Determine the Effects of Mobile Technology, Mobile Learning on Customer Satisfaction and Loyalty (Case Study: Mellat Bank)

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Abstract
Mobile technology and mobile learning are considered as important and impressive factors in earning the organizational competencies and achieving competitive advantages and customer loyalty. The purpose of this study is to evaluate the role of mobile technology in customer loyalty. The Mellat bank mobile services are entering a new transition period. In response, the banking industrial is shifting its strategic focus away from attracting new customers, towards retaining existing customers through the promotion of customer loyalty. This paper investigates how mobile learning and the customer satisfaction influence customer loyalty. The adjustment effect of the mobile learning on customer satisfaction and customer loyalty is also analyzed.

This study will also examine how mobile technology and mobile learning, affect both on improvement customer loyalty. The population of the study is Mellat bank. Results indicate that mobile learning support the customer satisfaction, and have a direct and positive effect on that. It also effects on improvement of mobile learning which allows us to reach the superior customer loyalty. Such mobile technology is due to the mobile learning. Actually, this article proposes an integrated model covering a variety of factors which influence mobile learners satisfaction, and show us how to track and evaluate customer’ satisfaction and further strengthen the m-Learning system implementation.

Keyword: mobile learning, satisfaction, customer loyalty, mobile services

Introduction
E-Learning is the use of telecommunication technology to deliver information for education and training. With the progress of information and communication technology, e-Learning is emerging as the paradigm of modern education. The great advantages of e-Learning include liberating interactions between learners and instructors, or learners and learners, from time and place barriers through the asynchronous and synchronous learning
network model (Chen Sun et al., 2008). M-learning is often defined as e-learning through mobile computational devices. In general by mobile device we mean PDAs and digital cell phone, but more generally we might think of any device that is small, autonomous and unobtrusive enough to accompany us in every moment in our every-day life, and that can be used for some form of learning. Mobile learning is the next generation of e-Learning and is based on mobile devices (Sharples, 2000). One advantage is the high availability of such devices: the market penetration of mobile phones in Iran is currently at a level of 70% and the numbers are still increasing. It can be emphasized that the majority of the population have a mobile at hand most of the time. Thus, m-Learning will be an important instrument for lifelong learning.

There are many properties that differ when comparing a mobile device from a desktop PC (the usual medium to deliver e-learning) and they have impact on what is reasonable, useful and even pleasant to do on such devices. Some of them are the output (i.e. the screen size and resolution capabilities, etc.); input (i.e. keypad, touch-screen, voice input); processing power and memory; supported applications and media types. When we try to transfer services provided by an e-learning platform into services in an m-learning platform we can see that some of them should change to fulfill the limitations of the small devices, some are impossible to be delivered in a certain context, but also new services appear, provoked by the mobility (Saade and Kira, 2009). The available mobile technology can enhance the shift from pure instructor centered classroom teaching to constructivist learner centered educational settings away from the classroom; for example in outside learning environments –business education is a good example.
The following criteria were used to determine whether devices were within the scope of the research: 1). capable of providing electronic communication and/ or information functions; 2). small enough to be easily carried; 3). can be used (at least part of the time) without a physical connection to fixed power or telecommunications services (Dye & Rekkedal, 2005).

**M-Learning as a mobile application**

While m-Learning is a form of e-Learning and shares some similarities with online learning, as a mobile application it complies with the basic definition of a commercial mobile application as ‘any transaction conducted via a mobile. As a mobile application, m-
Learning is characterized by the use of specific mobile infrastructure, which includes personal subscriber network access and location- and time-independent Connectivity.

The mobile learner has access to a private personalized service typically not shared with anyone else. Most mobile networks use encryption and provide security transparently for the user. M-Learning is independent of the location of the learner, as the device travels literally with its owner. Mobile earners have access to the same personal device on a 24/7 basis, and these types of devices are permissible for use in a broad variety of environments.

Information sent to a mobile user needs to be concise but very useful. Typically, users do not use mobile devices as a primary tool to access information but rather employ them in an ‘alert raising’ mode. Partially owing to the small size of the screen display, users prefer to receive ‘dense’ information – specific, concise and precise, packed with meaning, but not too detailed.

The ultimate success of an m-Learning application developed according to the requirements identified in the previous section will depend on the level of its adoption by learners. The adoption processes associated with m-Learning can be investigated using the value chain approach already applied to studying the m-Business phenomenon.

According to the value chain approach, the successful mobile application allows the players in the value chain to generate revenue streams. For this purpose, the application must propose a clear and identifiable value to the paying user (customer) – a value that can offset customer costs. The revenue streams of the actors in the value chain depend on the level of customer adoption.

The informational requirements of the application are met by the following two scenarios:

- **Scenario 1.** ‘question-and-answer’ test-revision session with feedback.
  1. SMS server: sends periodically a new revision question
  2. Learner: responds (coded or free text)
  3. SMS server: sends feedback (true/false or a short answer, as appropriate)
  4. Learner: can request the same question
  5. SMS server: sends total score for each round

- **Scenario 2.** ‘decision-making’ session (helpdesk and customer support queries simulation).
  1. The client sends a text message to the SMS server with a request (a preferred biometric characteristic, related to the group project)
  2. SMS server: broadcasts message to the group
3) The group ‘votes’, sending votes to the SMS server
4) The SMS server scores the votes and notifies the group and the client
5) If the biometrics is not accepted, the client has to choose another one and the cycle is repeated
6) The client has the option to interrupt the process and to convene an online meeting (AUTO line).
7) The SMS server broadcasts the message regarding the meeting
8) The group responds
9) If there is a majority, the meeting goes ahead
10) The voting cycle might be repeated within the time frame

Some of the most relevant characteristics of virtual learning environments, such as the flexibility and control they offer learners, can be considered as factors that learners take into account when deciding to use a program. Flexible learning is understood as the ability to complete a training activity without any time or space constraints. Learner control is the capacity that a learner has to alter some of the activities in the learning process.

Enjoyment was generated predominately from a study conducted by Lee (2009) who focused on understanding the behavioral intention within online gaming context. Four distinct items were identified and adapted from this study. (4) System design features – five different items were mainly adopted from Lin and Sun (2009) study of the factors influencing satisfaction and loyalty within online shopping context.

The availability of mobile and wireless devices is enabling different ways of communicating. Mobile communications are no longer restricted to companies that can afford large investment in hardware or specialized software. Individuals now have easy and inexpensive access to mobile telephony, and the cost of mobile access to the Internet is steadily reducing. Mobile technologies have enabled a new way of communicating, typified by young people, for whom mobile communications are part of normal daily interaction, who are ‘always on’ and connected to geographically-dispersed friendship groups in ‘tribal’ communities of interest (Rudman & Sharples, 2002).

The advent of mobile technologies has created opportunities for delivery of learning via devices such as PDAs, mobile phones, laptops, and PC tablets. Collectively, this type of delivery is called m-learning. While m-learning can be thought of as a sub-set of e-Learning, the emerging potential of mobile technologies tends to indicate that m-Learning, while mostly situated within the e-learning framework, also has links directly to the ‘just enough, just in time, just for me’ model of flexible learning, and is therefore just one of a suite of options that can be adapted to suit individual learning needs.
The characteristics of mobile financial services

M-Learning is the newest member of the telecommunications industry. The benefits of utilizing this technology are boundless, and it provides technicians in the field much needed support and direction. With M-Learning, technicians can store video-based instructions for consumer products to ensure that they can answer every client question and provide maximum customer satisfaction. M-Learning enables technicians to have documentation on the installation of the latest communications systems at their fingertips, literally. The technology also enables workers to have personal access to job aids while out in the field.

People always need clear added values when using technology. Within this domain, one benefit can be providing the necessary mobility amongst students to support, for example, bedside teaching or problem based learning. The predominant mode of electronic learning today is ‘online’ (Savill-Smith and Kent, 2003).

Mobile technologies offer other educational alternatives. This article defines mobile learning as a new paradigm of flexible learning and describes scenario for blended learning, which integrates the mobile and the online learning environments. The monetary benefits of M-Learning are impressive as well. Storage and access of job-related aids and documentation on a personal digital device is less expensive and easier to implement than access that uses expensive test equipment intended for other purposes. Having information available to a technician or consumer on their personal device, rather than a company-owned piece of equipment, makes it more likely that the information will be viewed, applied, and accessed when needed.

Mobile user has to be seen from his context when using the application. Needs and expectations are not generic, but bound to this context. As a typical mobile banking user, we consider someone who already is an electronic banking user (Speed facts Online Research, 2001), shows significant affinity to technology and often finds himself in situations where he cannot rely on an infrastructure necessary for electronic banking. In their simplest form, mobile banking services enable users to receive information on their account balances via SMS. The new WAP- and Java-enabled mobile phones using GPRS support a wider variety of banking services such as fund transfers between accounts, stock trading, and confirmation of direct payments via the phone’s micro browser. Mellat bank has introduced successful mobile financial services for these smart phones.

The diffusion rate of mobile services having surpassed 20% of the total population, factors such as the discontinuing of subsidies for mobile device purchases after 2005 reduced the increase of subscriptions to a marginal level, and some carriers even experienced a decrease in subscriber numbers. This is evident in support of the assertion that the mobile services sector had reached its saturation point in terms of customer numbers, in other words, attained market maturity.

A mobile user has to be seen from his context when using the application. As a typical
mobile banking user, we consider someone who already is an electronic banking user, shows significant affinity to technology and often finds himself in situations where he cannot rely an infrastructure necessary for electronic banking (Attewell and Savill-Smith, 2004).

Some of the most noteworthy current developments in the Mellat mobile services are the start of 3G (third-generation) services and the explosive growth of wireless Internet. Wireless Internet is showing sharp growth, boosted by the advance of mobile technology, the extensive diffusion of mobile devices capable of connecting to the wireless Internet and color LCD display mobile devices, and diversification of digital content. The wireless Internet market grew from 2.0% of total mobile services sales in 2010, to 10% in 2011.

Theoretical background and research hypotheses

Mobile technology

Mobile technologies used as part of ‘normal business processes’; whether mobile technologies contributed to business efficiencies and greater productivity; the value of mobile technologies to the business; and the use of m-technologies for learning. The use of mobile technologies for business and personal purposes; product uses that were not an expected part of the product design; drivers of new product development (specifically whether designs responded to requests by particular customer demographic groups); future trends for mobile technologies; and whether mobile devices were being produced specifically for educational use (Anderson, 2005).

Businesses saw significant benefits from mobile technologies. The following list shows common business efficiencies from the use of m-technologies:

- Flexibility, speed, and more efficient networking, which allows access to large numbers of staff throughout the world
- Provision of efficient customer service
- A more efficient working environment, with less manual paperwork – work can be done faster, more flexibly, and with greater levels of accessibility
- More efficient training, saving time to inform staff about new products and processes
- Improved storage and backup of data, with much of the risk removed
- Saving of time and money
- Creating greater responsiveness to change

An example of how m-technologies were being used in business was provided by European’s Department of Transport, Energy and Infrastructure, which was implementing mobile communications for traffic signal maintenance workers (Zhang, 2003).
Customer loyalty

In several markets, consumers can gain further information regarding how well a product fits their preferences only by experiencing it after purchase. This could then generate loyalty for the products tried first. Consumers learn in the first period about the product they buy and then make choices in the second period about the competing products, given what they learned in the first period. In financial markets, consumers can gain further information regarding how well a service fits their preferences only by experiencing it after purchase. A consumer might learn how much a certain bank meets his needs only after going through several transactions at that bank. Furthermore, in several of these markets an important part of the different valuations for the different products is idiosyncratic to each consumer; that is, consumers have different relative valuations of the available services (Anderson and Srinivasan, 2003).

Customer satisfaction

Service quality is linked to users’ satisfaction in the information systems and marketing fields (Yen and Lu, 2008). Satisfaction in the field of marketing is defined generally as the feelings or judgments of the customer toward products or services after they have been used. Customer or client satisfaction is considered a key to success in today’s highly competitive environment. The importance of satisfaction as a factor in strategy development for customer and market-oriented firms cannot be underestimated and, not surprisingly, organizations have been increasingly active in conducting satisfaction surveys. In the literature, there is an intensive investigation of the relationship between e-service quality different factors such as reliability, responsiveness, personalization, security, trust, interactivity, accessibility, and satisfaction. Most of those studies found a positive association between e-quality factors and satisfaction (Choi, et al., 2008).

Mobile learning

It is predicted the next phase of electronic learning development will be focused in mobile learning. Mobile learning is the point at which mobile computing and electronic learning intersect to produce an anytime, anywhere learning experience. The following is the proposed framework for mobile learning (Sahadev and Purani, 2008).

Mobile learning using handheld computers, smart phones and dedicated gadgets, often with the added functionality of text and picture messaging, built-in cameras and location-awareness, presents a variety of technical and pedagogic opportunities and challenges to educators and developers. These are becoming understood and mobile learning is slowly making the transition from small-scale short-term trials to sustainable institutional embedding. This process implies a continued need to explore appropriate methods for evaluation.
Table 1

<table>
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<tr>
<th>Mobile learning framework</th>
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<tr>
<td>Mobile learning applications</td>
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<tr>
<td>Mobile user infrastructure (browser, handheld devices)</td>
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<tr>
<td>Mobile protocol (adoption of content with WAP)</td>
</tr>
<tr>
<td>Mobile network infrastructure (cellular systems, satellites,</td>
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</table>

This framework for mobile learning defines several functional levels, simplifying the design and development so that different parties (e.g. vendors, providers, designers) can address individual levels. By using this framework, a single entity is not forced to do everything to build mobile learning systems, but can build on the top of the functionalities provided by others.

The mobile learning environment possesses many unique characteristics, they are (Aboelmaged, 2010):

- Urgency of learning need: The wireless applications can be used for an urgent matter of learning, such as linking problem solving and knowledge.

- Mobility of learning setting: The wireless devices are developed to be more and more portable. Therefore, the educational practice can be performed at any time and any place, such as on a tour bus, camping area, exhibit room, etc. All kinds of field trip situations can be facilitated. This kind of learning setting can be preplanned or be opportunistic in nature.

- Interactivity of the learning process: Through the interfaces of voices, pointing, mails, icons, even videos, the learner can communicate with experts, peers, or other materials effectively, in the form of synchronous or asynchronous communication. Hence, the expert is more reachable and the knowledge is more available (Lundin & Magnusson, 2003).

- Situating of instructional activity: Via wireless applications, the learning could be embedded in daily life. The problems encountered, as well as the knowledge required are all presented in authentic context, which helps learners notice the features of problem situations that make particular actions relevant.

- Integration of instructional content: The wireless learning environment integrates many information resources, and supports learners to do non-linear, multidimensional, and flexible learning and thinking. It especially facilitates complex and ill-structured learning content, such as the cross-subject, theme based learning activities.

The relationship between customer satisfaction, the mobile learning and customer loyalty

Businesses that commit to human capital development through learning technologies are aware of the evolution of these technologies. Concerning online courseware, businesses
can choose between a variety of authoring systems. The characteristics of these authoring systems are similar: They provide units of learning (learning modules); integration of audio, video, and graphics; teacher management tools (student access to their grades); personal spaces for student Web pages; chat rooms; and media centers.

Nusair and Kandampully (2008) defined enjoyment the devises that attract the attention of the online system users with enjoyable inputs, it might include features such as animation, music, video, and other multimedia effects. They further argued that enjoyment is essential in attracting, satisfying, and retaining users.

There are several research projects measuring the impact of design features on satisfaction and other intentional aspects of behavior. Cyr et al. (2006) investigated how design features could influence customers’ loyalty within mobile industry context.

In the literature, there is an intensive investigation of the relationship between e-service quality different factors such as reliability, responsiveness, personalization, security, trust, interactivity, accessibility, and satisfaction. Most of those studies found a positive association between e-quality factors and satisfaction.

Cyr et al. (2006) linked usefulness and enjoyment directly to loyalty within mobile learning.. Accordingly, we formed the following hypotheses:

H1: mobile technology has a positive effect on mobile learning
H2: mobile learning has a positive effect on customer satisfaction
H3: mobile technology has a positive effect on customer satisfaction
H4: mobile learning has a positive effect on customer loyalty
H5: customer satisfaction has a positive effect on customer loyalty
The purpose of the research was to provide an indication of whether Mellat bank is actually using m-technologies and m-Learning in the ways portrayed by the popular media. This paper reports on the findings of that research, framed by the literature, using questioners to establish the status of m-technology use and m-Learning uptake. Questioners were conducted with 364 respondents, representing: Mellat bank that use mobile technologies; manufacturers of mobile devices and software developers for mobile applications; and educational and training institutions.

A quantitative study, involving the administration of a survey, was conducted in order to empirically measure and then test the relationship between variables.

This study has adjusted some variables by using the results of a preliminary survey conducted with researchers and marketing experts from the mobile services. The survey used the seven point Likert scale for rating. We chose the sample for the survey from current users of Mellat bank mobile services. A total of 364 survey forms were distributed. Among completed survey forms, excluding those with omissions or with randomly repeated answers, there were a total of 286 valid survey responses. SPSS 19 was used for basic statistical analysis, factor analysis and reliability analysis, and AMOS was adopted for analysis of the structural equation model.

The questions of this research were examined by these experienced mobile banking...
customers. All subjects involved in this research were required to answer the questionnaire based on their perception of m-Payment Systems. The questionnaire explores the correlation among constructs based on the literature regarding to determine key factors affect on customer loyalty in mobile learning systems. This questionnaire consists of 52 items in eight constructs. The participants indicated their agreement with a set of statements, using a 7- point Likert-type scale (ranging from strongly disagree to strongly agree) drawn from previously validated data collecting instruments.

Data analysis

To test the proposed hypotheses, data were collected and analyzed using structural equation modeling (SEM) supported by AMOS with maximum likelihood estimation. SEM is a second-generation multivariate technique that combines multiple regressions with confirmatory factor analysis to estimate a series of interrelated dependence relationships simultaneously. SEM is a widespread technique in several fields including marketing, psychology, social sciences and information systems. Hence, the structural equation model (SEM) is applied to validate the relationship among variables in the research model. This study applies Amos to perform data analyses. The measurement model is used to test the validity and reliability of items and constructs in the research model.

The steps described in the last section reduced the data and resulted in a manageable number of valid and more reliable measurement items which were then used to evaluate the structural model in this section. The overall fit indices for the proposed structural model were, $X^2/df$ ratio of 2.28, a CFI of 0.918 and the RMSEA of 0.051. These values indicated that the model fits the data well.

Having established the final structural equation model, it was possible to test the hypotheses developed for this study. These hypotheses can be tested by evaluating the path coefficients and the significance levels among the constructs in the model.

| Table 2 |
| Fit indices for the measurement |
| Fit indicators | Criteria | Structural model |
| $X^2/df$ | 3 | 2.28 |
| GFI | 0.9 | 0.94 |
| AGFI | 0.8 | 0.87 |
| NFI | 0.9 | 0.91 |
| CFI | 0.9 | 0.92 |
| RMSEA | 0.08 | 0.051 |
| RMR | 0.05 | 0.034 |
Table 3
The results of internal reliability and convergent validity

<table>
<thead>
<tr>
<th>Construct</th>
<th>Internal reliability</th>
<th>Convergent validity</th>
<th>Average variance extracted</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Cronbach’s alpha</td>
<td>Composite reliability</td>
<td></td>
</tr>
<tr>
<td>Mobile technology</td>
<td>0.89</td>
<td>0.89</td>
<td>0.78</td>
</tr>
<tr>
<td>Mobile learning</td>
<td>0.85</td>
<td>0.81</td>
<td>0.78</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>0.79</td>
<td>0.86</td>
<td>0.85</td>
</tr>
<tr>
<td>Customer loyalty</td>
<td>0.88</td>
<td>0.81</td>
<td>0.74</td>
</tr>
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</table>

Table 4
Mean, standard deviation, average variance extracted and correlations of each construct

<table>
<thead>
<tr>
<th>Construct</th>
<th>Mean</th>
<th>Standard deviation</th>
<th>Average variance extracted</th>
<th>Correlation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mobile technology</td>
<td>3.44</td>
<td>0.71</td>
<td>0.73</td>
<td></td>
</tr>
<tr>
<td>Mobile learning</td>
<td>3.35</td>
<td>0.73</td>
<td>0.33 **</td>
<td>0.68</td>
</tr>
<tr>
<td>Satisfaction</td>
<td>3.57</td>
<td>0.70</td>
<td>20.03</td>
<td>0.16 *</td>
</tr>
<tr>
<td>Customer loyalty</td>
<td>3.25</td>
<td>0.71</td>
<td>0.01</td>
<td>0.25 **</td>
</tr>
</tbody>
</table>

Notes: * Significant at p < 0.05 (two-tailed); ** Significant at p < 0.01 (two-tailed)

Figure 3 presents the results standardized path coefficients between the proposed constructs. Customer satisfaction was significantly influenced by the proposed mobile dimensions.

Thus all of hypotheses were supported. Moreover customer loyalty towards the bank was significantly influenced by satisfaction and proposed mobile learning factors. The path coefficients of satisfaction and other mobile learning factors accounted for approximately 62 percent of the observed variance in customer loyalty towards the banks.
The primary objective of this study was to examine customer loyalty of mobile learning system in Mellat bank. The purpose of this study is to develop empirically test factors that would influence customer loyalty in m-learning. The results showed that customer loyalty of m-learning was determined by the factors in the model.

The proposed model enhanced the understanding of formation of customer loyalty. This research verifies the effects of satisfaction and proposed mobile learning factors on customers’ loyalty in m-learning. In line with past studies, this research found that satisfaction is an important determinant of customer loyalty. In addition, while previous studies indicated that interactivity and responsiveness directly affect customer loyalty, here it is found that these two factors influence customer loyalty indirectly. Moreover, it is revealed that the determinants of satisfaction, pave the way for a detailed exploration of how to improve customer satisfaction (Rudman. & Sharples, 2002).

This study showed empirically that mobile technology has a direct and positive effect on mobile learning; but its effects are low, because this technology is able to be copied and used by other companies. When the technologies that support mobile learning are being used for access to required knowledge, can improve customer loyalty(Ellis, 2003).

This study is undertaken to address these issues by identifying three critical factors that customer Perceive as important for loyalty. It was concluded that mobile technology,
mobile learning, customer satisfaction, were the most important. Hence, this study is
discusses to represent a useful contribution, relative to theoretical considerations and
empirical analysis of the factors that will be of value to systems designers and policy
makers working within online transacting environments. In Iran m-commerce has created to
business opportunities for banks in general. As more customers conduct their business
activities on the mobile internet, the demand for mobile banking services will continue to
grow. How to retain existing customers and attract new ones are the issues. The results of
this study suggest that by focusing on and improving the m-learning factors, banking on the
mobile internet can provide a more satisfying experience to customers. In turn customer
loyalty may be developed to help banks retain their existing customers.

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