

Learners' Satisfaction towards M-learning

Based on an Empirical Study on an App of English Words Learning

Yong-Jun ZHANG ^{a*}, Xue-Song ZHAI ^b, Fang WANG ^c Wen-Xing CAI ^d

a. Foreign Language School, Anhui Jianzhu University, China

b. Foreign Language School, Anhui Jianzhu University, China

c. Foreign Language Department, Hefei University, China

d. Foreign Language School, Anhui Jianzhu University, China

^{*}andyzhyj@126.com

Abstract: In this paper, related researches on M-learning and mobile vocabulary learning are generally reviewed, and five hypotheses concerning learners' satisfaction towards M-learning are put forward. Hypotheses are tested based on learners' data after their experience of using an English words learning App. The findings indicate that perceived ease of use, perceived usefulness and self-efficacy have positive significance on learners' satisfaction, but the facility and learners' learning attitude have no significant influence on learners' satisfaction toward m-learning.

Keywords: M-learning, satisfaction, English words learning, model

1. Introduction

The development of the Internet has created a new way for educators to communicate with learners. In particular, the mobile devices have become ubiquitous on today's college campuses. In this paper, based on the test (Mobile Memory Knowledge), we argue that the benefits in philosophical and practical development in education have created good conditions for the pedagogical use of mobile technologies based on authentic learning.

M-learning embraces many features of e-learning such as multimedia contents and communications with other learners (Horton, 2011). M-learning is often thought as a form of e-learning, and would be more correctly defined as a part of e-learning. M-learning is not only wireless or Internet based e-learning, but should include the anytime/anyplace concept without permanent connection to physical networks (Jones & Jo, 2004). Mobile learning is a specific type of learning model using mobile technology (Naismith et al., 2004), while e-learning is learning experiences to support individual learning with various types of computer technologies (Moore, 2007; Horton, 2011).

The introduction of mobile devices into the concrete learning process can complement e-learning by creating an additional channel of assessment with mobile devices such as PDAs, mobile phones, portable computers. Although there are previous studies concerning mobile vocabulary learning with regard to its content design (Perez et al., 2011), learning approach (Joseph et al., 2005; Wong & Looi, 2010), system development (Chen & Chung, 2008), effectiveness (Lu, 2008; Zhang et al., 2011), there is little research focusing on the satisfaction of using mobile devices to learn English words. Therefore, this paper focuses on learners' satisfaction towards m-learning based on learners' data after their experience of using an English words learning App. Based on American Customer Satisfaction Index (ACSI) and Technology Acceptance Model (TAM), the factors influencing learners' satisfaction may include perceived ease of use, perceived usefulness, facility, learners' learning attitude, learners' perceived self-efficacy. Thus, we have five hypotheses as follows:

H1: Perceived ease of use has a positive effect on satisfaction toward m-learning
 H2: Perceived usefulness have significant influence on satisfaction toward m-learning
 H3: Facility will positively influence learners' satisfaction to m-learning
 H4: Learners' learning attitude will influence their satisfaction to m-learning
 H5: Learners' perceived self-efficacy toward m-learning positively influence their satisfaction

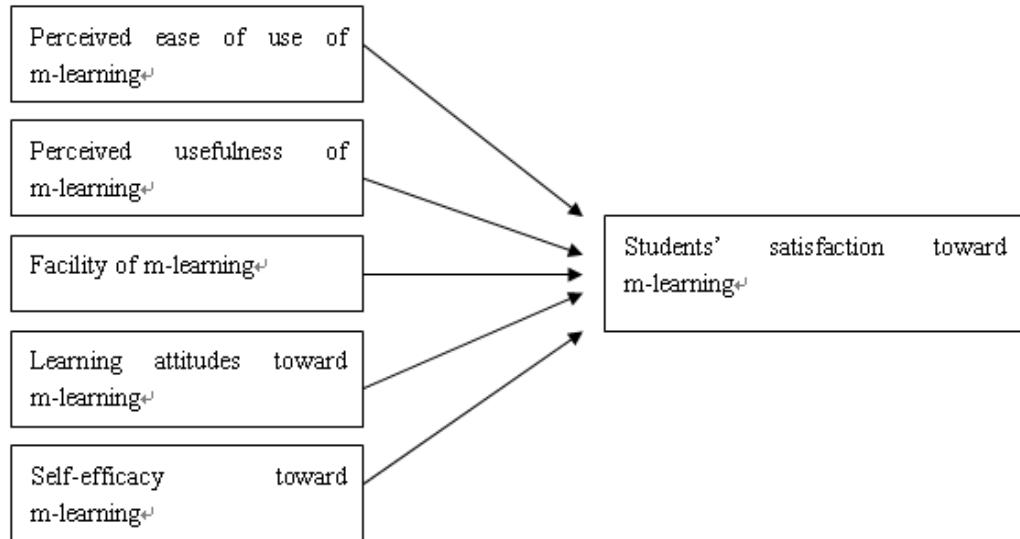


Fig 1. Hypothetical model

2. Methodology

2.1 Participants

83 Undergraduate learners in Anhui Jianzhu University were asked to take part in our study in the very beginning. Since the subjects' higher perception of m-learning would make the result of our study more reliable, we just firstly conducted a survey on participants' perception of m-learning by asking them to complete a questionnaire. We also offered some small gifts to learners to maximize the response rate. After data analysis of the survey by using SPSS19.0, 70 participants are kept for the following research. The participants were between 18-22 years old, and all of them possessed mobile phones. The experience of using mobile phones exceeded 4 years.

2.2 Procedure

The steps of this research are as follows. Participants firstly use the software "Mobile Memory Knowledge" to memorize the words and do the questionnaires. And then the data are collected, after which the useless data are deleted and the valid data are kept. The last step was to analyze the result of data and reach conclusion.

Fig 2. shows a simple introduction of software "Mobile Memory Knowledge", in which four parts such as 'log in', 'category', 'practice', and 'test' are included. It shows us how to use the App. As Fig 2. shows, you should log in the App and choose one module you are interested in, and then begin to memorize and use the words. The App will provide you with the pronunciation of the word, the sample sentences and usage of it. At last, you will have a test to review the words you have learned.



Figure 2. Introduction of software “Mobile Memory Knowledge”

2.3 Instrument

To measure the satisfaction towards m-learning, we developed an English questionnaire first, and then translated it into Chinese by a team consisting of four researchers from English department. The questionnaire consists of 24 items addressing all six constructs.

The questionnaires of ease of use and usefulness, developed by Tsai, Lin, and Tsai (2001), were used in this study to measure learners' perceived ease of use and perceived usefulness of the App in the mobile devices. Learning attitude and facility were measured by 5 items and 4 items respectively, which were adopted and adapted from Tsai et al.(2001). In addition, the questionnaire of self-efficacy was modified from that of Cheng & Tasi (2011).

2.4 Data analysis

To measure the reliable data, at the beginning, researchers make the loading analysis for each item. Some items with low loading should be removed and available items remained (loading value > 0.5). The coefficient Alpha values of all items in the quiz were better than 0.6 except the learning attitude (0.489) indicating that they almost reached reasonable standards of internal consistency and reliability. And we have examined the correlation between these variables, table 2 and table 3 showed the result. Analysis was carried out using SPSS 19.0.

3. Result

Exploratory factor analysis was carried out to figure out whether these data reflect the suggested factors before confirmatory factor analysis (CFA). With 70 sample size, the Kaiser-Mayer-Olkin (KMO) measure of sphericity exceeds the level of 0.6, and the Bartlett's test of sphericity is significant ($P < 0.01$). The data collected were analyzed by CFA to test the factor structure stability and internal consistency. Some items with low loadings are not reasonable match between data model and the theoretical model should be cut out, the fit measures determine the stability of the factor structure.

To assess the reliability and validity of the m-learning measurement scales, factor analysis was performed. As Table 1 shows, Cronbach's α values range from 0.489 to 0.806, which indicates that all variables have acceptable reliability except learning attitude. And we tested the measurements' convergent validity and discriminant validity. The results revealed that all of the lists' loading were up 0.60 criteria. A cronbach's α value that is greater than 0.7 suggests high reliability. The reliability values of perceived ease of use of mobile devices and the learning attitude toward mobile learning are 0.65 and 0.49, respectively. The reliability values of the other items are higher than 0.70 indicating a commonly acceptance level for exploratory research. As Table 1 shows, the values of composite reliability ranged from 0.50 to 0.90, which were above the 0.50 recommended level.

Table 1. Loadings, Cronbach's Alpha (α), Composite Reliability

| Variable | Loading | Cronbach's α | Composite Reliability |
|-----------------------------|-----------|---------------------|-----------------------|
| Perceived ease of use (PEU) | 0.72-0.84 | 0.65 | 0.65 |
| Perceived usefulness (PU) | 0.70-0.78 | 0.77 | 0.78 |
| Facility (F) | 0.63-0.67 | 0.74 | 0.82 |
| Learning attitude (LA) | 0.60-0.69 | 0.49 | 0.50 |
| Self-efficacy (SE) | 0.65-0.80 | 0.80 | 0.90 |
| Learning satisfaction (LS) | 0.68-0.75 | 0.76 | 0.78 |

** $P < 0.01$

Table 2. Means, Standard Deviations, Correlations in Diagonals

| | Mean | SD | PEU | PU | F | LA | SE | LS |
|-----|------|------|--------|--------|--------|--------|------|----|
| PEU | 4.01 | 0.51 | 1 | | | | | |
| PU | 3.56 | 0.67 | 0.32** | 1 | | | | |
| F | 3.99 | 0.64 | 0.38** | 0.09** | 1 | | | |
| LA | 3.78 | 0.55 | 0.29* | 0.31** | 0.22** | 1 | | |
| SE | 3.52 | 0.65 | 0.21** | 0.18** | 0.16** | 0.23** | 1 | |
| LS | 3.36 | 0.45 | 0.20** | 0.10** | 0.28* | 0.12** | 0.3* | 1 |

* $P < 0.05$, ** $P < 0.01$; SD, Standard deviation.

As table 2 shows, all mean scores are higher than the mid-point in the 5-point scale. All mean value have exceeded 3.52 except the learning satisfaction's mean value is 3.36. And every variable are interdependent with each other. P value signifies that, ease of use, usefulness of mobile devices, good facility, learners' learning attitude, self-efficacy and learning satisfaction have significant correlations.

From table 2, we can prove that mobile devices' ease of use, usefulness, facility, learners' learning attitude, and self-efficacy have significant correlations with learning satisfaction. Correlation analysis which was used to test the relationship between each scale and learning satisfaction can't make a final conclusion about the causal relationships. Therefore, regression analysis was used to explain the relationship between perceived ease of use, perceived usefulness, facility of m-learning, learners' learning attitude, self-efficacy and learning satisfaction.

In the preliminary regression analysis, both the learning attitude ($\beta=0.216$, $p>0.05$) and facility ($\beta=-0.018$, $p>0.05$) didn't have a significant effect on satisfaction and were excluded from the

regression model. In the final model of Table 3, perceived ease of use ($\beta=0.39$, $p<0.05$), perceived usefulness ($\beta=0.051$, $p<0.05$) and self-efficacy ($\beta=0.017$, $p<0.05$) have a positive significant effect on satisfaction of undergraduates to m-learning.

Table3 Regression coefficients and their significance in predicting satisfaction of undergraduates to M-learning

| Model | Unstandardized Coefficients | | Standardized Coefficients | | |
|---------------|-----------------------------|------------|---------------------------|------|---------|
| | B | Std. Error | Beta | t | p-value |
| Ease of use | 1.85 | .55 | .39 | 3.38 | .001 |
| Usefulness | .045 | .12 | .051 | 2.38 | .03 |
| Self-efficacy | .013 | .092 | .017 | 2.16 | .03 |

a. Dependent Variable: satisfaction of undergraduates to m-learning

4. Discussion

The constructed model helps to test the five hypotheses. The significant impact of perceived ease of use and perceived usefulness indicated that college learners who feel m-learning is easy to use and useful are more likely to use mobile devices for their courses. Therefore, a new system which was easy to use should overcome the technical limitations of mobile devices mentioned earlier. Shortcomings such as the smaller screen size and slower network speed should be considered when designing a user interface and content structure. The meaningful use of mobile devices for their courses would be an important means of guiding college learners to utilize m-learning (Liu et al., 2010). And the first step to implement m-learning is providing useful mobile course information. Data of self-efficacy implies that learners with confidence in using mobile devices would lead to a greater possibility of m-learning adoption. As Shih and Mills (2007) suggested, learners are familiar with certain forms of mobile activities, such as texting, taking pictures, or voice recording, which can be used to achieve an educational goal. Surely, it is supposed to be noted that college learners' self-efficacy would be different depending on the concrete application of mobile devices. For instance, learners' confidence in learning English would be lower than their confidence in online chatting.

No significant effect was found between learning attitude or facility and learner's satisfaction, which indicated that learners haven't accepted m-learning as a main learning method and learners are not interested in learning English by mobile devices. Furthermore, with the upgrading of phones, the good mobile facility was already widely used, therefore, learners don't think facility have a significant effect on satisfaction. Overall, this study not only expands the scope of m-learning and mobile vocabulary learning, but also shed light on the future study from the perspective of learners' experience.

On the other hand, the results of the present study should be treated with some caution due to a number of limitations. First, the study was based on a sample of 70 learners, and the App of learning English words was used by most of the participants for the first time. It is disputable to generalize learners' motivation or attitude based on such a short time. Therefore, caution is advised when trying to generalize these findings to a broader population. Second, the survey builds on self-report instruments to study learners' satisfaction toward m-learning, which may make the result not completely objective. So we considered a further research. In the future, the findings might be examined by a mixed design where learners are provided with chances to use it.

Acknowledgements

This study is supported in part by Basic Research and Development Program of Hefei University (12KY02RW).

References

Chih-Ming Chen, & Ching-Ju Chung. (2008). Personalized mobile english vocabulary learning system based on item response theory and learning memory cycle. *Computers & Education*, 51(2), 624–645.

Moore, D. R. (2007). E-learning and the science of instruction: proven guidelines for consumers and designers of multimedia learning. *Performance Improvement*, 54(2), 197-200. Compeau, D., & Higgins, C. A. (1995). Computer self-efficacy : development of a measure and initial test. *MIS Quarterly*, 19(2), 189-211.

Horton, W. K. (2011). *e-Learning by Design*. Wiley John + Sons.

Jones V.,&Jo H.J.(2004). Ubiquitous learning environment: an adaptive teaching system using ubiquitous technology. In: Proceedings of the 21st ASCILITE conference, Perth, Western Australia, 5-8 December,2004.

Joseph, S., Binsted, K., & Suthers, D. (2005). PhotoStudy: Vocabulary Learning and Collaboration on Fixed and Mobile Devices. *Wireless and Mobile Technologies in Education*, IEEE International Workshop on(pp.206-210). IEEE Computer Society.

Kun-Hung Cheng, & Chin-Chung Tsai. (2011). An investigation of taiwan university students' perceptions of online academic help seeking, and their web-based learning self-efficacy. *Internet&shiger Education*,14(3), 150–157.

Liu, Y., Li, H., & Carlsson, C (2010). Factors driving the adoption of m-learning: an empirical study. *Computers & Education*, 55(3), 1211-1219

Lu, M. (2008). Effectiveness of Vocabulary Learning via Mobile Phone. *Journal of Computer Assisted Learning*, 24(6), 515-525.

Naismith, L, Lonsdale, P., Vavoula, G., Sharples, M. (2004). NESTA future lab report 11: Literature review in mobile technologies and learning. Retrieved from http://www2.futurelab.org.uk/resources/documents/literature_review/Mobile_Review.pdf.

Perez, M. M., Cornillie, F., Senecaute, M. P., Wannemacker, S. D., & Desmet, P. (2011). Mobile vocabulary learning : activities allowing for interaction through input enhancement. *Communications in Computer & Information Science*.

Shih, Y. E., & Mills, D. (2007). Setting the new standard with mobile computing in online learning.. *International Review of Research in Open & Distance Learning*, 8(2).

Tsai, C.-C., Lin, S. S. J., & Tsai, M.-J. (2001). Developing an Internet attitude scale for high school students. *Computers & Education*, 37, 41-51.

Wong, L- H., & Looi, C- K. (2010). Vocabulary learning by mobile- assisted authentic content creation and social meaning- making: two case studies. *Journal of Computer Assisted Learning*, 26(5), 421-433.

Zhang, H., Song, W., & Burston, J. (2011). Reexamining the effectiveness of vocabulary learning via mobile phones. *Turkish Online Journal of Educational Technology*, 10(3), 203-214.