STUDENT PREFERENCES FOR M-LEARNING APPLICATION CHARACTERISTICS

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ABSTRACT

This study attempts to find out students' expectations from mobile learning (m-learning) applications. The relationship between students' grade levels (freshman, sophomore, junior, senior) and their preferred m-learning application characteristics were analyzed. A questionnaire on students' preferences in m-learning applications was used as the data collection instrument to 78 undergraduate students in a public university to 3 majors namely IT, Computer and Electronics engineering during summer 2013 semester. ANOVA analysis was used on the collected data. The results showed that the availability and easy usage of mobile applications are among the most preferred characteristics of applications. Surprisingly, entertaining feature was the least expected feature by students. In general, there was a differences among students' perception related to their expected educational m-learning applications considering their majors and school experience.

KEYWORDS

m-learning application characteristics, student preferences

1. INTRODUCTION

Rapid growth of technological devices and informatics technologies and their use in diverse fields motivate and help educators to use them in their instructional designs as learning enhancement tools. Consequently, traditional educational methods are replaced with new technology-enhanced learning environment with bringing improvement to the existing e-learning strategies (Korucu & Alkan, 2011).

The fast-pace life style of 21st century requires individuals to use diverse technological devices especially mobile ones in their daily lives. Consequently, educational fields attempt to integrate and use the rapidly developed technology for enhancing learning process leading to emergence of the notion of mobile-learning. However, implementation and use of mobile applications require great care in design to satisfy the educational needs. Ally (2009) point out that mobile learning looks for carefully consideration of various aspects such as hardware and technologies, pedagogical perspectives and other characteristics. Portability, immediacy, individuality, connectivity and accessibility are among the important features of mobile devices which in center of m-learning. According to Sharpless (as cited in Park, 2008) these innovative technologies advocate m-learning to access contents easily and outside of the classroom. The idea on focusing on the importance of learning outside of the classroom is supported in literature Eliasson, Knutsson, Nouri, Karlsson, Ramberg and Pargman (2012) stating that " one of the most promising arguments for introducing mobile devices to learning is to provide students with opportunities to learn outside the classroom, with direct access to contents and contexts relevant to the learning goals." (p.92)

In m-learning, one has the opportunity to use a computer like smart device anywhere and anytime. Wagner (as cited in Park, 2008) believed that technologies look for essential factors for accomplishing its purposes such as technology readiness in terms of learning. Readiness of learners is categorized into two: (i) readiness of changes acceptance and (ii) readiness for new learning innovation (Abas ,Peng & Mansor , 2009). Students readiness for technology usage and m-learning investigated in literature by Kennedy, Judd, Churchward, Gray and Lee-Krause(2008), Abas et al. (2009). The studies by Jairank, Praneetpolgrang & Mekhabunchakij (2009) and Liaw, Hatla & Huang (2010) focused on the acceptance of mobile learning. In the study conducted by Jairank et al. (2009) the m- learning acceptance and influential factors of its usage in higher education in Thailand was considered. They used the TAM (Technology Acceptance Model) (Davis,

1989; Davis, 1989, 1992) and UTAUT model (Unified Theory of Acceptance and Use of Technology) by Venkatesh, Morris, Davis &Davis (2003). The results of their study indicate that the most referred three factors in m-learning were: (i) ease of use, (ii) capabilities of usage without time and place constrains, and (iii) it's interesting interface. It is noted that most of the participants ask for training in advance. Another important finding of the study was that the students' perceptions play an important role in designing m-learning system (Abas et al., 2009).

Some studies in literature point on the effect of m-learning to external and internal leaner characteristics and behaviors. Homan and Wood (as cited in Liaw, Hatala & Mei Huang, 2010) stated that the mobile devices have the potential for changing students' behaviors, interaction with each other and their attitudes toward learning. The role of mobile devices can be noted as a complementary approach for existing learning style. It is stated that m-learning theory expected to support learning which happen outside of the classroom and within individual's activity without interrupting them. (Liaw et al. , 2010). Moreover, the learned actions should consider psychological requirements such as: being meaningful and intelligent, operational with cognitive tools such as signs. The studies conducted by Weinbrenner et al. (2012) and Forbus, et al. (2008) emphasis on semantic interpretation of digital sketching and sketch understanding in terms of cognitive science and education respectively. (Park, 2008) studied the role of visualization in m-learning using cognitive learning theory which considers mental process of information transformation and explain the importance of pictorial instruction in terms of huge amount of information.

The study conducted by Liaw et al. (2010) reveals that four factors which increase the acceptance of m-learning systems are learners' satisfactions, learners' autonomy, powerful system functions and rich interaction and communication activities. Prensky (as cited in Kennedy et al. 2008) stated that new generation students are completely different from other generation in terms of using technology whom they refer as digital natives. Moreover, it is stated that the condition in which new generation are grown up has influenced their preferences and skills leading them to be prone to reach and access information quickly.(Kennedy et al. 2008) The research about students readiness for mobile learning in Malaysia Abas et al. (2009) demonstrated that while the majority of the students in OUM ("Open University Malaysia" the pioneer in the open and distance learning and the second largest mobile penetration in South East in Asia) were ready for m-learning, they were interested in the use of it for non-technical courses rather than for technical ones. However, the high usage rate of technology by students in their daily lives does not mean they use it for educational purpose .The study conducted by Caruso & Kvavik (as cited in Kennedy et al. 2008, p.3) reveals that “students are comfortable with basic set of technologies in their daily lives but are less comfortable with specialized technologies. ”

In the case study conducted by Gil-Rodríguez & Rebaque-Rivas (2010) the relationship between mobile learning and commuting was considered for developing useful m-learning applications. The study revealed and confirmed the effectiveness of m-learning in terms of on-line education for commuters. Reading activities came out to be among the most referred ones done by students while travelling, so e -books could be useful tools for them. On the other hand, learners search for more flexible editing options which could enable them to underline part of text and take notes on the page while reading. Internet connections are basic needs for students so as provide facilities for emailing, consulting in forums and searching for information while commuting. Generally, type of contents and mobile application types need to be taken into account for students who commute regularly in daily scale. Various types of mobile learning applications such as ubiquitous and augmented game (Fotouhi-Ghazvini, Earnshaw, Robinson & Excell, 2009) using audio /video streaming and podcasting (Walls, Kucsera, Walker ,Acee ,McVaugh & Robinson, 2010 ; Mandula, Meda & Jain, 2012) for different fields of study such as language learning (Guerrero, Ochoa, Collazos 2010; Gromik, 2012), organic Chemistry instruction (Pursell ,2009), natural science courses (Jen Hwang, Wu & Ru Ke, 2011) have been developed recently according to learners needs and characteristics of diverse fields. Yarandi, Jahankhani& Tawil (2012) considering the importance of personalization in learning process proposed a model based on ontology emphasizing on learners abilities and preferences. Regarding the adaptive learning theory and item response theory, they provide combination of both in which personal capabilities are requirements for the selection of the next learning steps in mobile application design.

1.1 The Purpose of the Study

The importance of m-learning using various applications is among innovative concepts in terms of education. New generation which are known as "net-generation" explain their interests for online-learning and consequently m-learning. (Gil-Rodríguez and Rebaque-Rivas, 2010). Different studies such as Liaw et al. (2010) and Jairank (2009) about m-learning acceptance and influential factors emphasized on the important role of learners' attitudes in designing and developing m-learning applications. The result of the study by Liaw et al. (2010) noted learners' satisfactions as one of the increasing factors for more acceptance of m-learning applications. Therefore, analyzing learners' expectations from m-leaning applications can be noted as a crucial factor for developing more useful and easier m-learning applications. The suitable mobile applications from students' perspectives that can provide students expectation and match their requirements have not been fully considered yet. In this study, we attempt to find out students' perceptions about characteristics and features of m-learning applications from various aspects and explore their expectations from m-learning applications. The results of this study can provide useful and needed information for designing and developing more and easier accepted m-learning application. The questions that the study attempts to answer are:

1. Do undergraduate students' grade levels (freshman, sophomore, junior, senior) effect the type of their preferred m-learning application characteristics?
2. Are there significant differences among students' from different departments (IT, Computer and Electronic engineering) preferences in terms of m-learning application characteristics?

2. METHODOLOGY

This study attempts to find out students' expectations from m-learning applications in order to improve the m-learning application design and development process which possibly could enhance learning process and meet students' requirements. The role of students' departments and grade levels on their expectations from m-learning applications were analyzed. Survey research design was used in this study. The used data collection instrument, participants of the study and statistical analysis are represented in the following sections.

2.1 Instrument

Considering the study conducted by Venkatesh et al. (2003) and Liaw et al. (2010) which indicated that ease of use, interesting interface and rich interactions and communications as the important factors for acceptance of m-learning applications by students help us to develop the questionnaire for this study. Developed questionnaire included 30 questions that were divided into 5 subsections ,each of which considered specific feature of m-learning applications namely: ease of use (6 questions), collaboration (7 questions), entertainment (5 questions), educational (8 questions) and availability (4 questions). The questionnaire was scored based on 5 points Likert scale (Strongly agree, Agree, Neutral, Disagree, Strongly Disagree). In order to check the validity of the questionnaire, subject expert opinion was collected. Furthermore, a pilot was conducted and data collected from 23 undergraduate students of 3 departments (Information technology, Computer and Electronic engineering) with age range of (20- 29) who study in different grades was analyzed. The calculated Cronbach's $\alpha = 0.76$ based on 78 returned the questionnaire from undergraduate students.

2.2 Data Collection and Analysis Method

The data was collected from 78 Iranian undergraduate students (41 female and 37 male) who study in three majors namely: IT Engineering, Computer Engineering and Electronic engineering with age range of 20-29 ($M = 22.99$, $SD = 2.07$) using developed questionnaire. Descriptive and inferential statistics was used for analyzing the data using SPSS. One-Way Analysis of Variance (ANOVA) was applied in order to find out the difference between students' expectations from various features of m-learning applications and their majors and grades. In addition, Pearson Correlation Coefficient was used for analyzing the relationship between students' expectations and their ages.

2.3 Results

In order to answer the first and second question of the research regarding with learners' perceptions on m-learning applications first data from participants in different departments was analyzed. The results of descriptive statistics indicate that the availability (M =.94 , SD =.14) and easy usage (M = .82 , SD = .17) of m-learning applications are among the most preferred characteristics for m-learning whereas entertainment (M =.55 , SD =.22) is the least expected types of m-learning applications by learners depicted in table 1.

Table 1. Means of students' perceptions on M-learning applications

M-learning Application Feature	M	SD
Ease of use	.82	.17
Collaboration	.87	.14
Entertainment	.55	.22
Learning	.88	.16
Availability	.94	.14
Total	.81	.22

One-way ANOVA tests show that students' preferences are approximately similar to each other about various types of m-learning applications based on their majors. However, there is a difference between students' preferences p<.05 related to educational m-learning applications based on their majors as it is shown in table 2.

Table 2. One-way ANOVA results for students' M-Learning preferences among departments

Sources	*Groups (Students of IT, Computer, Electronic Departments)*	*df*	*F*	*P*
Ease of use	Between Groups	2	3.09	.05
	Within Groups	75		
Collaboration	Between Groups	2	1.59	.21
	Within Groups	75		
Entertainment	Between Groups	2	.07	.93
	Within Groups	75		
Educational	Between Groups	2	7.07	.00[a]
	Within Groups	75		
Availability	Between Groups	2	1.95	.15
	Within Groups	75		

[a] P<.05

The differences between students' preferences in relation to educational m-learning applications could be explained with by the perceptions of IT and Electronic engineering students. Descriptive statistics shows that educational mobile applications are the most preferred once for IT students (M =.94, SD =.14), and Electronic engineering students are the group who prefer educational applications the least (M =.77, SD =

.20). Considering the effect of students' grade levels on their expectations, we attempted to analyze students' perceptions on m-learning applications who study in different grades (Freshman, Sophomore, Juniors, Seniors).

According to descriptive statistics, senior students are the one who prefer more educational mobile applications (*M*=.95, *SD*= .08) and educational applications are preferred the least with sophomores (*M* =.79, *SD* =.20).

Table 3. One-way ANOVA results for students' M-Learning preferences by grade levels

Sources	*Groups (Students' grades Freshman, Sophomore, Juniors, Seniors)*	*df*	*F*	*P*
Ease of use	Between Groups	2	1.74	.17
	Within Groups	75		
Collaboration	Between Groups	2	2.69	.05
	Within Groups	75		
Entertainment	Between Groups	2	.34	.80
	Within Groups	75		
Educational	Between Groups	2	6.44	.00 [a]
	Within Groups	75		
Availability	Between Groups	2	.74	.53
	Within Groups	75		

[a] P<.05

In order to check the relationship between students' ages and their preferred types of m-learning applications, Pearson Correlation Coefficient was used and it showed that there is a positive correlation $p<.05$, (r^2 =.27) between students' grade level and their preferences about easy usage of m-learning applications .

3. CONCLUSION AND LIMITATION

In a nutshell, this study aimed to find out learners' perspectives on m-learning applications in order to design required and desired mobile application. Students' opinions about various features of m-learning applications (ease of use, collaborative, educational, entertaining, availability) were analyzed using the developed questionnaire (Cronbach's α= .76). The number of returned questionnaires by undergraduate Iranian students were 78 who study in 3 majors (IT, Computer, Electronic engineering) in summer 2013.The results of data analysis indicated that the availability and easy usage of mobile applications (*M* = .94, *SD* =.14) and *(M* =.82, *SD* = .17) were among the most referred characteristics of required applications respectively.

The results of this study depicted that the easy usage (*M* = .82 , *SD* = .17) of m-learning applications is among the most preferred characteristics of m-learning applications by students. similar outcomes were found in the case study by Gil-Rodríguez and Rebaque-Rivas (2010). The study indicated that while commuters were satisfied by some of the m-learning applications such as e-book, they looked for more flexible applications that can enable them to perform more regular tasks such as taking notes or editing options while studying. Their study depicted the importance of user-friendly features for mobile applications from learners' perspectives as the result of the current study. The current research shares also similar results

with the study by Jairank (2009) in Taiwan which indicated that ease of use was among the factors which increases the acceptance level of m-learning applications in higher education. To our surprise, entertaining feature (*M*=.55, *SD*=.22) was the one which expected the least by students.

In addition, the results of the study revealed that educational mobile applications are the most expected types of applications by undergraduate students. On the other hand, the study by Caruso & Kvavik (as cited in Kennedy et al. 2008, p.3) pointed out that "students are comfortable with basic set of technologies in their daily lives but are less comfortable with specialized technologies."

There was a difference among students' perceptions related to their expected educational m-learning applications considering their majors and grades. Descriptive statistics shows that IT students (*M* =.94, *SD* =.14) prefer more educational applications in their mobile devices and Electronic engineering students are the group who prefer educational applications the least (*M* =.77, *SD* = .20). Senior students (*M*=.95, *SD*= .08) are the most interested group in educational mobile applications while educational applications are preferred the least with sophomores (*M* =.79, *SD* =.20) as well. The findings of the study can shed light on the path which we need to take for designing more useful and easier m-learning applications. Students' majors that are limited to 3 specific engineering fields and short research span which lasted only for summer school can be noted as the constrains of the study .

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