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Investigating the Influential Factors on Mobile Learning to Public Libraries of Iran based on FRAME Model

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Abstract

The main purpose of this research is to determine the views of referred individuals to public libraries of Iran about mobile learning on the basis of FRAME model. This study is an applied research conducted in the form of survey method. The population of study was 180 individuals specified based on the method of determining the size of samples from unknown populations using clustersampling method from referred individuals to 21 public libraries of Mashhad city.Data were collected using researcher made questionnaire of mobile learning based on FRAME model. The validity of questionnaire was approved using expert ideas and the stability was approved using Cronbach's alpha coefficient. In the views of referred individuals, the instrument of mobile learning should contain a small size, touch screen, a memory with more than 20 MB, high processing speed, wireless internet connection and Android operating system. Also, the effect of general factorson public libraries is significantly higher than average level, but mobile learning in social factor was less than average level. In addition, the rate of applying mobile learning devices by referred individuals in connections related to learning (interactive learning) in public libraries was less than average level. As a result, there was a significant difference between the suitability of mobile learning potentialities for educational and library activities. This research is the first research about mobile learning in public libraries that according to a specific model attempted to analyze the influential factors on this type of learning.

Keywords: mobile learning, public libraries, Iran, FRAME model, Mashhad.

Introduction

Development of technology has changed learning methods with incredible speed. In addition, developing internet using network and increasing the speed of internet connection in last 10years has created new forms of education such as distance learning (McConatha& Paul, 2008). In addition, education through mobile device has provided this opportunity for learners to review, update, and listen to the speeches of their instructors or peers simply in spare time such as exercising or the time waiting for appointment (Heskenzlong, 2009). In fact, the development of owning mobile phone and increasing access to other wireless and portable deviceshas revolutionized the landscape of technology-supported learning (Cocoleska Helm, Ovanz and Treksler, 2005). The dependency of distance learning on electrical devices caused this education to be known as electronic learning. Electronic learning has gradually opened the way for mobile learning (Williams, 2008).

The term mobile learning is a subcategory of electronic learning, educational technology and distance learning that emphasizes on learning beyond the text and learning with the help of mobile devices(Mobile Learn, 2003), but it should be noted that mobile learning is different from electronic learning. Regarding mobile learning there are different related definitions. For example, Keegan (2002) defined mobile learning as education through Personal Digital Assistant (PDA), portable microcomputersand mobile phones. Brown (2003) delineated mobile learning as a subcategory of electronic learning and considers electronic learning as a general concept that includes both online and mobile learning. Mobile learning has many other benefits such as: providing relatively low cost learning opportunities, multimedia content, entertaining, supporting long life learning, increasing literacy level of the youth, decreasing educational costs, etc.(Elias, 2011; kresnet, and Lee, 2011).

Based on the released statistics from International Telecommunication Union (ITU) (2017) in 2016 about 53% of the worlds' population (3900000000 individuals) has access to internet that in Iran it is 58%,while about 84% of the world's population lives in areas covered by the network of internet for mobile phones. This statistics represents high capacity of using internet-based devices, especially mobile instrument in different aspects of human life. One of the most important aspects that such technologies would be used is different educational issues or the same mobile learning, while there is a plan like 'mobile library', using mobile technology has not been used in libraries and information centers (Hahn, 2008) and most of the libraries have no program or policy to use devices of mobile learning; however, libraries are social centers that provide people communication and they are not mere physical places.

Meantime, public libraries as universities for people and educational centers in different cultural, social, scientific and art aspects are used for the entire members of society and highly valorized; therefore, duties and responsibilities of libraries to provide informative needs and offering high quality services to potential and active customers would be significant. Based on advices of EFLA, public libraries are institutions that are able to undertake education and information for people and provide a wide range of information in different aspects to people in order to change the social and cultural life of society (EFLA advices, UNSCO for development, 2007).

Since most library users have mobile phone, and the number of individuals using smart phones is increasing, it is time for libraries to benefit the instruments of mobile technology. Mobile technology helps naïve and experienced librarians to communicate with mobile society. To achieve this goal they need to be aware of changes in technology and ready for mutual effects of applying such technologies in libraries. If librarians like to offer better

services by using such technologies, they should match themselves with these changes (Saxena & Yadav, 2013). Hahn (2008) believed that studying the usage, needs and necessities of mobile devicesregarding mobile learning before designing and development are considered as necessary steps to develop services.

Since many different factors influence on mobile learning, in the Framework for the Rational Analysis of Mobile Education (FRAME) that is a relatively comprehensive model in mobile learning is devoted to such issues. In this model different factors such as mobile, learner and social learning devicesare concerned; however, the condition of none of the factors is clear in public libraries of Iran, while mobile learning and dependent devices on this type of learning can provide this possibility for public libraries to achieve other goals of being informative and educational, along with other common approaches. Since the use of mobile learning has been changed into an improving device for promoting education at the moment because of such advantages as saving costs, capability of reusing and flexibility for public use.

Generally, according to indicated cases the main problem of the present research is ‘based on FRAME model on what situation does the influential factors in mobile learning in public libraries stand?’In this way, it is attempted to analyze the six dimensions of the model in the form of a unified question.

Model of FRAME

As the present research has been conducted on the basis of FRAME model, explaining the model seems necessary. In the realm of applying the tools of mobile learning there are various models such as: Scenario Message Synchronization Evaluation Model (SMSEM) (Shih, 2005), Task Model (TM) (Taylor et al., 2006), Shih Model (Shih, 2007), and FRAME model (Kool & Ally, 2006) that each has concerned mobile learning from a specific aspect.

The model of FRAME describes mobile learning as a process issuing from cooperation between mobile technologies, capacity of human learning and social interaction. This model that is shown by a diagram is composed of three circles called learner aspect (L), Device aspect (D), and Social aspect (S) and overlap in areas that belongs to the interaction of various aspects. The intersection of the three aspects in the center of the diagram represents the ideal condition of the mobile learning (Kool & Ally, 2006). In figure 1 different dimensions of the model are represented.

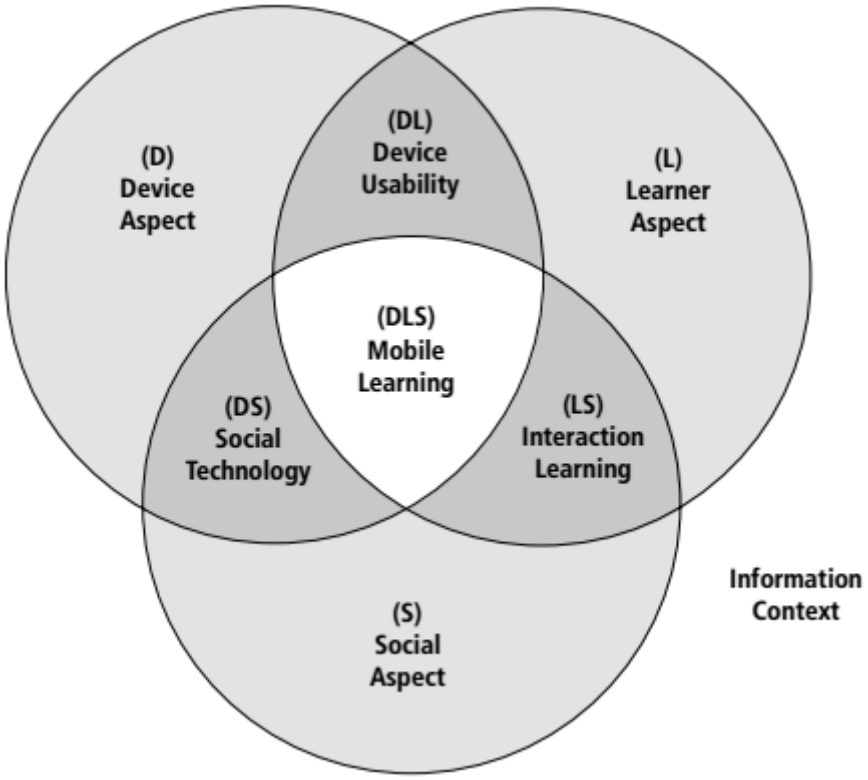

Figure: FRAME Mobile learning model (Kool and Ally, 2006).

According to information in figure 1; it should be stated that in the context of information, dimensions and trifold factors of device, social and learner are interacting with each other and by twofold interaction of them, three factors of social technology (combination of social aspect and device aspects), device usability (combination of device aspect and learner aspect) and interactive learning (combination of social and learner) is formed and where the entire factors are interacting with mobile learning is formed. In fact, lack of considering each of these factors causes mobile learning to be formed improperly.

From the analysis of present studies regarding the application of mobile learning devices in libraries it was specified that unfortunately previous studies were usually conductedonone of mobile learning devices like mobile phone or digital personal assistant and their applications in libraries and informative centers.

The subject of mobile learning in libraries has been dealt with only in several cases. However, some of the studies about mobile learning and studies concerning mobile learning devices such as mobile phones in the following reviewed concisely.

Based on one of mobile learning devices, cell phone, Alimohamadi (2009) in his study analyzed informative services using short massage in university libraries and discovered that the service of delivering and receiving short message in Teacher Training University and gradually in universities of Iran is not concerned due to some reasons. Shuva (2009) used a different approach in his study in Bangladesh. He listed types of services by 6 operators of cell phones in Bangladesh containing services in educational environments such as libraries and investigating the methods of exploiting the technology of short messaging. The result of study showed that according to revolution occurring in the future of libraries, orientation of libraries and their procedures would change and the effect of services based on cell phones will be increased.

In a study based on another mobile learning device, Cummings (2009) performed a study titled as "The use of handheld mobile devices: their impact and implications for library services" using a questionnaire with open ended questions in which users of libraries were asked about the impact and implications of mobile devices on library services of universities. Findings of the study showed that increasing application of handheld devices, cell phones, and personal digital assistant (PDA) have provided a potential demand for using the list of libraries by users. About more than 58.4% of respondents used small screens to search the list of library. The result of study showed that users of cell phone and devices of small screen would be important factors in developing library services.

The analysis of cell phone application in library services was performed in Delta University of Abraka, Nigeria by Enemute et al., (2010). Findings of their study showed that librarians believe that cell phone can cover many library services. Also, it was specified that Delsu library do not use cell phone in library services for reasons such as: lack of substructures of distance communication, high costs, issues and problems related to technology and of education and awareness of workers.

Nazi and Ghasempour (2011) studied the society of librarians' views regarding library services based on cell phone in libraries of the country with the society of librarians of public libraries through researcher made questionnaire. In this study 100% of respondents used possibilities of dialogue and short message frequently and 63% of them used facilities of cell phone for listening to music, and finally 62% used camera devices. Moreover, the result showed that 63.5% of respondents did not consider mobile phones in libraries as bothering devices.

To analyze library services by cell phone, Ghods et al (2014) performed a survey analysis. The method of data collection was a researcher made questionnaire distributed among 384 members of libraries some of them, meanwhile, were interviewed. Findings of the study showed that users of libraries agree with offering types of cell phone services that necessitates manipulation of services that are on the basis of cell phones.

In a study Valizadeh et,al. (2017) aimed at studying the role of social network of telegram (on mobiles) in the development of university central library services among managers and librarians. The study was performed using survey analysis and the given data were collected through checklist and questionnaire. Findings of the study showed that the average of managers' and librarian's views at the development of library services such as borrowing (mean=3.50), and education and research (mean=3.35) were at the moderate level.

With taking a general view of the previous studies, it should be noted that mobile learning is a subject concerned recently in the studies of various areas. Nevertheless, there are small studies regarding mobile learning in libraries and informative centers, while few number of studies aforementioned dealt with one or several aspects of mobile learning (Razavi et al., 2014; Shua, 2009; Enimute et al, 2010). In these cases, however, such studies are not on the basis of mobile learning.On the other hand, libraries and information technologies have deep rooted connection to each other and mobile technologies are developing rapidly; as a result, they can be applied in different areas such as libraries, archives and informative centers.

Research Method

The present study is an applied survey study aimed at collecting data related to the present time and condition (Kumar, 1992). The purpose of this study was to understand behaviors and motivation of the participants among society or their composing groups performed based on information and survey data and establishing communication among different variables (Hafeznia, 2016). The population of this study is the entire referred individuals to public libraries. Since there was not a specific list of referred individuals to public libraries of Mashhad, size of population was considered unbounded. To specify the size of samples in an unbounded the society, the Cochran Formula was used and the size of samples as many as 180 participants was determined. To select the size of samples, cluster sampling approach was implemented to collect data from referredindividuals from different libraries in different parts of Mashhad city.

Necessary data for responding the research questions was performed using a researcher made questionnaire based on the model of FRAME. Questions of this questionnaire were designed to determine the content validity, the questionnaires for the context of libraries and informative centers that aimed at specifying content validity. The questionnaire was given to 8 experts with PhD in library and information science and they were asked to express their views on the proposed statements. The final version of the questionnaire with 34 items (for six factors of frame model) was codified using LIKERT'sscale.

Also, the analysis of internal coordination of the items was performed using Cronbach's Alpha. The result of calculating Cronbach's Alpha in this research questionnaire was 89% in general, and since 0.7<0.89; therefore, reliability of the questionnaire was approved. Hence, according to normal distribution of collected data, the tests of inferential statistics was used to answer the research questions.

Research Findings

The first question: in the view of referred individuals what are characteristics of mobile learning 'device' in public libraries?

In the research questionnaire, 6 questions were asked about expected features of referred individuals regarding mobile learning devices in public libraries including: type of screen, memory, speed of processing, connection capability, operating system, and method of transforming information.

In fact, the question was "if library ought to offer services or teachings through mobile learning devices, what features do you prefer such devices contain? Based on space limitation for referring to findings related to the entire 6 features, in table 1 the highest item refers to the proposed feature. In addition, non-parametric test for comparison of relationships (Chi^2) was used.

Table 1: Expected features of referred individuals from mobile learning devices

Expected feature	Selected item	frequency	percentage	Test result		
				Chi-squire	Degree of freedom	P-Value
type of screen	Touch pad	106	58	134.36	3	0.000

Expected feature	Selected item	frequency	percentage	Test result		
				Chi-squire	Degree of freedom	P-Value
memory RAM	More than 20 Gigabyte	70	39	79.80	5	0.000
speed of processing data	High	169	93	455.87	3	0.000
connection availability	Wireless	159	90	0.5	2	0.000
operating system	Android	152	81	323.75	3	0.000
method of transforming information	All cases (Bluetooth, wireless, cable)	108	67	160.75	3	0.000

Findings of table 1 shows that the referred individuals intend to have mobile learning devices with touch pad, processing power and high memory in order to have the possibility of transferring information and connectivity to wireless networks. Also, the result of chi-squire showed that the proportion of individuals who prefer such features is significantly more than referred individuals who select the other items.

The second research question: how is the attitude and views of referred individuals (learner factor) about mobile learning in public libraries?

Findings of this section was achieved from 7 questions in the questionnaire and the purpose of the question was to specify the extent in which the referred individuals are aware ofthe advantages of mobile learning (Acceleration, facilitation, reduction of costs, reduction of time, …) in libraries. Descriptive findings of this variable showed that the mean of the referred individuals' views about this factor of mobile learning is 77.9, but to answer this question, student one sample t-test was used to examine whether the attitude and views of referred individuals about mobile learning in public libraries is in higher level than average (3) or not?

Table 2: Studentt-test for analyzing the condition of learner's mobile learning in public libraries

Variable	Descriptive statistics			Test results		
	Frequency	Mean	Standard deviation	Degree of freedom	t-statistics value	P-value
Lerner's dimension	182	4.1	0.58	181	25.90	0.000

According to findings of table 2 it can be indicated that the value of t-student statistics and P-value for the condition of learner dimension of mobile learning in public libraries is more

than average level. In other words, referred individuals to public libraries are aware of the advantages of using mobile learning in public libraries.

The third question: to what extent doesreferred individuals to public libraries use devices of mobile learning in social interactions (social factor) related to library?

In the research questionnaire 5 questions are used about the extent referred individuals used mobile learning devices (mobile phone, tablet…) to communicate with librarians, other referred individuals, discussion groups…Descriptive findings of the present variable (social dimension) showed that the average of this dimension among referred individuals was 2.9 that was specified using t-student one-sample test in order to specify whether social factor of mobile learning in public libraries is more than average level or not?

Table 3: t-student test for analysis of social dimension of mobile learning in public libraries

Variable	Descriptive statistics			Result of test		
	Frequency	Mean	Standard deviation	Degree of freedom	t-statistic value	P-value
Social factor	182	2.9	0.91	181	*-1.13*	0.780

Findings of the study in table 3 showed that according to the views and ideas of selected referred individuals to public libraries the value of t-student statistics and P-value for general condition of public libraries in social factor of mobile learning is less than average level. Because the significance value or P-value 0.780 is more than significant level; therefore, referred individuals do not use mobile learning devices for social-supported interaction.

The fourth question: How isthe rate of applying mobile learning devices by referred learners in related interactions to learning (interactive learning) in public libraries?

The purpose of this question was measured by 7 questions to specify the extent referred individuals to public libraries have used mobile learning devices for interactions related to learning (file sharing, transferring ideas, feedback…) in public libraries.Findings related to this interactive factor (table 4) showed that the mean of this factor is less than average level and since p-value is more than significance level; therefore, with 95% confident application of learning devices by referred individuals in interactions related to learning in public libraries is less than average level.

Table 4: Student t- test for analyzing interactive learning factor in public libraries

Variable	Descriptive statistics			Test result		
	Frequency	Mean	Standard deviation	Degree of freedom	t-statistics value	P-value
Interactive learning	182	3	0.97	181	*-0.92*	.537

factor						

The fifth research question: which mobile learning capability of referred learners to public libraries has been used more than others?

This question aimed at specifying the rate of using mobile learning devices by referred individuals in different living affaires (educational activities, research, personal, entertainment…). The response to this question of the research was achieved using one-sample t-student test to specify whether social factor of mobile learning in public libraries is in a level higher than average (3) or not?

Table 5: student t- test for analyzing the condition of social technology factor of mobile learning in public libraries

Variable	Descriptive statistics			Test results		
	Frequency	Mean	Standard deviation	Degree of freedom	t-statistics value	P-value
Social technology factor	182	3.8	0.87	181	*11.84*	0.000

Based on findings of the study in table 5 it can be understood that the rate of using public libraries by referred individuals from capabilities of mobile learning devices is more than average level; because the rate of significance or p-value is less than the significance level of the test. It means that referred individual has used mobile learning devices greatly in issues related to their life except libraries.

The six research question: to what extent does each possibility of mobile learning devices is influential in the views of referred learners to public libraries?

The purpose of designing this question was to specify the view of referred individuals to public libraries to see which capability of mobile learning device is suitable for library activities. In this way, ten capabilities of mobile learning devices were proposed in which the mean level for each capability for grading suitability and importance of each mobile learning device capability is offered using the result of testing one-way variance analysis. Accordingly, when the least couple of means shows significant difference, the H0 is rejected.

Table 6: the test of one-way variance analysis for analyzing differences between the rate of suitability of mobile learning device capability for educational activities of libraries

Capabilities of mobile learning devices	Descriptive statistics			Test results		
	Frequency	Mean	Standard deviation	Degree of freedom	t-statistics value	P-value

Calendar	178	3.5	1.1	*1747 and 9*	*13.21*	*0.000*
Memory	176	3.4	1.1			
Electronic books	178	3.7	1.2			
Computer games	177	2.7	1.3			
Virtual libraries	178	3.6	1.2			
Multimedia programs	170	3.7	1.0			
Concurrent connections	178	3.7	1.1			
Non-continuous connections	180	3.4	1.2			
Online Library Lists	171	3.4	1.2			
Continuing reference resources	171	3.6	1.2			

Findings of table 6 show that capabilities of electronic books, concurrent connections and multimedia programs have the most means and the least means belong to computer games. Also based on valued from comparison p=0.000 with significance level of $\alpha = 0/05$ it is concluded that since p=0.000 and less than 0.5, the H0 is rejected in 0.5%; therefore, in general by 95% confident it is claimed that there is a significant relationship between the rate of suitability of mobile learning device capabilities for educational and library activities. Now after awareness about at least one significant difference between suitability of mobile learning device capability for educational and library activities, it is tried to specify differences between capabilities. To do this the comparative test of Duncan for couple of treatment means was used and result were offered in table 7.

Table 7: result of Duncan test for comparing the rate of suitability of mobile learning device capability of public libraries

Mobile learning devices capabilities	Group (based on priority)		
	first	Second	Third
Concurrent connections	*3.74*		
Multimedia programs	*3.72*		
Electronic books	*3.65*		
Virtual libraries	*3.63*		
Continuing reference resources	*3.60*		
Calendar	*3.49*		
Online Library Lists		*3.43*	
Non-continuous connections		*3.40*	
Memory		*3.38*	
Computer games			*2.66*

Result of comparative test of Duncan for couple of treatment means (table 7) showed that the rate of suitability of capacity of mobile learning devices for educational and library activities is classified into three categories; therefore, it is possible to use the sum of results and Duncan test with 95% confident about the rate of suitability of mobile learning devices capabilities of the first group more than other capabilities.

Discussion and Conclusion

The present research aimed at analyzing the condition of influential factors on mobile learning in public libraries of Iran. Findings of the study revealed that despite attention and attendance of referred individuals to public libraries to mobile learning devices and understanding benefits of such devices in daily life, unfortunately public libraries still did not use such devices for their services sufficiently and delimited to the usage of services based on mobile phone. However, findings of previous studies showed that increasing usage of handheld computation devices, cell phones and PDA has provided potential demands for usage of referred individuals from these technologies. Shua (2009) in his study found that based on the revolution occurring about libraries in the future, orientation of libraries and their approaches would changes and meantime the effect of services based on mobile phone will be greater.

One of the most important and accessible mobile learning devices that many referred individuals to public libraries have access are smart phones. It is a type of device that can be the background for many public library services. In the study of Bassil et al (2010) it was specified that librarians believe cell phones can cover many library services because many referred individuals to libraries have cell phone and involving them in library services srenecessary that in turn causes increasing connection between users and library staff. It helps to improve and increase library services toattract and maintains library users.

Currently, many public library services are offered with the aid of information and communication technology like internet and users intend to have access to information wherever. Public library should offer necessary information for referred individuals and preserve them as the main capital; otherwise, referred individuals would provide information from alternative channels and disregard libraries. According to Ralf Shau “if library do not provide a social need, society would not stop satisfying that need, but creates another institution to fulfill that requirement” (quoted from Fatahi, 2014). However, the institution of public libraries of the state should try to provide necessary substructures for manipulation of services based on mobile learning devices to obviate possible deficiencies in this area such as: lack of distance communication substructures, costs, problems related to technologies that removes lack of education and awareness of workers.

Based on the results of the study, it is suggested that responsive agents of public libraries should provide programs to use such opportunities and emphasize on them. Allocation of research and execution budgets for investment on mobile learning can be considered the first step in this process. In addition, since most of the referred individuals benefit advantages of mobile learning and its devices and apply it to their educational, research and personal affairs, it is suggested that public libraries take into account these issues and prepare their necessary needs by obviating their informative needs. On the other hand, since referred individuals do not use mobile learning devices for library interactions, in the first step they are suggested to use direct ways of communication using short massage, channels for social media, discussion groups for libraries and electronic feedbacks.

Another suggestion raised from the present research is that since the rate of using mobile learning devices was in a low level, agents of public libraries should try to provide proper procedures and policies for such services and increase the possibility of using them in library environment. Furthermore, since it was specified that public libraries should have more attention to mobile learning and overcome some problems; therefore, some suggestions as follows are proposed:

- It seems that one of the problems for implementing educations based on mobile learning is lack of necessary standards in this area that by generating educational standards for changing traditional education to electronic education based on the needs of library users it is possible to overcome this problem;
- Development and improvement of bandwidth as well as networks of mobile phones for better and more access to users;
- Adopting the necessary security strategies in the public libraries under the supervision of the institution and the municipality for better access to the mobile education system;
- Budget allocation from the government (institution of libraries and municipality) to expand access to mobile education in libraries;
- Making changes to the traditional education structure for the promotion of mobile education;
- Create places around and inside the library with the appropriate technical and infrastructural facilities for mobile learning.

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