An empirical study of user acceptance of lifelong learning on the move

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Abstract: Mobile learning is the ongoing project that aims at fulfilling learning requirements in informal settings for Shanghai citizens. In order to understand whether users like using the mobile learning materials, an empirical study was conducted in a simulated field situation that was based on an integrated model. Fifty volunteers were recruited from the target population to participate in this study. The results showed that perceived quality had a significant influence on user satisfaction, as well as on individual intention to adopt. The findings of this study will help mobile learning content providers to develop learning materials based on an understanding of the perceptions of potential adopters.

Keywords: user acceptance, information system success, mobile learning system, user satisfaction, simulated field study

1. Introduction

In a rapidly changing world, mobile and pervasive technologies provide a new way for lifelong learners to access learning at any time and anywhere. Lifelong learners are typically engaged in a variety of learning activities for the practical purpose of addressing immediate problems, gaining understanding, or practicing a skill as the needs emerge (Fischer & Konomi, 2007). One striking feature of mobile learning is that learners typically perform different activities that might compete for attention simultaneously (Lin et al., 2007). With the understanding that there are always other distractions competing for limited time and attention resources in mobile situations, the exploration of user behavior could prove helpful to designers who want to make learning materials for mobile users that better serve the everyday user's needs. Therfore this study explores user acceptance and factors that influence mobile learning content delivery for daily usage. The findings in this study will be used as a basis for further diffusion of the mobile learning system in the lifelong learning network in Shanghai. This study will provide new knowledge about user acceptance of mobile technology in learning and show how to better serve the needs of the lifelong learner on the move.

2. Research framework

We start this investigation by linking an Information System (IS) success model (DeLone & McLean, 2003) with a Technology Acceptance Model (TAM) (Davis, 1989), both of which are broadly used in IT research and practice fields. By using an integrated IS success and user acceptance model, this study will attempt to identify the factors that affect user intentions to use mobile learning in their lifelong learning.

In our research context, we need to know whether the mobile learning system has potential value to users, so success should be measured from the perspective of users and focus on the model to explain intention to use/reuse. The success of mobile learning is focused on the quality and satisfaction association, while quality is interpreted as user perceptions of usefulness, usability, and task fit (Figure 1). Meanwhile external variables were added as precedent factors that affect the perceived quality of the mobile learning system. Perceived quality of usefulness, usability, and task fit are the major determinants of satisfaction that further affect the intention to use and reuse.

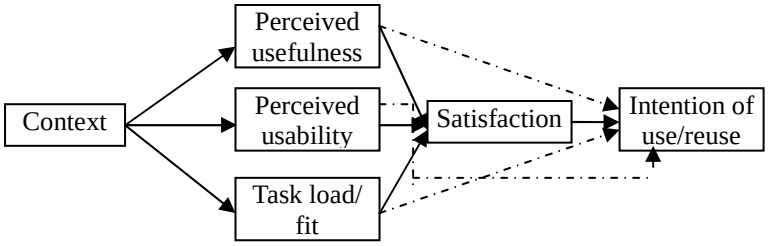

Figure 1 Research framework

The success of the mobile learning system in contributing to individuals achieving their learning goals was the starting point of our research framework. Due to the difficulties of measuring the quality of a system, we propose to measure the quality using perceived usefulness, perceived usability, and task load as predictors of user satisfaction by integrating the measures from TAM and task-technology fit.

Lifelong learning on the move presumably takes place in various contexts, whenever the user can find available time. It is hypothesized that different usage contexts would have significantly different effects on the user's perception of usefulness, usability and task load for a learning product in use. Typical usage contexts are waiting and, on some occasions, walking. The contexts of waiting and walking are different, but we can project them onto three situations, according to previous studies: sitting, walking in a line, and freely walking along a path (Barnard et al. 2005; Lin, et al., 2007). The context of mobile learning was added to our framework as a form of ‘facilitating condition’.

User satisfaction is the resulting attitude from the quality-value linkage of the IS success model (DeLone & McLean, 2003; Seddon, 1997; Rai et al. 2002), which is related to the intention to use in the updated IS success model (DeLone & McLean, 2003). The construct of satisfaction is a form of attitude toward behavior in the TAM, which is one of the predictors of behavioral intention (Davis et al., 1989). In our framework, user satisfaction was presumably directly affected by the quality of the mobile learning system, and this determined a user's adoption intention.

3. Methodology

The participants were widely recruited from the target lifelong learning population in Shanghai. An online questionnaire about attitudes towards obtaining information or resources with mobile phones, along with an invitation note to participate in our research was circulated on the popular social websites (such as renren.com), BBS, e-mail lists, and also in print form via leaflets in Shanghai. In the two weeks before the field study, 117 questionnaires were collected containing basic demographic information about the respondents, their attitudes towards obtaining resources with mobile phones, and a question about whether they would like to take part in the user experience study. The first 50 volunteers who ticked ‘I’d like to’ were invited to participate in the simulated field study.

The difficulties of obtaining user experience from real situations necessitated that we conducted a simulated field study, similar to Barnard et al (2005) and Lin et al. (2007), in which three mobility conditions were designed to correspond with the three typical mobile learning contexts chosen for this research: waiting (including sitting and standing), free walking (free of all obstacles), and walking through an obstacle course. Participants were asked to be seated in the waiting condition, while free walking involved walking along a path free of obstacles at a comfortable speed.

A testing protocol was designed for participants to follow in the experiment. Participants were asked to make a choice from a pool of available mobile learning resources, according to their own perception that the material could be useful then or in the near future. They were asked to enter one of the three different simulated contexts and situated themselves in any of them. Then to complete three tasks using any of the learning materials they selected, *i.e.*, open, start learning, or quit on finish. After the tasks were finished, the participants were asked to finish a self-reporting survey.

The self-reporting survey was developed by adapting instruments from previous studies, as appropriate for this research context. Five measures were developed to assess the user intentions to use/reuse and the factors affecting this: *Perceived usefulness* (α=0.892), *Perceived usability* (α=0.914), *Task load/fit* (α=0.917), *Satisfaction* (α = 0.843) and *Intention to use/reuse* (α = 0.776). The 32 items for these five constructs were measured using a 7-point Likert scale labeled from 'strongly agree = 7' to 'strongly disagree = 1' (α = 0.956).

4. Results

A multiple regression analysis for the hypothesized model was performed to explore the relationships among the external factors, user perspectives of learning material quality, satisfaction, and intention of adoption. Altogether, the proposed model accounted for 52.8% of the variance in intention to use/reuse. Details have been elaborated in the following paragraphs of external factors and internal factors.

A MANOVA was used to further explore the influence of external variables on perceived quality of mobile learning products. With F as 2.757 (P =0.065), 7.976 (P = 0.000) and 5.119 (P=0.006), the results show that in different mobility contexts, users exhibited significant differences in their perception of usability and work load, but no difference were found on perception of usefulness.

Post hoc test comparisons showed that in terms of work load, there was a significantly better fit in the context of waiting, compared with free walking and walking through an obstacle course. There was no significant difference between the contexts of free walking and walking with obstacles. In terms of perceived usability, the results were significantly better in the context of waiting compared with walking through obstacles. There was no significant difference in perceived usability, either between waiting and free walking or between the two different walking contexts. Thus, the mobility context had significant effects on user perceptions of usability and task load.

The internal factors included the perceived usefulness, perceived usability, and workload fit were presumably affected by external factors, especially the mobility context, so this might have affected user satisfaction and thereby affect a user's intention of adoption. The Pearson correlation from the regression analysis showed that there were significant correlations between the internal factors of perceived usefulness, perceived usability, work load fit, and satisfaction. Regression analysis further supported casual effects on user satisfaction by perceived usefulness, perceived usability, and task load fit. With a coefficient of 0.7000 and a coefficient of determination of 0.487, these three factors can explain 48.7% of the variance in user satisfaction.

The correlation coefficients between the variables presumably determined the intention to use/reuse, which were also positively correlated. The casual effects were further supported in the stepwise regression analysis, where satisfaction explained 39.3% of the variance of user intentions of adoption, satisfaction and perceived usability explained 46.8% of the variance, while satisfaction, perceived usability, perceived usefulness explained 52.8% of the variance of user intentions of adoption.

The path coefficients in show that the standardized coefficients of perceived usefulness, task load fit, and perceived usability were 0.319 (t = 7.568, P = 0.000), 0.322 (t = 6.890, P =0 .000), and 0.208 (t = 5.191, P = 0.000), and of them were significantly correlated with user satisfaction. The standardized coefficients of satisfaction for perceived usability and perceived usefulness were 0.307 (t = 7.107, P = 0.000), 0.292 (t = 7.791, P = 0.000), and 0.304 (t = 7.569, P = 0.000), and all of them were significantly correlated with user intentions to use/reuse. Task fit had a significant effect on user satisfaction and stepwise regression on intention, but the effect of task fit on user intention to use was not significant.

5. Discussion and Conclusions

The results indicate that perceived usefulness had a significant influence on user satisfaction and individual intention of adoption. This means that the majority of users were concerned with the possible usefulness of the learning material. Another measure of perceived quality of a mobile learning system, perceived usability, was found to have a significant impact on user satisfaction and individual intention of usage. This means that most of the users tend to adopt the mobile learning if it results in a satisfactory experience. Thus, the content provider of lifelong learning on the move should pay special attention on the usefulness and usability of the learning materials. As expected, we found that task fit, the construct that was separated from perceived ease of use, had a significant impact on user satisfaction. Although contrary to our expectation that task fit would indirectly influence user intention of adoption, this finding still suggests that the majority of users were concerned about the time needed to finish learning on the move and the complexity of the learning task in a contextual situation full of distractions. Therefore, the content provider should strive to design the learning tasks to fit the complexity likely to occur in mobile learning situations.

Meanwhile, external factors had a significant impact on the user's perceived quality toward the mobile learning materials. We found that perceived usability and workload fit were affected by different mobility contexts. On the onther hand, differences in mobility contexts did not have a significant impact on perceived usefulness. This means that the potential usefulness of the mobile learning materials was context-independent, while perceived quality of usability, subjective attractiveness, and task load fit were related to the different contexts of usage. Thus, mobile learning providers should take the mobility context into consideration when they design learning material and suitable learning tasks for lifelong learners on the move.

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