

## EXPLORING COLLEGE STUDENTS' ATTITUDES AND SELF-EFFICACY OF MOBILE LEARNING

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### ABSTRACT

Previous studies have indicated that computers and the internet play very important roles in students' acceptance and use of new information technology. In recent years, with the rapid development of mobile technology, mobile learning (m-learning) has becoming another popular topic. However, little is known about the students' attitudes and self-efficacy with the use of a mobile device in language learning. The purpose of this study was to investigate the attitudes and self-efficacy of using mobile learning devices for college students in a language class by employing task-based instruction. The sample group of the study comprised 58 second-year students at a technical university in central Taiwan who used mobile devices for m-learning in an English class to complete assigned tasks under the guidance of the instructor. Results showed that most students agreed that their motivation for English learning was enhanced and most of them had positive attitudes towards m-learning. Implications for future research and the practice of m-learning are discussed.

**Keywords:** computer self-efficacy, m-learning, language learning, task-based approach

### INTRODUCTION

The growth of mobile technologies, like mobile phones, smart phones, personal digital assistants (PDA), and Tablet PCs have attracted the attention of the educators and researchers (Mcconatha, Praul & Lynch, 2008; Motiwalla, 2007; Thornton & Houser, 2002; Patten, Sa´nchez & Tangney, 2006) to consider its pedagogical implications. Seppala and Alamaki (2003) pointed out that the instruction via mobile devices would play an important role in the educational realm, given that 98% of the university students possessed cell phones. The educational use of the mobile devices was referred to as mobile learning (m-learning) with the focus on facilitating and extending the reach of the teaching and learning, such as the knowledge construction, the information collection and exchange, the collaborative learning (Hine, Rentoul, & Specht, 2004), independent learning (Bull & Reid, 2004) and lifelong learning (Attewell & Savill-Smith, 2004). Huang, Jeng, and Huang (2009), for example, adopted a mobile blogging system as a means for generating collaboratively interactive and learning opportunities for geographically dispersed persons and groups. Vavoula et al. (2009) used mobile phones for inquiry-based learning to allow learners to gather information during school visits to museums.

Mobile learning has been acknowledged as a useful approach in language skills training, particularly for English as Foreign Language (EFL) students (e.g., Chen & Huang, 2010; Chang, Chen, & Hsu, 2011; Hwang & Chang, 2011; Lee, 2009; Sandberg, Maris, & Geus, 2011). Due to the spontaneous, informal, contextual, portable, ubiquitous, pervasive, and personal features of the mobile learning, students were provided with more access and greater exposure to abundant authentic learning contexts (O'Malley et al, 2003). The authentic learning contexts via mobile learning in turn have positive effects on second language acquisition (Gulati, 2008; Judd, Kennedy, & Cropper, 2010; Kreijns, Kirschner, & Jochems, 2003; Mompean, 2010). The authentic learning contexts help students bridge the gap between formal and informal learning experiences (Kolb, 2006; Wagner & Wilson, 2005). In other words, the authentic tasks in real word situations allow students to connect the contents of the textbooks with real world materials to achieve better comprehension and learning outcomes (Kolb, 2006). Wagner and Wilson (2005) also highlighted that students can better transfer the acquired language skills into the real life situations if they have developed the language skills in authentic contexts. In addition, students demonstrated high learning motivation when they became engaged in the authentic learning tasks.

Related empirical studies have manifested the effectiveness of mobile learning upon the language teaching and learning. For example, Attewell (2005) designed a mobile learning project to motivate students to learn a foreign language. She found that 82% of the students improved their reading comprehension and spelling skills via mobile learning, and 62% of the students expressed their continual use of mobile devices to learn the language. Basoglu and Akdemir (2010) recruited 60 university students to examine the effectiveness of the mobile devices and conventional flashcards upon English vocabulary learning. The findings showed that students displayed better academic performance in the learning vocabulary and had positive attitudes toward learning English vocabulary via mobile learning.

Many factors may negatively influence the effectiveness of mobile learning upon language instruction which result in a lower percentage of the students' learning participation in mobile learning (Gulati, 2008; Isman &

Celikli, 2009; Judd, Kennedy, & Cropper, 2010; Kreijns, Kirschner, & Jochems, 2003; Mompean, 2010). Students' computer self-efficacy and attitudes were the core factors which determined the success of the students' participation in mobile learning (Isman & Celikli, 2009), as previous studies pointed out that people with high computer self-efficacy were more actively engaged in computer related activities (Davis et al., 1989; Delcourt & Kinzie, 1993; Hill, Smith & Mann, 1987). Computer self-efficacy (CSE) is defined as the "judgment of one's capability to use a computer" (Compeau & Higgins, 1995, p. 192). In other words, the CSE refers to the belief that one possesses in their competence for using computers (Topkaya, 2010). The attitude toward computers was often regarded as an essential component of the CSE (Barbeite & Weiss, 2004; Compeau & Higgins, 1995; Hsu, Wand & Chiu, 2009; Kao & Tsai, 2009; Brock & Sulsky, 1994; Busch, 1995; Harrison & Rainer, 1992; Hassan, 2003; Potosky, 2002). Previous studies also revealed that the CSE was influenced by the psychological factors, including computer anxiety and the perceptions toward computers as helpful and self-directed tools (Brock & Sulsky, 1994; Barbeite & Weiss, 2004; Kao & Tsai, 2009). In studying the relationship between the CSE and the computer anxiety, Compeau and Higgins (1995) found that people with lower CSE were more frustrated and anxious in operating and using computers for problem solving. Some researchers also associated the individual social-cultural backgrounds such as genders, ages, or years of computer usage with the CSE and the attitudes toward computers (e.g., Gattiker & Hlavka, 1992; Harvey & Wilson, 1985; Venkatesh & Morris, 2000). However, comparatively scant studies on mobile learning have probed the nature of the CSE and its relationship with the students' attitudes toward the use of mobile learning for language instruction.

### PURPOSE OF THE STUDY

The purpose of this study is to use a Mobile Attitude Survey (MAS) and a Mobile Self-efficacy Survey (MSS) to investigate the relationships between the students' CSE and their attitudes toward mobile-learning. In addition, some other variables including gender and internet experience were analyzed as well. Three research questions were addressed in this study:

1. What are the students' attitudes towards the use of the mobile device for m-learning?
2. What is the students' self-efficacy towards the use of the mobile device for m-learning?
3. Is there any gender difference in students' attitudes and the self-efficacy in m-learning?

### RESEARCH METHOD

#### Participants

The sample of the study comprised 58 second-year college students (48 males and 10 females), who had minimal experience of using mobile devices for m-learning. The students were from a department at a college of engineering. The 58 students had prior training for 2 weeks before the mobile learning implementation. The students' English proficiency was determined by their English test score from the entrance examination at a pre-intermediate level.

#### Research setting

The participants took the Advanced English course at a technical university in central Taiwan. The researcher used *Academic Connections* as the reading material for the course. Inside the textbook, the instructor chose two main topics for students to read and perform tasks from: marketing and green chemistry. The activities lasted for six weeks, and included in-class instruction and m-learning activities. After the reading, the researcher assigned the students different tasks for in-class online discussion. For example, information gaps with the Green chemistry issues, which included problem solving skills and which encouraged students to negotiate meanings and carry out conversations. Five situational scenarios based on these two units were created for the students to undertake problem-solving discussion tasks in an m-learning environment. All of the students utilized their mobile phones after class for searching information, posting, answering questions, and filming related materials.

#### Data collection and analysis

In order to investigate the students' attitudes and self-efficacy toward the m-learning, the researcher adopted two instruments: an m-learning attitude survey and an m-learning self-efficacy survey. The m-learning attitude survey was adapted from Tsai, Tsai, & Hwang's (2010) PDA attitude scale, with some additional modifications being implemented by the researcher. The m-learning self-efficacy survey implemented in this study was derived from Tsai and Tsai's (2003) Internet self-efficacy survey. Some items were modified in order to fulfill the requirements of mobile-learning. The researcher also interviewed 20 volunteer students (15 males and 5 females). Each interview lasted for 30 minutes and semi-structured questions were used. The interviews were recorded and later transcribed for the data analysis. The guidelines of thematic analysis (Braun & Clarke, 2006) were adopted to analyze the interview data. First, different coding units, such as students' computer efficacy and attitude toward m-learning, were coded into the major categories. Next, stronger units were grouped based on their comments and feedback on their m-learning experience. Last, the researcher described the meanings of each unit and summarized the major statements made by the students for further explanations and inferences.

## RESULTS

RQ1: What are the students' attitudes towards the use of mobile devices for m-learning?

In order to understand the students' attitudes and self-efficacy toward m-learning, two instruments were administered: the m-learning attitude survey and the m-learning self-efficacy survey. Table 1 presented the results reporting students' attitudes towards m-learning. The results indicated that most of the students expressed interest in using mobile devices to engage in intensive learning and have online discussions anytime and anywhere (Mean=4.16, SD=0.42). The m-learning supported the students in attaining more ideas, increasing learning motivations, promoting imaginative work, and working independently and collaboratively. Only one negative opinion of m-learning was designed in the m-learning attitude survey. Question 5 in Table 1 showed that students were uncomfortable with the use of mobile devices (Mean=4.62, SD=0.40).

In the interviews (Table 2), many students indicated that the use of the mobile device along with the task-based assignments really enhanced their motivation and they had much more fun in English learning. They believed that it saved a lot of their time since they could still engage in the tasks without time and space constraints. They agreed that English learning would take place anytime and anywhere with the mobile devices.

Table 1 The students' attitudes towards m-learning

Item	Mean	SD
1. In the m-learning environment, a mobile device can help me to attain more ideas.	4.82	0.54
2. In the m-learning environment, a mobile device is helpful for my learning.	4.36	0.22
3. In the m-learning environment, a mobile device can enhance my desire to learn.	4.70	0.38
4. In the m-learning environment, a mobile device can allow me to do more interesting and imaginative work.	3.78	0.72
5. In the m-learning environment, a mobile device makes me feel uncomfortable.	4.62	0.40
6. In the m-learning environment, I feel bored using a mobile device.	2.12	0.42
7. In the m-learning environment, I am not good at using a mobile device.	3.90	0.36
8. In the m-learning environment, I hope to have a regular time to use a mobile device.	4.02	0.34
9. In the m-learning environment, I hope to apply mobile devices in various learning activities.	4.66	0.50
10. In the m-learning environment, I can use a mobile device independently without other's help.	4.68	0.32
Overall	4.16	0.42

Table 2: The students' statements in the interviews for attitudes towards m-learning

Statements	Frequency (N=20)
It is quite fun to use a mobile device for English learning.	20
I hope I can use mobile devices for learning in other classes too.	15
I love to use mobile devices to multi-task.	14
It is time-saving for m-learning because I can learn without space and time constraints.	12
I love to get access to my mobile devices and learning takes place naturally.	11
I did not like English before. Now I would use my smart phone for English learning.	9
Reading too much on the mobile made my eyes sore.	8

RQ2: What is the students' self-efficacy towards the use of mobile devices for m-learning?

Table 3 shows that the students have high self-efficacy towards m-learning. Students had no problem with the use of the functionalities in the mobile devices such as downloading online materials, as well as reading and entering information.

Table 3 The students' self-efficacy of the m-learning

Item	Mean	SD
1. In the m-learning environment, I can download a figure from the internet using a mobile device.	4.52	0.22
2. In the m-learning environment, I can key in a website address to enter the site using a mobile device.	4.78	0.18
3. In the m-learning environment, I can check a hyperlink to enter another website using a mobile device.	4.68	0.14
4. In the m-learning environment, I can read the content on the screen using a mobile device.	4.80	0.16
5. In the m-learning environment, I can enter words into a document using a mobile device.	4.25	0.22

The students indicated that they could effectively use the functionalities of the mobile devices (Table 4). They could use the mobile device to support their discussion with peers such as posting question and providing feedback immediately. With the mobile device, they attempted to relate to the reading materials by taking pictures and filming the related situations to share with their peers. They provided authentic pictures and scenarios for their peers to visualize the ideas presented in the reading. The students tried to extend the formal learning from the textbooks to informal learning in their daily life.

Table 4: The students' statements in the interviews for self-efficacy of m-learning

Statements	Frequency (N=20)
I could use the mobile device to discuss with my peers about the reading materials.	20
I could log into the discussion forums via the mobile device.	15
I know how to post questions about the reading via the mobile device.	14
I know how to respond to pees' questions via the mobile device, which made the learning more interactive.	12
I can take pictures with my phone to show the related information about the assigned tasks.	12
When it comes to typing, it's rather difficult. There is no keyboard to type with and the screen is too small. It was inconvenient to write messages to answer peers' questions on mobile devices	10
I could use the mobile device to film some clips and share with my peers about what we have learned in class.	9

RQ3: Is there any gender difference in students' attitudes and self-efficacy in m-learning?

From Table 5, it was clear that there were no significant differences between male and female attitudes and self-efficacy in m-learning. But, there were slight differences between male and female students' attitudes from their interview data. Table 6 shows that male students were much more accustomed to the use of the mobile device for English learning in and outside the class than female students. By contrast, the female students perceived the mobile device as an entertainment facility.

Table 5 Gender comparisons on mobile learning attitudes and mobile self-efficacy

Mobile attitude survey (MAS)	male (n=15)	female (n=5)	1-tailed <i>t</i> -test
	4.24 (0.39)	4.08 (0.44)	0.183
Mobile self-efficacy survey (MSS)	4.71 (0.13)	4.50 (0.24)	0.002

P<0.01

Table 6: The male and female students' statements in the interviews for mobile learning attitudes and self-efficacy

Statements	Frequency (Males=15)
The mobile phone is like a toy to me. I love to use it for our tasks.	12
I would attend to the new message on my mobile every hour	10
It is very cool to use mobile phones for English learning. I shared some learning materials with my family members too.	9
Statements	Frequency (Females=5)
I did not like to do the assignments on the mobile phones.	5
My phone is not as fancy as others so I did not find it easy to do the tasks.	3
Mobile devices are only for entertainment. I do not think it is ideal for English learning.	2

## DISCUSSION AND CONSLUSION

The major contribution of this study was to identify students' attitudes and self-efficacy towards m-learning as well as to report the college students' perceived viewpoints after the implementation of using mobile devices in their English learning. Different tasks and situated scenarios were designed based on the reading materials to

support students' mobile learning by employing a task-based approach. The results indicated that students demonstrated positive attitudes toward m-learning. Students considered that m-learning offered them more chances to acquire more information and supported collaborative and ubiquitous learning. Students often expected to receive messages from peers via mobile devices after they shared their opinions in the online discussion forums. The nature of mobile devices made the learning ubiquitous. The results echoed the previous studies in that the mobile learning project can increase students' learning participations in the learning tasks (Attewell, 2005; Basoglu & Akdemir, 2010). In addition, this study found that students are competent enough in using mobile devices to read the assigned texts, post questions, read and provide feedback to peers. Students also took environmental pictures and filmed authentic scenarios related to what they had learned in textbooks. They then shared their pictures and films via the mobile devices. In other words, students possess high CSE for mobile devices and thus they would relate the authentic material with the learned material. This study also attempted to prove the relationship between students' self-efficacy and attitudes within genders. However, based on the survey results that were revealed there is no major difference in students' self-efficacy and attitudes between male and female students. From the interview, the male students showed a great interest in using mobile devices to engage in learning those assigned tasks, but female students indicated they tended to use them for entertainment purposes only.

This study offered additional support in that the students' computer self-efficacy and attitudes were core factors which affected the success of mobile learning. This study also provides an analysis for the students' perceptions of their attitude and self-efficacy of mobile learning. The results showed that gender was not a pivotal factor which influenced the self-efficacy and attitudes toward m-learning but they might perceive the purposes of m-learning slightly differently.

This research was limited by focusing on the learning method of only the task-based learning. It is only through continuous evaluation and fine-tuning of the new technology (i.e., mobile phones, pads, and laptop computers) with the learning practice (i.e., lesson planning, IT support, and learning activity planning), that an educational innovation like a mobile forum will reach its full potential in transforming educational practice.

## REFERENCES

- Attewell, J. & Savill-Smith, C. (2004). *Learning with mobile devices: research and development – a book of papers*. London: Learning and Skills Development Agency.
- Attewell, J. (2005). *Mobile Technologies and Learning: A technology update and m-learning project summary*. London: Learning and Skills Development Agency.
- Barbeite, F. G., & Weiss, E. M. (2004). Computer self-efficacy and anxiety scales for an Internet sample: testing measurement equivalence of existing measures and development of new scales. *Computers in Human Behavior*, 20 (1), 1-15.
- Basoglu, E. B., & Akdemir, Ö. (2010). A comparison of undergraduate students' english vocabulary learning: Using mobile phones and flash cards. *Turkish Online Journal of Educational Technology*, 9 (3), 1-7.
- Brock, D. B., and Sulsky, L. M., (1994) Attitudes toward computers: Construct validation and relations to computer use. *Journal of Organisational Behaviour*, 15, 17-35.
- Bull, S. & Reid, E. (2004). Individualised Revision Material for Use on a Handheld Computer, in J. Attewell & C. Savill-Smith (eds), *Learning with Mobile Devices Research and Development* (pp. 35-42), London: Learning with Mobile Devices, Learning and Skills Development Agency.
- Busch, T. (1995). Gender differences in self-efficacy and attitudes toward computers. *Journal of Educational Computing Research*, 12, 147-158.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qualitative Research in Psychology*, 3, 77-101.
- Chang, C. S., Chen, T. S., & Hsu, W. H. (2011). The study on integrating WebQuest with mobile learning for environmental education. *Computers & Education*, 57 (1), 1228-1239.
- Chen, H. R., & Huang, H. L. (2010). User acceptance of mobile knowledge management learning system: design and analysis. *Educational Technology & Society*, 13 (3), 70-77.
- Compeau, D.R. & Higgins, C.A. (1995). Computer self-efficacy: Development of a measure and initial test. *MIS Quarterly*, 19 (2), 189-211.
- Davis, F.D., Bagozzi, R.P. and Warshaw, P.R. (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science* 35 (8), 982-1002.
- Delcourt, M. A. B., & Kinzie, M. B. (1993). Computer technologies in teacher education: The measurement of attitudes and self-efficacy. *Journal of Research and Development in Education*, 27 (1), 35-41.
- Gattiker, U. & Hlavka, A. (1992). Computer attitudes and learning performance: Issues for management education and training. *Journal of Organizational Behavior*, 13, 89-101.
- Gulati, S. (2008). Technology-Enhanced Learning In Developing Nations: A Review, *The International Review*



- of *Research in Open and Distance Learning*, 9 (1), 1-16.
- Harrison, A., & Rainer, K. (1992). An examination of the factor structures and concurrent validities for the computer attitude scale, the computer anxiety rating scale, and the computer self-efficacy scale. *Educational and Psychological Measurement*, 44, 501-505.
- Harvey, T.J. and Wilson, B. (1985) Gender differences in attitudes towards microcomputers shown by primary and secondary school pupils, *British Journal of Educational Psychology*, 57, 114-21.
- Hassan, B. (2003). The influence of specific computer experiences on computer self-efficacy beliefs. *Computers in Human Behavior*, 19, 443-450.
- Hill, T., Smith, N. D., & Mann, M. F. (1987). Role of efficacy expectations in predicting the decision to use advanced technologies: The case of computers. *Journal of Applied Psychology*, 72 (2), 307-313.
- Hine, N., Rentoul, R., & Specht, M. (2004). Collaboration and roles in remote field trips. In J. Attewell & C. Savill-Smith (Eds.), *Learning with Mobile Devices Research and Development* (pp. 69-72), London: Learning and Skills Development Agency.
- Hsu, M. K., Wang, S. W., & Chiu, K. K. (2009). Computer attitude, statistics anxiety and self-efficacy on statistical software adoption behavior: An empirical study of online MBA learners. *Computers in Human Behavior*, 25 (2), 412-420.
- Huang, Y. M., Jeng, Y. L., & Huang, T. C. (2009). An educational mobile blogging system for supporting collaborative learning. *Educational Technology & Society*, 12 (2), 163-175.
- Hwang, G. J., & Chang, H. F. (2011). A formative assessment-based mobile learning approach to improving the learning attitudes and achievements of students. *Computers & Education*, 56 (4), 1023-1031.
- Isman, A., Celikli, G. E. (2009). How does student ability and self-efficacy affect the usage of computer technology? *The Turkish Online Journal of Educational Technology*, 8 (1), 33-38.
- Judd, T., Kennedy, G., & Cropper, S. (2010). Using wikis for collaborative learning: Assessing collaboration through contribution. *Australasian Journal of Educational Technology*, 26 (3), 341-354.
- Kao, C. P., & Tsai, C. C. (2009). Teachers' attitudes toward web-based professional development, with relation to Internet self-efficacy and beliefs about web-based learning. *Computer & Education*, 53 (1), 66-73.
- Kreijns, K., Kirschner, P.A., Jochems, W. (2003). Identifying the pitfalls for social interaction in computer-supported collaborative learning environments: a review of the research. *Computers in Human Behavior*, 19, 335-353.
- Lee, L. (2009). Promoting intercultural exchanges with blogs and podcasting: A study of Spanish – American telecommunication. *Computer Assisted Language Learning*, 22, 425-443.
- McConatha, D., Praul, M., & Lynch, M. J. (2008). Mobile learning in higher education: An empirical assessment of a new educational tool. *The Turkish Online Journal of Educational Technology*, 7 (3), 15-21.
- Mompean, A.R. (2010). The development of meaningful interactions on a blog used for the learning of English as a Foreign Language. *ReCALL*, 22 (3), 376-395.
- Motiwalla, L. F. (2007). Mobile learning: A framework and evaluation. *Computers & Education*, 49 (3), 581-596.
- O'Malley, C., Vavoula, G., Glew, J. P., Taylor, J., & Sharples, M. (2005). Guidelines for Learning/Teaching/Tutoring in a Mobile Environment. Retrieved 7 July, 2009, from [http://www.mobilelearn.org/download/results/public\\_deliverables/MOBILearn\\_D4.1\\_Final.pdf](http://www.mobilelearn.org/download/results/public_deliverables/MOBILearn_D4.1_Final.pdf)
- Patten, B., Arnedillo-Sánchez, I., & Tangney, B. (2006). Designing collaborative, constructionist and contextual applications for handheld devices. *Computers & Education*, 46 (3), 294-308.
- Potosky, D. (2002). A field study of computer efficacy beliefs as an outcome of training: The role of computer playfulness, computer knowledge, and performance during training. *Computers in Human Behavior*, 18 (3), 241-255.
- Sandberg, J., Maris, M., de Geus, K. (2011). Mobile English learning: An evidence-based study with fifth graders. *Computers & Education*, 57, 1334-1347.
- Seppala, P., & Alamaki, H. (2003). Mobile learning in teacher training. *Journal of Computer Assisted Learning*, 19 (3), 330-335.
- Thornton, P., & Houser, C. (2005). Using mobile phones in English Education in Japan. *Journal of Computer Assisted Learning*, 21, 217-228.
- Topkaya, E. Z. (2010). Pre-service English language teachers' perceptions of computer self-efficacy and general self-efficacy. *The Turkish Online Journal of Educational Technology*, 9 (1), 143-156.
- Tsai, M. J. & Tsai, C. C. (2003). Information searching strategies in web-based science learning: The role of Internet self-efficacy. *Innovations in Education and Teaching International*, 40 (1), 43-50.
- Tsai, P.-S., Tsai, C.-C., Hwang, G.-H. (2010). Elementary school students' attitudes and self-efficacy of using PDAs in a ubiquitous learning context. *Australasian Journal of Educational Technology*, 26 (3), 279-380.
- Vavoula, G., M. Sharples, P. Rudman, J. Meek, and P. Lonsdale. (2009). MyArtSpace: Design and evaluation of support for learning with multimedia phones between classrooms and museums. *Computers & Education*, 53 (2), 286-299.

- Venkatesh, V. & M.G. Morris. (2000). Why don't men ever stop to ask for directions? Gender, social influence, and their role in technology acceptance and usage behavior. *MIS Quarterly*, 24 (1), 115-139.
- Wagner, E. & Wilson, P. (2005). Disconnected. *ASTD*, December, 40-43.