Factors Affecting the Use of Mobile Learning in Higher Education: An Iranian Context

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Abstract: The aim of the present study was to investigate the factors influencing the use of mobile learning in the higher education milieu. The research has used the descriptive survey methodology. The participants in this study were 265 professors at Shahid Beheshti University, Tehran, Iran. These participants were chosen randomly. The data were collected by a questionnaire consisting of 42 questions. The questionnaire was developed through a review of existing literature in this field. The reliability of the questionnaire was measured 0/89, using the Cronbach's alpha with SPSS software. To analyze the data and identify the factors, the exploratory factor analysis was run. The results revealed the factors affecting the use of mobile learning in higher education from the perspective of teachers, including technical and technological factors, Attitude factors, personal factors, skills and knowledge factors.
Keywords: Higher education, mobile learning, contributing factors, Shahid Beheshti University, Iran.

1. Introduction

In recent epoch, with the realm of technology growing apace exponentially, various facets of mankind's lives have experienced radical changes concurrently. Meanwhile, the turf of education has also enjoyed its share of changes. The fast changes in the technologically oriented areas have culminated in fundamental alterations in different levels of education which include, inter alia, the methods of training, the methods of presenting, space and time. The current advances in the internet technology have fostered the electronic learning tools for the distant learning. Furthermore, they have generally facilitated the processes of learning and have boosted the interactions amongst the learners and

teachers or professors and also have improved their cooperation in different learning activities such as cooperative and learning, discussion and problem solving (Sarrab, Al-Shihi, & Al-Manthari, 2015). In effect, given the aforementioned alterations and improvements, the higher education also, as one of the quintessential entities among the educational organizations, is faced with novel needs and demands. The scrutiny of the transferable devices and Wi-Fi technology has demonstrated that these facilities have spawned significant socio-economic changes in people's lifestyles. Nowadays, a sundry of portable technological tools has been manufactured to which people have accustomed. This equipment is revolutionizing the quotidian lives of the individuals from different perspectives (El-Hussein & Cronje, 2010). With respect to the way we represent our teaching and learning in the area of higher education, a set of fundamental changes will surface among the professors, students and the community which could result in dissatisfaction over the quality of the educational experiences. The improvement of the technology in a society (e.g. internet, laptop, wireless communication, phone calls, satellite communication, TV cables, games and simulations) and consequently the technological innovations have brought about limitations in the sphere of research and management. Meanwhile, the innovations in technology in the domain of teaching and learning—pinpointing and diagnosing the available topics and specific needs of qualitative learning experiences pertinent to higher education— presents a new uncharted territory.

With the technological advancements such as internet, network and portable instrument becoming more and more prevalent, issues like novel methods of distant learning and, on broader terms, electronic learning become more highlighted. E-learning is adopting information and communication technology such as internet and multimedia for enhancing the learning quality through facilitating the access to the educational resources and services and providing the required paraphernalia like interaction and cooperation through distant methods. As a consequent of utilizing electronic learning, mobile learning, which as a subcomponent of E-learning provides more opportunities for learning, also has found its place in the education domain. The mobile learning can be deemed as a part of the electronic learning in which learning takes place through the use of portable wireless devices and gadgets such as mobile cell phones and smart phones, laptop, notepads and PCs (Attewell, 2005).

In not too distant a future, the educational institutes will not have any choice but—for maintaining their status and in a competitive fashion—enhancing their methods based upon the learners' needs. Before implementing the novel approaches of the M-learning, however, the perspectives and needs of the learners and teachers—more generally, stake holders—ought to be taken into account (Cheon et al, 2012). In the domain of higher education, the exact and appropriate implementation of the M-learning is not envisaged possible without active cooperation's of the teachers and students. The acceptance and

integration of the M-learning are to a large extent dependent on the personal perspectives of the learners and users. For instance, Liaw, Huang & Chen (2007) claim that the personal views are amongst the most important and unique factors in using technology. Therefore, for improving the use of M-learning in learning contexts, having a sound understanding pertained to the users' perspectives is absolutely essential. The individual backgrounds, as one of the three important factors (i.e. individual backgrounds, organizational backgrounds and social backgrounds) has been defined in the domain of communication and information technology (Park, Nam, & Cha, 2012). Given the fact that mobile learning opens a new horizon for using technology and adopting useful mechanism for enriching the learners' and teachers' experiences at the universities (Hamat, Embi, & Abu Hassan, 2012), the universities are equally attempting to move towards the fast technologically oriented advancements; these processes of keeping update and moving hand in hand with technological expansions are being implemented through the augmentation of openness to or acceptance of such technology and improvement in the learning and training procures. Ahmadi et al (2013) studied the attitudes and technical knowledge of the farmers in Zanjan province, Iran towards the application of the M-learning and training. They found that the farmers' attitudes towards the educational and training organization was at an average level. The mean score of the technical knowledge of the farmers with regard to M-learning was 9/67 from 20 which signals their low level of knowledge in this regard. Iqbal and Bhatti (2015) found that the initial skills of the students and their psychological readiness or openness for the use of new technological tools, are influential in the degree of use and their understanding of the usefulness towards M-learning. In a study by Parsons & Ryu (2010), with the aim of positing a framework for the evaluation of the quality of learning, it was revealed that M-learning from the technical perspective has some pitfalls. The limitations include small screen size, limitations in the storage of the information and low quality resolutions in some of mobile learning tools. They, furthermore, found that the application of the learning tools from the viewpoint of software have some limitations such as the inability to download some practical applications, the lack of support for operating systems and the absence of supporting software platforms for mobile learning in some of these devices, lack of internet connectivity during travel and the unavailability or high cost for public access to the PC, laptops or tablets.

As the review of the literature reveals, most of the studies done in the realm of M-learning have zeroed in on the area of attitudes' assessment towards agricultural training; therefore, the application of the M-learning in the formal learning contexts and particularly higher education has not been much dealt with. In this regard, this calls for a particular research desideratum with a zoom on the influential factors in the application of the M-learning in higher education. The results of the present study will be useful in the utilization of the facilitating technological tools in the educational milieu.

2. Methodology

This research is a descriptive survey. In terms of purpose it is practical and is part of the fieldworks. The population in the study is comprised of all the professors at the University of Shahid Beheshti, Tehran, Iran. Using the Krejcie-Morgan-sample-size table**,** 265 individuals were chosen by the purposeful sampling. The instruments used for gathering information in the study were questionnaire developed by the authors. For developing such questionnaire, first the literature and the background were examined; then, based upon the done researches, 42 components, which seemed to be influential in the application of the M-learning, were chosen and a 5-licart scale questionnaire was developed. The questionnaire was content analyzed by the experts in the field and after the final analyses its face validity and content validity was confirmed. For analyzing the reliability, Cronbach's alpha was used. In this regard, 30 questionnaires were piloted by the participants and the Cronbach's alpha was 0/89, which demonstrates that the research tool has the required reliability. The data in this research were analyzed by the exploratory factor analysis. The test of Kaiser-Meyer-Olkin (KMO) was run for the adequacy and fitness of the data. The calculated quotient (0.87) demonstrated that the coefficient between the data was seemed to be appropriate for the factor analysis. The chi-square (X2) of the Bartlett's test showed that the observed correlation matrix does not belong to a community with uncorrelated community; therefore, the data can be analyzed through the factor analysis. After the factor analysis of the items in the questionnaire, 32 items were found to be loaded appropriately and the rest of the items were excluded. Below the results are given.

3. Results

In order to answer the research question and to analyze the influential factors in applying the M-learning in higher education, factor analysis was performed. The results will be provided below.

Assumption	Amount
Kaiser-Meyer-Olkin (adequacy of the sample)	0.89
Bartlett's test	547.865
Significance	0.05
Degree of freedom	45

Table 1. The results of the Kaiser-Meyer-Olkin and Bartlett tests for the adequacy of the sample and the coefficient among the variables.

For analyzing the possibility of performing the factor analysis and the adequacy of the sample, first the Kaiser-Meyer-Olkin and Bartlett tests were run. As shown in Table 1, the number 0.89 for the Kaiser-Meyer-Olkin test signals the adequacy of the sample because the scholars have contended that for the Kaiser-

Meyer-Olkin test, the values between 0.5 to 0.7 show modest factor analysis, 0.7 to 0.8 average factor analysis and 8.0 to 9.0 an optimal factor analysis and greater than 9.0 indicates ideal factor analysis (Field, 2009). The Bartlett's test also shows that the coefficient matrix of the data is not zero in the population and therefore is a justifiable factor finder. The results shown in Table 1 reveal that all the required assumptions for running the factor analysis are observed and it is safe to use this approach.

Factor	Special value	Variance percentage	Density percentage
1	8.2	19.3	19.3
2	5.2	13.5	32.8
3	4.6	11.8	44.6
4	3.8	9.9	54.5
5	3.1	7.6	62.1

Table 2. Factors, special value, variance percentage and the density percentage for the factors in the questionnaire

As shown in Table 2, 5 factors have been identified as the influential factors in applying the M-learning which determines an aggregate of 62.1 variance of inapplicability. These five factors have been identified with the consideration of the special value higher than 1. Following, the coefficient matrix of the items and the five factors after circulation in Tables 3 to 7. The mentioned items, because of the compatibility and their loadings, are categorized five levels. It should be noted that in presenting the tables, the loadings greater than 0.50 have been expressed.

Items of the first factor: Technological factors	*Factor loading*
Access to satisfactory broadband	0.85
Benefiting from convenient mobile reception	0.83
Satisfactory access to the Internet for the cell phone and laptop	0.76
Benefit from Bluetooth	0.71
Having access to the related software	0.65
Benefit from short and multimedia message services individually and in group	0.64
Providing appropriate wireless coverage in the required locations	0.59

Table 3. Factor loadings from the factor solution with varimax rotation (first factor)

With regard to the elicited results in Table 3, the seven items (variables) have correlation and compatibility with the first factor (technical and technological factor). From amongst the mentioned items, benefit from satisfactory broadband with the loading factor of 0.85 seemed to have the highest correlation. The factor providing appropriate wireless coverage in the required locations seemed to have the lowest correlation with other factors.

Items of the second factor: Attitude factor	Factor loading
The feeling of independency in educational activities	0.88
Belief in creating amusement in the educational activities	0.86
Belief in personal empowerment in educational activities	0.79
Belief in system's ability to effectively contribute to efficacious education	0.77
Belief in saving time by mobile learning	0.73
Belief in personal empowerment in teaching and learning activities	0.69
Believing in the system's ability to provide various educational opportunities	0.66
Belief in the system's ability in upgrading the flexibility in educational processes	0.54

Table 4. Factor loadings from the factor solution with varimax rotation (second factor)

Based on the elicited results in Table 4, 8 items (variables) have correlation and compatibility with the second factor (attitude factor). From amongst the mentioned items, the feeling of independency in educational activities with the loading factor of 0.88 seemed to have the highest correlation. Furthermore, the factor belief in the system's ability in upgrading the flexibility in educational processes seemed to have the lowest correlation with the factor.

Items of the third factor: Personal factor	Factor loading
The possession of suitable laptop by the learner	0.81
The possession of suitable personal cellphone	0.78
The possession of a suitable palmtop by the learner	0.77
The possession of a suitable and sufficient internal memory by the learner	0.75
The existence of personal motivations for learning through portable facilities	0.71
Possessing portable accessories with high capacities	0.69

Table 5. Factor loadings from the factor solution with varimax rotation (third factor)

Based on the elicited results in Table 5, 6 items (variables) have correlation and compatibility with the third factor (personal factor). From amongst the mentioned items, the possession of suitable laptop by the learner with the loading factor of 0.81 seemed to have the highest correlation. Moreover, the factor possessing portable accessories with high capacities was found to have the lowest correlation with the aforementioned factor.

Items of the fourth factor: Skill factor	*Factor loading*
The amount of literacy in using cellphones	0.84
The amount of literacy in working with laptops	0.81
The level of skill in using pocket laptops	0.76
The level of ability in sending and receiving e-mails	0.73
The level of ability in sending and receiving Text and multimedia messages	0.69
The level of skill in storing and retrieving information from the internal memory	0.59
The level of ability in connecting to the internet and browsing the web through portable tools	0.52

Table 6. Factor loadings from the factor solution with varimax rotation (Fourth factor)

Based on the gleaned results in Table 6, 7 items (variables) have correlation and compatibility with the fourth factor (skill factor). From amongst the mentioned items, the amount of literacy in using cellphones with the loading factor of 0.84 seemed to have the highest correlation. Moreover, the factor the level of ability in connecting to the internet and browsing the web through portable tools was found to have the lowest correlation with the aforementioned factor (factor loading was found to be 0.52).

Items of the fifth factor: Knowledge factor	*Factor loading*
Computer literacy of the learner	0.89
The level of awareness of the individuals about m-learning	0.83
Having technological awareness about the m-learning tools	0.79
Having awareness about how the software work	0.74

Table 7. Factor loadings from the factor solution with varimax rotation (fifth factor)

Based on the results displayed in Table 6, 4 items (variables) have correlation and compatibility with the fifth factor (knowledge factor). From amongst the mentioned items, computer literacy of the learner with the loading factor of 0.89 seemed to have the highest correlation. Moreover, the factor having awareness about how the software work (loading factor 0.74) was found to have the lowest correlation with the aforementioned factor.

4. Conclusions

The increase in the society's expectations from the technological paraphernalia and concurrently in the increase in the expectations from the higher education demand that these technologies be dovetailed or mingled with the educational system and be applied in its development. Hence, the electronic learning and particularly mobile learning can go a long way in this regard. The changes in the traditional and classic paradigms of the educational system and society and their upgrading from capital centeredness to education centeredness demand the entrance of the information and communication technology and particularly up to the minute learning and training tools into the educational milieu. This is so due to the fact that technology brings about some rudimentary changes in educational structure and pedagogical methods to pace with the modern changes and needs and be able to respond to the modern needs of the society and the process of globalization. This becomes possible through critical thinking, the ability to communicate effectively, decision making and the development of the skill domains of the learners.

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