used the smartphones to perform learning related activities like accessing learning material online, checking classroom schedules, exam dates, report submission deadlines, exam grades, university activities, their attendance, group messages, forum discussions, university notifications, announcements, and making payments online. They also used smartphones for social networking, online buying, media storage and for that privacy, and safety were important reasons for owning/using Smartphones by students (Alzougool, Basil & Almansour, Jarrah,2017).

There are many uses of mobile devices, and these devices are being used by everyone. In educational institutions, discussions are going on about using mobile phones in and outside the classrooms, since more and more students and teachers are using them. The role of a teacher is vital in mobile phone adoption among students, therefore, the attitude of the teacher toward mobile phone use becomes very important.

A study about teachers in Korea, showed Korean teachers' mobile learning attitudes was low in general. The attitude of the female teachers was more positive than male teachers. Secondary school teachers' attitudes on the Mobile Learning was significantly higher than elementary school teachers. The group with more than 15 years of teaching experience showed higher positive attitudes toward mobile learning than those groups that had less experience. Similarly, teachers in the science and computer related subjects were more comfortable using

mobiles as compared to teachers in the languages (Baek, Youngkyun; Zhang, Hui; and Yun, Seongchul, 2017).

The potential for M-learning in Pakistan

In higher education, interestingly students are willing to utilize mobile technology for learning as they feel comfortable with this novel technology (González et al. , 2017), but speculations are raised by many researches regarding lack of understanding in usage of these devices; hence, leading towards lack of its adoption. It is combined with varying technology which decelerated its adoption rate, also caused shortage of research in this new field of learning (Wilen-Daugent, 2009; Kaliisa & Picard, 2017). Also, in many regions of the world, even if spread of m-learning is more rapid, still researches regarding driving factors that trigger m-learning adoption are in short supply (Liu, Li, & Carlsson, 2010; Davison & Lazaros, 2015; Alrasheedi & Capretz, 2015)**.** Moreover, the usage of mobile phone among young people especially in students is expanding exponentially but for enhancing its productive usability and eliminating its downside, more research needs to be done in this field (Porter, et al., 2016). Although there is a wide spread of mobile devices in educational institutes, readiness of students in terms of m-learning has yet to be fully explored specially in developing countries like Pakistan (Cheon, Lee, Crooks, & Song, 2012; Iqbal & Bhatti, 2017).

Research Gap

Several researches supported the opinion that in developing countries wireless technologies can be adopted by educational institutes after examining significant recommendations from developed countries (Barker, Krull, & Mallinson, 2005; Alrasheedi & Capretz, 2015; Annan, Ofori-Dwumfuo, & Falch, 2018)**.** In view of that Yusri, Goodwin, & Mooney (2015) have proposed m-learning variables in teacher's context, however did not test and validate them in proper model form. These proposed variables include device limitations, pedagogical issues, learning method issues, security issues, knowledge issues, readiness issues, training, as well as cost concerns. In present research, we are testing five proposed variables on student's perception in terms of m-learning in Pakistan's context, especially in higher education sector. Specifically, in present research following research question would be addressed:

Q.1 Which of the proposed variables have positive correlation with perception of mobile learning?

As learning through mobile devices is still in its infancy in Pakistan, a lot of work needs to be done for implementing its usage in our educational environment especially in higher education institutes (HEI), as people use mobile devices only for entertainment and other purposes due to lack of its educational usage awareness. While, this research work aims to fill in some gaps by empirically testing and validating that how many of proposed variables have correlation with mobile learning, it can also provide assistance to transcend this area of study and to build grounds for future research in mobile learning.

Research Objective

The basic goal of this research is to investigate the student's perception in terms of usage of mobile devices for educational purpose especially in terms of proposed variables. Also this research paper articulates an in-depth argument that throws light on the validity of applying proposed variables to the domain of m-learning. Subsequently, it will lead to better understanding and wider adoption of m-learning in future.

Theoretical framework

Mobile Learning Theories

Previous literature (Keskin & Metcalf, 2011; Nikou & Economides, 2017) reported that mobile learning has its roots in numerous technology adoption theories (Bean & Bradley, 1986), Behaviorism (Smith & Ragan, 2005), The Unified Theory of Acceptance and Use of Technology (UTAUT) (Venkatesh et all., 2003), Constructivism (Bruner, 1966), Cognitivist theory (Good & Brophy, 1990), Consumer Behavior Theory of Reasoned Action (Ajzen & Fishbein, 1988), Problem based Learning (Koschmann et all., 1996), and Location-based Learning (Johnson et all., 2009).

Underlying Theories

Especially three "The Cognitivist Theory, The Unified Theory of Acceptance and Use of Technology (UTAUT), and The Theory of

Reasoned Action (TRA)" were taken because their underlying tenets are best suited with research model and linked hypothesis. Moreover, two variables i.e. device issues and learning method issues are relevant to Cognitivist theory (Good & Brophy, 1990), as theory is related to image, text, audio, video, multi-media, font, display, and animation. Furthermore, Readiness and knowledge of m-learning are linked to the factors explained in UTAUT model (Venkatesh et all., 2003), which relates to performance expectancy, effort expectancy, social influence, and facilitating conditions. Finally, financial issue is associated to Theory of Reasoned Action (Ajzen & Fishbein, 1988), as consumer makes buying decisions by considering outcome first in his mind. Therefore, according to underlying theory, every student would spend money on m-learning by considering outcome and benefit due to numerous financial concerns.

Theoretical Model and Construction of Hypothesis

Student Perception Towards Mobile Learning

Student perception regarding technology and its advancement has been altering due to multiple factors in recent time (Pettersson & Gil, 2010; Annan, Ofori-Dwumfuo, & Falch, 2018). Their communication style is varying along with the content and their conversation approach, which has been assisted by advanced technology. It also depicts the shift in perception of a student in terms of learning and education as innovative techniques are being adopted in educational institutes now-a-days (Andrews, et al., 2010).

Along with changing trends of societies and its commodities, Franklin (2011) and Porter, et al (2016) highlighted facts regarding the changing advancement in mobile technologies that encounter our lives, which also include Web 2.0 equipment, advanced virtual setting, and virtual environments that immensely provide comfort to the learner in terms of 24/7 learning opportunities.

Knowledge on Mobile Learning

Knowing the numerous benefits which awareness of mobile technology bring, Wu, Jim-Wu, Chen, Kao, Lin, & Huang (2012) and Kaliisa & Picard (2017) spend a lot of time analysing which tools people would need. They were convinced that untill people are properly equipped

with the knowledge they need to use the mobile phone technology, it would not be possible to implement this tenology and draw any benefit.

Whereas Alrasheedi & Capretz (2013) highlighted success indicator for educational institutions, since they were convicned that in this digital age, educational instititons are bound to incorporate the latest technologies so that these technologies are put in practice by the learners and are spread widely. Among many unique features, one of the features highlighted by Heflin, Shewmaker, & Nguyen (2017) is combined learning because it enhances the knowledge of learner. More precisely, if students would have enough knowledge of how to use mobile, then they may use it. However, if they do not have proper knowledge then they will not prefer it. Consequently, awareness would be most important factor for them. Therefore, following hypothesis is proposed based on above discussion:

H1: Knowledge on mobile is positively associated with student's perception towards mobile learning.

Financial Issues

In the past era, mobile phone was only considered as a luxury item due to high cost, scarcity of resources and it's less production (Bahry, Anwar, Amran, & Rias, 2015). Whereas, with the rapid advancement in technology, increasing demand and more availability due to multiple production companies, which also imitate leading companies, its cost has been decreased and now-a-days it has been thought as a basic necessity instead of luxury item (Heflin, Shewmaker, & Nguyen, 2017).

Mobile devices have also eliminated many financial issues by providing reasonable and abundant access to learning (Korucu & Alkan, 2011; Ferreira, Klein, Freitas, & Schlemmer, 2013). Moreover, these devices have excelled in providing efficient web access and high speed functionality to the users as compared to any other technology (Melhuish & Falloon, 2010). Accordingly, these mobile devices may provide unique academic value due to its low cost factor in compare to its functionality and benefits (Andrews, et al., 2010; Bahry, Anwar, Amran, & Rias, 2015). Due to the decreased costs of mobile phones and telecommunication system, learning trend of universities towards m-learning is expected to continue and increase as well (Alrasheedi & Capretz, 2013), therefore in line with this discussion following hypothesis is presented:

H2: Financial issue is positively associated with student's perception towards mobile learning.

Readiness on Mobile Learning

Yusri, Goodwin, & Mooney (2015) and Annan, Ofori-Dwumfuo, & Falch (2018) highlighted another aspect that in order to provide relaxation of time and space facilities to the people specially for learning process, small and portable devices have been vastly leveraged in present time. This factor has also been fueled by the increased usage of laptops and notebooks in our learning process to enhance the readiness of students for academic purpose (Clarke, 2014).

Moreover, researches done by Andrews, Smyth, Tynan, Berriman, Vale, & Cladine (2010) and Iqbal & Qureshi (2012), on the readiness of mobile learning draw a strong point that mobile learning offers several unique features to users that were not possible in traditional learning platforms and even in e-learning to some extent. Possible advantages include but are not limited to anytime/anywhere access to media-rich content, enhanced interaction between peers, differentiation of learning needs, bespoke learning, reduced cultural barriers and facilitation of collaboration through synchronous and asynchronous communication. (Arpaci 2015). Thus, if students are already using mobiles, then they are likely to use it for learning as well. Based on aforementioned discussion, following hypothesis is proposed:

H3: Readiness of students is positively associated with student's perception towards mobile learning.

Device Issues

Mobile device issues range from display of material, numerous security and connectivity issues, resource poverty, storage capacity, font size, display of graphics, battery problem and management of viruses (Aminzadeh, Sanaei, & Ab Hamid, 2015; González et al. , 2017). A number of researches highlighted that due to potential benefits and less complication in advance devices, these have dominated student's lives, and also hurdles causing factors have been eliminated from advanced phones for the ease of people (Traxler, 2010).

Therefore, students prefer mobile devices over tablet, desktop, laptop and other devices by considering them more user-friendly, easy to carry and use due to light weight, easy functionality, appropriate screen size, clear font size, attractive graphics and other added factors (Porter, et al., 2016). Thus, due to enhanced and easy functionality, mobile devices are affordable and popular among middle and lower income groups which increased the circulation of these devices in recent time (Ferreira, Klein, Freitas, & Schlemmer, 2013). Based on above discussion, the following hypothesis is postulated:

H4: Device issue is positively associated with student's perception towards mobile learning.

Learning Method Issues

After considering literature it has been found that students prefer mobile phones over other devices (Alrasheedi & Capretz, 2015), because they consider it more personal gadget as compared to others due to its user friendly learning methods. Korucu & Alkan (2011) stated that m-learning appeared as a final point of co-evaluation of 'mobile informatics' and e-learning domain, which makes it a candidate system in order to fill in the gaps of former distance learning approaches using mobile technologies. Thus, it highlighted that learning through mobile devices is easier, advanced and less complicated then mobile informatics which include laptops, tablets, computers, pocket PCs, portable media player and other mobile devices (Chong, Chong, Ooi, & Lin, 2011; Clarke, 2014).

Whereas many authors have given arguments in favor of effective learning approaches through mobile phones, in line with Joo-Nagata, Abad, Giner, & García-Peñalvo (2017) learning method is considered one of the key elements in terms of m-learning. Therefore, following hypothesis is presented based on aforementioned discussion:

H5: Learning method issue is positively associated with student's perception towards mobile learning.

Theoretical Model

The model of the present research has been shown in figure 1:

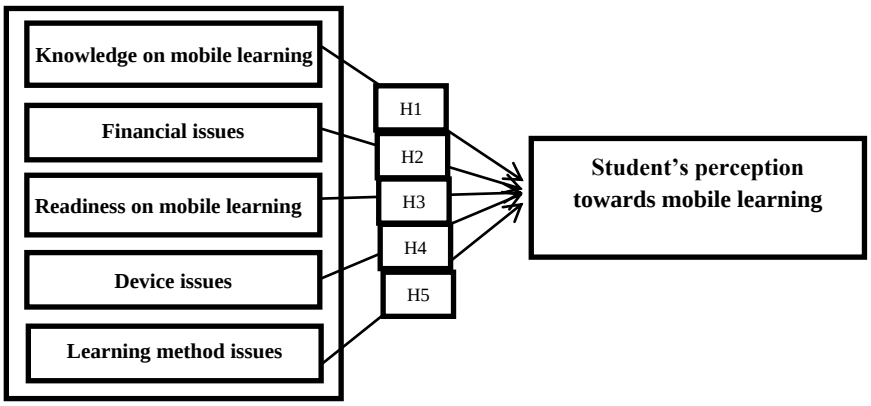

Figure 1: Proposed M-learning model

Research Methodology

The research regarding the above stated factors is descriptive in nature in which quantitative method has been used in order to conduct this work. Convenience sampling has been done by using cross-sectional technique. This type of technique can be used to describe characteristics that exist in a community, but not to determine cause-and-effect. While this type of study cannot demonstrate cause-and-effect, it can provide a quick look at correlations that may exist at a particular point. Data has been collected from various undergraduate and post graduate students of different universities in which perceptions and opinions of engineering students and Business students regarding mobile learning have been collected. Our questionnaire consisted of two sections. In total, there were 31 questions, 5 relating to the demographic segment (i.e. section one), and 26 questions were related to the constructs of our proposed model (i.e. section two). A five point Likert scale has been used for questions in section two. In order to test the reliability of questions, short pilot test has been conducted then questionnaire has been distributed to different classes of students of three leading public universities in Lahore, Pakistan. Students of university (undergraduates and postgraduates) are used in abundant studies in which researchers have focused them in order to evaluate m-learning system (Motiwalla, 2007; Heflin, Shewmaker, & Nguyen, 2017; Annan, Ofori-Dwumfuo, & Falch, 2018), and were relevant in context of research. Moreover, these students belonged to Business Administration, Engineering program, Health Sciences and other academic areas. In this survey, out of the total relevant study population of 8800 students, a total of 270 students participated; most of which had some prior knowledge with regard to m-learning. While a total of 200 questionnaires were considered useful due to skewness and normality concern (see table 1).

Table 1

Respondent demographics' data

Gender	Male	60% (120)
	Female	40% (80)
Degree Program	Intermediate/A-level	1% (2)
	Bachelors	65% (130)
	Masters	34% (68)
	Ph.D.	
	Other area	
Study Area	Business Administration	51% (102)
	Engineering	48% (97)
	Health Sciences	.5% (1)
	Sciences or Liberal Art	
	Other area	
Household Income (Monthly)	Below Rs. 30,000	17.5% (35)
	Rs. 30,000 - Rs.50,000	25% (50)
	Above Rs. 50,000 – 100,000	29.5% (59)
	Above 100,000	28% (56)
Age	Less than 18	2% (4)
	19 – 23	83% (166)
	24 – 30	14.5% (29)
	Above 30	.5% (1)

Survey Material

In section two, previously validated survey material has been utilized i.e. questions. Furthermore, small adjustments were made to the survey questions in order to make them appropriate to the m-learning environment.

Original M-Learning Constructs

Previous literature suggested many factors and variables that were considered significant for m-learning process (Liu, Li, & Carlsson, 2010; Hao, Dennen, & Mei, 2017). The 20 questions in present research, comprised of five independent dimensions of m-learning, adapted from

Yusri, Goodwin, & Mooney (2015). Whereas, 6 survey questions regarding dependent dimension (Student's perception towards mobile learning), were taken from Al-Fahad (2009). However, questions were contextually changed in order to ensure suitability in regard to mobile learning.

Data Analysis and Results

In order to conduct data analysis, SPSSv19 and AMOS 22 were used in this study. Moreover, SPSS has been utilized for basic research statistics, and AMOS to support regression (i.e. Structural equation modeling) and model testing. Results of this research paper are presented in three sub-sections relating to respectively: i) Reliability and Validity, ii) Exploratory Factor Analysis and iii) Fitness of results.

Reliability and Validity

In order to analyze the reliability of scale, Cronbach Alpha (Cronbach, 1951) has been checked for the purpose of measuring internal consistency. For all questionnaire items, the Cronbach Alpha is 0.797. The Cronbach alpha values for all the constructs of our mobile learning are shown in Table 2. All Cronbach alpha values are greater than (>) 0.70, which indicates that all variables are highly correlated and interchangeable (Jarvis, Holford, & Griffin, 2003).

Table 2

Scale Reliability

Factor Label	Number of Items	Cronbach's alpha (α)
Knowledge on mobile learning	5	0.938
Learning method issues	4	0.916
Device issues	3	0.803
Financial issues	3	0.747
Readiness on mobile learning	5	0.927
Student perception of mobile learning	6	0.917

Terms that are measuring the same constructs, are demonstrating high construct loadings, i.e. exhibiting adequate convergent validity. According to Hair, Anderson, Tatham, & Black (1998), for a sample size of 200, the minimum threshold value recommended is 0.350. Thus all

loaded values are above 0.50, ensures that the constructs are having sufficient discriminant validity and no unexpected cross-loading occurred (see table 3).

Table 3

Discriminant and convergent validity

Composite Reliability	**Constructs**	**Readiness on mobil learning**	**Student perception towards m-learning**	**Knowledge on mobile learning**	**Learning method issues**	**Financial issues**	**Device Issues**
0.856	**Readiness on mobile learning**	**0.816**					
0.918	**Student perception towards m-learning**	0.078	**0.806**				
0.933	**Knowledge on mobile learning**	-0.108	-0.088	**0.861**			
0.927	**Learning method issues**	-0.046	-0.175	0.358	**0.847**		
0.709	**Financial issues**	0.110	0.441	-0.001	-0.198	**0.672**	
0.712	**Device Issues**	0.198	0.544	-0.032	-0.069	0.370	**0.624**

After analyzing the scale reliability, convergent and divergent validity was tested. Establishment of convergent validity can be done if two indicators correspond to each other. Whereas, divergent validity is such unit by which differentiation between two dissimilar constructs can be analyzed.

Table 4

Pattern Matrix[a]
Extraction Method: Principal Component Analysis. Rotation Method: Promax with Kaiser Normalization.
Rotation converged in 5 iterations.

	Component					
	1	2	3	4	5	6
Student perception Q6	.885					
Student perception Q5	.876					
Student perception Q1	.851					
Student perception Q4	.820					
Student perception Q2	.799					
Student perception Q3	.753					
Knowledge on mobile learning Q1		.947				
Knowledge on mobile learning Q4		.942				
Knowledge on mobile learning Q2		.925				
Knowledge on mobile learning Q3		.833				
Knowledge on mobile learning Q5		.816				
Learning method issues Q3			.910			
Learning method issues Q2			.901			
Learning method issues Q5			.895			
Learning method issues Q4			.848			
Learning method issues Q1			.834			
Readiness on mobile learning Q2				.886		
Readiness on mobile learning Q3				.874		
Readiness on mobile learning Q1				.871		
Device issues Q4					.817	
Device issues Q3					.761	
Device issues Q2					.709	
Device issues Q1					.619	
Financial issues Q2						.812
Financial issues Q3						.763
Financial issues Q1						.762

Exploratory Factor Analysis (EFA)

To observe the adequate correlation among variables i.e. whether reliability and validity criteria has met or not, Exploratory Factor Analysis using Principal Component Analysis, with Promax rotation has been done (see table 4). Two reasons have been pointed out for the selection of Promax, first because of our large sample size i.e. n=200, and secondly since Promax has been considered as a suitable tool at the correlation of multiple factors. No question has been dropped because all questions loaded well in pattern matrix. Moreover, six factors which were loaded in the pattern matrix (Table 4) were used for further

examination. Factors were having cumulative variance value as 72.55%. Each variable was having all the communalities significantly high i.e. all were above 0.300, with most being above 0.700. For this research data, the Kaiser-Meyer-Olkin and Bartlett's test for sampling adequacy was significant, displaying that there was significant correlation among all variables (see Table 5)

Table 5

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.843
Bartlett's Test of Sphericity	Approx. Chi-Square	3682.728
	Df	325
	Sig.	.000

Fitness of Result

The prominent factors of mobile learning have been tested in proposed model of this study in order to measure the perception of students regarding mobile learning. Subsequently, five hypotheses were tested as independent variables i.e. the five proposed dimensions of mobile learning. At the P <0.05 level, two dimensions were recognized to positively relate to the student's perception regarding mobile learning, i.e. Financial issues and Device issues. Knowledge on mobile learning, Learning method issues and Readiness on mobile learning were not found to be significant at this stage of our study. In table 6, Regression weights are given. Thus, in line with this our research work consequently confirms hypotheses H2 and H4; confirming Financial issues and Device issues are positively associated with the perception of student's regarding mobile learning.

Table 6

Regression Weights

		Estimate	S.E.	C.R.	P
Student perception <---	Financial Issues	.334	.078	4.285	***
Student perception <---	Learning Method Issues	-.037	.045	-.821	.412
Student perception <---	Readiness	.003	.050	.061	.952
Student perception <---	Device Issues	.612	.090	6.778	***
Student perception <---	Knowledge on m-learning	.016	.050	.329	.742

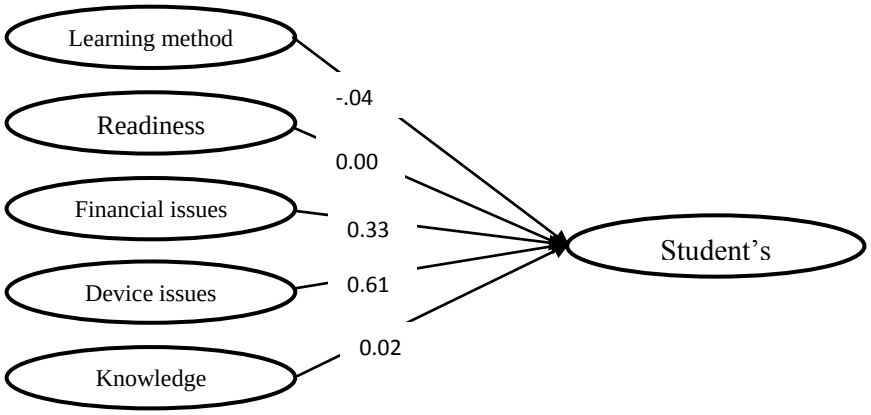

Figure 2: M-learning model with path coefficients

Depending on the tests and their analysis, fitness values of entire data are within acceptable criteria limits, thus indicating a good model fit (see table 8). Our Chi-square/DF value is 1.979, REMSA value is 0.070, whereas CFI and NFI values are 0.907 and 0.841 respectively; signifying goodness of fit, consequently they support the result and are validating the proposed model. Furthermore, correlations among variables are also shown in table 7.

Table 7

Correlations Matrix

	Student perception of mobile learning	**Knowledge on mobile learning**	**Learning method issues**	**Readiness on mobile learning**	**Financial issues**	**Device issues**
Student perception of mobile learning	1.000					
Knowledge on mobile learning	.002	1.000				
Learning method issues	-.037	.237***	1.000			
Readiness on mobile learning	.070	.021	-.011	1.000		
Financial issues	.366***	-.058	.004	.053	1.000	
Device issues	.482***	.023	.014	.125*	.252***	1.0001

***. Correlation is significant at the 0.001 level (2-tailed).

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 8

Goodness of Fit Statistics

Index	Value	Criterion
Chi – Square /Df	1.979	1.0 – 3.0
RMSEA	0.070	0 – 0.1
CFI	0.907	0 ~ 1
NFI	0.841	0 ~ 1

Discussion

In education sector, the dominance of wireless technologies is enhancing, thus leading to an increase of research in the domain of m-learning. This paper investigates the perceptions of different classes of university students towards usefulness of mobile learning in their course of education. The answers of the quantitative questions in the surveys have been analyzed in order to gain an understanding regarding the view of university students towards the usage of mobile devices in learning atmosphere. This notion is supported by majority of students that in learning, wireless devices enhance the flexibility of access to resources; moreover, work could be done independently through these variable resources as compared to lab or library PCs. The students also favored to use all sources of mobile learning approaches through their PDAs, laptops and mobile devices in order to gain access to information at anytime and anywhere.

Our findings are in line with the work of Yusri, Goodwin, & Mooney (2015) in which they concluded that aforementioned discussed factors are important for mobile learning. Since due to device problems, students are reluctant to use mobile phones for learning, therefore if these issues will be resolved then due to easy availability and less cost, students would not face much problem in purchasing phone, ultimately leading towards usage of phones for learning process. Moreover, now-a-days more universities are providing content online, which is a great source for enhancing their knowledge and may be easily accessed through mobiles. Once students will start using mobiles in their routine lives then due to frequent use their readiness to learn through this approach will also enhance, additionally by getting content from teachers through mobile phones will also narrow down their learning method issues. Eventually, universities and teachers should also include such content and system that facilitates access or learning through mobile phones. In education sector, wireless technologies impact readiness, portability and collaboration, as well as, result in benefits for students.

Conclusion

The analysis of this study, thus, highlights the fact that mobile learning is widely welcomed by the students. In order to gain insight regarding student's perception, we propose a model for measuring their acceptance towards m-learning, which comprises of five independent variables i.e. Knowledge on mobile learning, learning method issues, device issues, financial issues and their readiness towards m-learning. The objective behind this study was to investigate the likelihood of usage of m-learning by university students in higher education. Our research confirms hypotheses **H2** and **H4**; i.e. validating that financial issues and device issues has positive association with student's perception towards m-learning.

Hence, this study concludes that positive perception of students towards m-learning is dependent upon these two significant issues prescribed in the model which cause inverse effect on student's perception. These issues need to be eliminated or taken care of so that a well-defined m-learning process is achieved. The research model highlights the prominence of taking into account all these five proposed dimensions for successful adoption of m-learning in higher education institutions.

Limitations

The present research has some limitations that would provide opportunities for future work. Data has been collected from two public universities, as present research has not included individuals outside the educational domain and not even from outside the Pakistan's boundaries. Moreover, to make the outcome generalizable to larger population, constructs used in this study may also be re-tested with a larger sample size.

Recommendation

The integration of mobile learning is happening rather quickly in education in the recent years and this trend will prevail in the future as well. Plenty of novel ways of learning will be enabled by mobile phones which will facilitate learning beyond the classroom setting. It is therefore vital for education providers to create teaching and learning content which is easily accessible on regular mobile phones which are within the

buying power of most learners. It is equally important for learners to make use of mobile phones and other latest portable devices which may be used for learning, as delivery of content through these devices will only increase in the future.

Implication

Since use of mobile devices are on a rise, teaching and learning content creators are forced to create content which is suitable for these devices. The screen size, weight, storage capacity, software and other features of mobile devices have to be kept in mind by the content designers so that the content can be easily accessed through these mobile devices. This will change how teaching and learning content is created and shared.

Similarly, learners will adopt how they access the learning content ubiquitously. When choosing mobile devices, potential learners will choose mobile devices not only for calling and messaging, but also for accessing learning content. Therefore, it will impact their choice of mobile phones. Mobile phone companies will focus on designing mobile phones which are not only economically priced, but also use friendly and feature rich.

Future Work

In the near future, next generation of wearable gadgets and enriched technology settings will be majorly adopted by learners, where these technologies will be part and parcel of a repertoire of devices and other social networking mediums. This will enable the provision of opportunities for learners along with expansion of knowledge regarding multiple cultures. Most importantly, policy makers, instructors and learners should be capable of fully grasping and understanding these opportunities in order to avoid consequences caused by losing them. Moreover, future work can be done to overcome the aforementioned limitations by broadening the area of investigation to diverse contexts and countries, in order to get the wider generalization of the study. Finally, survey questionnaire has been used in this study for data collection it may be interesting to replicate present study using in-depth interviews.

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