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Exploring the Moderating Role of Self-Management of Learning in Mobile English Learning

Rui-Ting Huang
Department of Business Administration, National Chung Hsing University, Taiwan //
rthuang0324@dragon.nchu.edu.tw

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ABSTRACT

Although a considerable number of studies have revealed that self-management of learning (SML) could be closely related to learning achievements, there is still a paucity of research investigating the moderating effect of self-management of learning on mobile learning outcomes. Accordingly, the primary purpose of this study was to explore the moderating role of self-management of learning in mobile English Learning. The participants of this study were 389 undergraduate students who used to use handheld electronic dictionaries to learn English before. The Partial Least Squares (PLS) analysis, a component-based Structural Equation Modelling (SEM) technique, was adopted to examine the data in this study. It has been demonstrated that perceived usefulness and playfulness of electronic dictionary could be positively related to mobile English learning satisfaction. Additionally, the study results have revealed that with particular respect to learners with higher SML, resistance to change could have no influence on mobile English learning satisfaction. Finally, it has been found that the self-management of learning could moderate the relationships between key mobile English learning determinants, satisfaction, and continuance intention.

Keywords

Mobile English learning, Self-management of learning

Introduction

Mobile learning, which generally refers to learning activities via the use of mobile devices such as notebook computer, mobile phone, and personal digital assistants (PDA), has gradually played a critical role in helping people acquire new knowledge and skill in life (Valk, Rashid, & Elder, 2010). Probably because the applications of mobile devices are increasing and expanding in today' teaching and learning environments (Cavus & Ibrahim, 2009; Clough, Jones, McAndrew, & Scanlon, 2008; Goh & Kinshuk, 2006), recently, there has been a growing interest in mobile learning studies (Roca & Gagné, 2008; Wang, Wu & Wang, 2009). Nevertheless, more research is still needed on evaluating mobile learning outcomes (Sung & Mayer, 2013; Uzunboylu, Cavus, & Ercag, 2009). With particular respect to the link between self-management of learning and mobile learning outcome, although a considerable number of studies have revealed that self-management of learning could be closely related to learning achievements (Abar & Loken, 2010; Dignath, Buettner, & Langfeldt, 2008; Kauffman, Zhao, & Yang, 2011), there is still a paucity of research investigating the moderating effect of self-management of learning on mobile learning outcome. More specifically, whether learners with different levels of self-management of learning could have different levels of relationships between key mobile learning determinants, satisfaction and continuance intention has not yet been fully investigated in present studies.

In addition, previous research has indicated that the continuance intention of customers could be a key measure to evaluate the final success of new products or services (Lin, 2012). Although numerous researchers have highly focused on mobile learning studies, relatively little attention has been paid to the role of moderating variables in continuance intention (Lin, 2011). In order to close the gaps in research, and further enhance mobile learning effectiveness and efficiency, it is important that researchers and practitioners in the mobile learning field should concentrate not only on mobile technology adoption, but also on mobile learning outcomes. As mobile technology has gradually and closely connected with our life, the applications of mobile technology in teaching and learning environments will become more common than previously thought. Accordingly, the primary purpose of this study is to explore the moderating role of self-management of learning in mobile English Learning.

Theoretical background and hypothesis development

Mobile English learning and handheld electronic dictionary

Handheld electronic dictionaries have gradually become one of the critical tools for learning English in Chinese speaking countries, probably owing to the convenience of mobile technology and the useful function of electronic dictionaries. Chen (2010) added that "there are no significant differences between pocket electronic dictionary (PED) and paper dictionary (PD) use in comprehension, production and retention of vocabulary although the speed of the former is significantly faster than the latter" (p. 275). More specifically, the potential advantages of using handheld electronic dictionaries include expansive vocabularies, synonyms and grammar references, and as compared to book-form dictionaries, digital-form electronic dictionaries not only allow learners to easily and quickly search for specific words, but also provide them with powerful pronunciation functions that help learners to improve their English ability (Chen, 2010). In view of the critical influence of mobile technology on the quality of language learning, it has been shown that there is a growing interest in mobile assisted language learning studies (Chen & Chung, 2008; Lu, 2008). However, limited studies have been done to examine the moderating role of self-management of learning in mobile English learning satisfaction and continuance intention.

In previous research, it has been well documented that there is a positive correlation between consumer satisfaction and their continuance intention to adopt new IT products or services (Lin, 2012; Zhao & Lu, 2012). That is, as customers and users are more satisfied with new products or services, it is likely that they will have more positive continuance intention. In the same vein, it is conceivable that learners with higher levels of mobile English learning satisfaction (MELS) will have more positive mobile English learning continuance intention (MELCI), which refers to their continued intention to take mobile learning. Consequently, this study proposes the following hypothesis.

H1: Mobile English learning satisfaction (MELS) could have a positive influence on mobile English learning continuance intention (MELCI).

Perceived usefulness (PU)

The perceived usefulness (PU), which refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p. 320), could play a key part in determining user satisfaction (Roca, Chiu, & Martínez, 2006). That is, in terms of using new information technology, if customers perceive higher usefulness of information technology, it is probable that they will be more satisfied with new IT products or services. Previous online learning studies have shown that the perceived usefulness, which is viewed as extrinsic motivation (Davis, Bagozzi, & Warshaw, 1992), could have a positive impact on learner satisfaction (Arbaugh, 2000; Roca et al., 2006; Sun, Tsai, Finger, Chen, & Yeh, 2008). Nonetheless, a recent report by Kim (2010) has indicated that consumers' perceived usefulness of mobile data service could not be related to their satisfaction. In mobile learning environments, it is assumed that learners with better perceived usefulness of mobile learning will have better mobile learning satisfaction. Based on previous suggestions, consequently, this study offers the following hypothesis.

H2: Perceived usefulness could have a positive influence on mobile English learning satisfaction.

Perceived playfulness (PP)

How to make learning be less tedious and more enjoyable to students is always one of the key issues in the educational fields. Although there are several ways to improve learning processes and outcomes, it has been suggested that the applications of new learning technology in instructions play a key role in maximizing learning effectiveness and efficiency (Kopcha, 2010). Previous information technology (IT) research has indicated that user satisfaction is very likely to fall under the sway of perceived playfulness of IT products or services (Hsu & Chiu 2004; Kang & Lee, 2010). Moon and Kim (2001) defined the perceived playfulness of world-wide-web (WWW) as "the extent to which the individual (a) perceives that his or her attention is focused on the interaction with the WWW; (b) is curious during the interaction; and (c) finds the interaction intrinsically enjoyable or interesting" (p. 219). Lee, Yoon, and Lee (2009) added that "playfulness is a complex variable which includes individual's pleasure, psychological stimulation, and interests" (p. 1323).

Although there is no universal definition of perceived playfulness (Mitchell, Chen, & Macredie, 2005), in mobile learning environments, perceived playfulness, which is regarded as intrinsic motivation (Moon & Kim, 2001), is described as the degree to which a user feels his or her enjoyment, joyfulness, and pleasure in using mobile learning devices to acquire new knowledge (Wang et al., 2009). Several studies have demonstrated a positive link between perceived playfulness and customer satisfaction (Hsu & Chiu, 2004; Kang & Lee, 2010). Nevertheless, a recent study by Kim (2010) has indicated a negative result, which reveals that perceived playfulness could not be associated with customer satisfaction. In mobile learning domains, it is possible that learners with higher perceived playfulness could have better mobile English learning satisfaction. Consequently, this study offers the following hypothesis.

H3: Perceived playfulness could have a positive influence on mobile English learning satisfaction.

Resistance to change (RTC)

Previous reports have indicated that individual resistance to change (RTC), which is viewed as a de-motivator (Baddoo & Hall, 2003), is another key element that could negatively affect the use of information technology (Kim & Kankanhalli, 2009; Manzoni & Angehrn, 1997; Nov & Ye, 2008). Especially in online banking studies, it has been shown that whether customers are used to or interested in online banking activities could be very critical for the success in online banking services, mainly because they may not get used to the new way for banking activities (Al-Somali, Gholami, & Clegg, 2009). In mobile learning environments, resistance to change, which is described as learners' resistance to change from traditional learning ways, is very likely to have a negative impact on mobile technology usages, which in turn could negatively affect mobile learning satisfaction. That is, if users are not used to or interested in using mobile technology to acquire new knowledge, it is possible that they will have lower mobile learning satisfaction. Hence, this study proffers the following hypothesis.

H4: Resistance to change could have a negative influence on mobile English learning satisfaction.

The moderating effect of self-management of learning

The self-management of learning (SML) has been one of the central issues in educational research (Lounsbury, Levy, Park, Gibson, & Smith, 2009), probably owing to its critical role in facilitating more positive learning performances (Abar & Loken, 2010; Lounsbury et al., 2009; Moos, 2010). Zimmerman and Pons (1986) have suggested that SML capabilities could be one of the key indicators to determine learning achievement. Similar words, close to the meaning of SML, cloud include autonomous learning, independent learning, and self-directed learning (Regan, 2003; Wang et al., 2009). Abar and Loken (2010) indicated that SML "involves activating and sustaining cognitions, behaviors, and emotions in a systematic way to attain learning goals" (p. 25). Zou and Zhang (2013) revealed that "in general, students are self-regulated when they are meta-cognitively, motivationally, and behaviorally active participants in their own learning process, without relying on teachers, parents, or other educational services" (p. 55). Pintrich (1999) suggested that SML models could contain "three general categories of strategies: (1) cognitive learning strategies, (2) self-regulatory strategies to control cognition, and (3) resource management strategies" (p. 460).

Although several studies have examined the nature and essence of SML, generally speaking, the historical development, definitions, and strategies of SML could be closely linked to three critical and cyclical stages: goal setting and strategic planning, performance monitoring, and performance management (Zimmerman, Bonner, & Kovach, 1996; Zimmerman, 2000). For example, in order to maximize the effectiveness and efficiency of SML, an early review by Nückles, Hübner, and Renkl (2009) has revealed that writing learning protocol could be a critical way to enhance SML outcomes. Another recent report by Kostons, Gog, and Paas (2012) has shown that students' SML could be facilitated by training their self-assessment and task-selection skills.

With particular respect to the association between SML, extrinsic, and intrinsic motivation, Sha, Looi, Chen, Seow, and Wong (2012) have not only suggested that according to the self-determination theory (SDT) (Ryan & Deci, 2000), the need for autonomy, which is regarded as intrinsic motivation, is critical to the success of mobile learning, but also added that "the variance of student performance and achievement in mobile learning can be accounted for by the degree to which individual students are motivated intrinsically to ubiquitously engage in mobile learning activities" (p. 720). Additionally, in an adult learning study, Ahmad and Majid (2010) have indicated that self-regulated learners tend to be more intrinsically motivated and be fond of learning. In another recent report, Moos (2010) has further suggested that the levels of quality in self-management of learning could be closely linked to

intrinsic and extrinsic motivation. That is, in self-management of learning, it is revealed that deep learning could be associated with intrinsic motivation, whereas surface learning could be connected with extrinsic motivation (Moos, 2010).

In terms of the moderating role of SML in mobile learning, it is likely that learners with better SML will have a stronger relationship between perceived playfulness and MELS, a weaker connection resistance to change and MELS, and a stronger relationship between MELS and MELCI than those with less SML, due probably to the critical roles of intrinsic motivation variables, such as perceived playfulness and satisfaction, in learning outcomes (Ahmad & Majid, 2010). Conversely, it is assumed that learners with less SML have a better link between perceived usefulness and MELS than those with better SML, probably because they could be more extrinsically motivated (Ahmad & Majid, 2010). In other words, learners with less SML are likely to rely more on the usefulness of mobile devices, which in turn could lead to better mobile learning satisfaction (Arbaugh, 2000; Davis, 1989; Roca et al., 2006).

In mobile learning environments, Wang et al. (2009) described SML as "the extent to which an individual feels he or she is self-disciplined and can engage in autonomous learning" (p. 101). That is, as learners could spend more time in their autonomous and independent learning activities with specific regard to learning goals, it is possible that they will have better learning achievements. Considering the critical impacts of SML on learning outcomes, although numerous researchers have focused on the relationship between SML and learning achievements, little is known about the moderating role of SML in mobile learning satisfaction and continuance intention. Based on previous suggestions, it is conceivable that the self-management of learning could moderate the relationships between key mobile learning determinants, satisfaction and continuance intention. Accordingly, this study proposes the following hypotheses.

H5: The self-management of learning could moderate the relationship between perceived usefulness and MELS. That is, learners with less SML could have a stronger relationship between perceived usefulness and MELS than those with better SML.

H6: The self-management of learning could moderate the relationship between perceived playfulness and MELS. That is, learners with better SML could have a stronger relationship between perceived playfulness and MELS than those with less SML.

H7: The self-management of learning could moderate the relationship between resistance to change and MELS. That is, learners with better SML could have a weaker relationship between resistance to change and MELS than those with less SML.

H8: The self-management of learning could moderate the relationship between MELS and MELCI. That is, learners with better SML could have a stronger relationship between MELS and MELCI than those with less SML.

In summary, the primary purpose of this study is to explore the moderating role of self-management of learning in mobile English Learning. According to previous suggestions, consequently, this study proposes the following research framework (see figure 1).

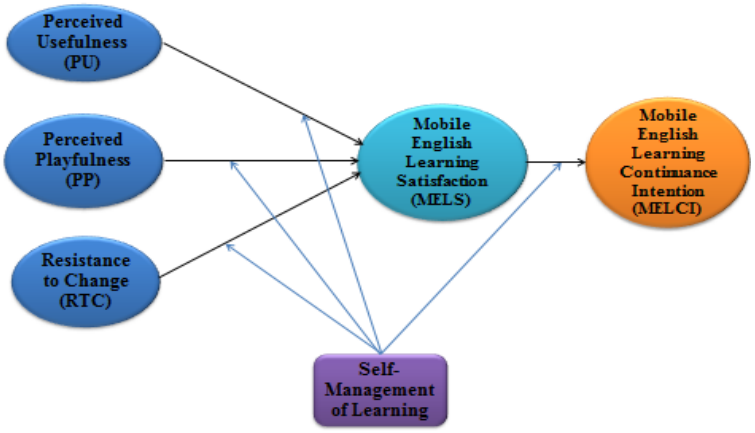


Figure 1. The research framework

Research methodology

Demographic data for respondents

The participants of this study were 389 undergraduate students in Taiwan. As shown in the table 1, there were more female than male students participating in this study (*Male = 170; Female = 215*). With regard to the academic level of participants, the number of freshman, sophomore, junior, and senior students was 132, 146, 53, and 46, respectively. It was revealed that most participants were undergraduate students majoring in business (see table 1).

Table 1. Demographic data for respondents

Demographics	Items	Number	Percentage of respondents
Gender	Male	170	44
	Female	215	55
	Missing data	4	1
Undergraduate Level	Freshman	132	34
	Sophomore	146	37
	Junior	53	14
	Senior	46	12
	Missing data	12	3
College Major	Social Sciences	69	18
	Science	45	11
	Arts and Humanities	53	14
	Business	158	41
	Engineering	64	16

Data collection

This study gathered the data from 9 different universities, which were randomly selected from 4-year colleges and universities in Northern, Middle, and Southern Taiwan. 900 paper and pencil surveys were sent to the participants. In addition, the participation of this study was voluntary, and all participants were undergraduate students that used to use handheld electronic dictionaries to learn English before. The final number of usable data was 389, after this study deleted the invalid surveys.

Measurement development

18 questionnaire items were scored on a seven-point Likert scale, with rank from "1 = strongly disagree" to "7 = strongly agree". Three items of the perceived playfulness were selected from Ahn, Ryu, and Han (2007), and from Igbaria, Iivari and Maragahh (1995). Four items of perceived usefulness were chosen from Davis (1989), and Roca et al. (2006). Four items of resistance to change were taken from Al-Somali et al. (2009), and four items of self-management of learning were adopted from Wang et al. (2009). Moreover, three items of mobile English learning satisfaction, and three items of mobile English learning continuance intention were adopted from Roca et al. (2006).

Common method bias

In order to evaluate the potential threats related to common method bias, Harman's single-factor test was adopted to investigate the effect of common method bias on this study (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). It was shown that one factor only accounted for 37.4% of total variances. Accordingly, the common method bias may not be a major concern for this study.

Control variables

The types of college and universities, and user experience were two major control variables in this study. That is, this study only collected data from 4-year colleges and universities in Taiwan, and the participants of this study were undergraduate students that used to use handheld electronic dictionaries to learn English before.

Data analysis and results

The Partial Least Squares (PLS) analysis, a component-based Structural Equation Modelling (SEM) technique (Chin, Marcolin, & Newsted, 2003), was adopted to examine the data in this study. First, the factor loadings and Composite Reliability (CR) in each model were used to determine the internal consistency and reliability of measuring scales. As shown in table 2, the internal consistency and reliability of measuring scales were acceptable, mainly because factor loadings in each model were all above the suggested value = .70, and Composite Reliability of each construct was all above .90 (Fornell, & Larcker, 1981). In addition, as shown in table 3, it was revealed that the convergent and discriminant validity were acceptable, because the average variance extracted (AVE) in each model was all above the suggested value of .50 (Fornell & Larcker, 1981), and correlations between variables in each model were all lower than the square root of AVE values on the diagonal (Fornell & Larcker, 1981). Third, the structural model and hypotheses were examined through path coefficients in each model. In figure 2, 3, and 4, it was demonstrated that H2and H3 were supported by study findings, whereas H4 was partly supported by study results in the full model and low SML group.

Finally, in order to investigate the moderating effect of self-management of learning on mobile learning, the median value of SML = 4.25 was adopted to classify participants into two groups: high SML group (*n = 194*), and low SML group (*n = 195*). According to procedures from Keil, Tan, Wei, and Saarinen (2000), the analysis of path coefficient comparison, which was initially suggested by Wynne Chin and subsequently adopted by several studies (Chung & Kwon, 2009; Fang, 2012; Hartmann & Slapničar, 2012; Hwang, 2010; Kwahk & Ahn, 2010; Lee, Shi, Cheung, Lim, & Sia, 2011; Sanchez-Franco, Ramos, &Velicia, 2009), was performed to probe into the moderating role of self-management of learning in mobile learning. The procedures were as follows:

$$Spooled \sqrt{\frac{(Nh-1)\times SEh^{2}+(Nl-1)\times SEl^{2}}{(Nh+Nl-2)}}$$

$$t=\frac{(PCh-PCl)}{\frac{Spooled}{\sqrt{\frac{1}{Nh}+\frac{1}{Nl}}}}$$

Spooled = pooled estimator for the variance
t = t-statistic with (*Nh+Nl-2*) degrees of freedom
Nh = sample size of High SML group; *Nl* = sample size of Low SML group
PCh = path coefficient in structural model of high SML
PCl = path coefficient in structural model of low SML
SEh = standard error of path in structural model for high SML
SEl = standard error of path in structural model for low SML
As shown in table 4, it was found that H5, H6, H7, and H8 were all supported by study findings, which indicated that the self-management of learning could moderate the relationships between key mobile learning determinants, satisfaction and continuance intention.

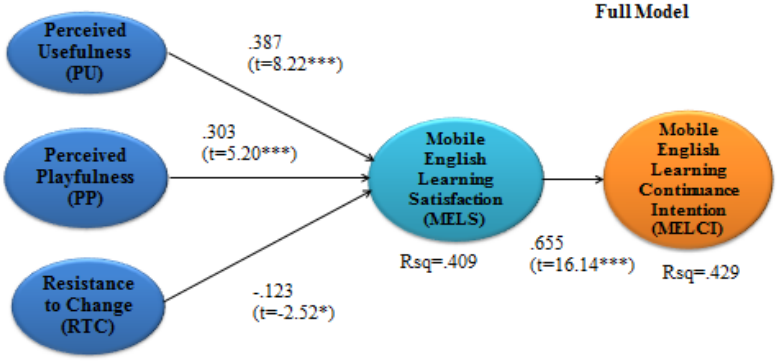
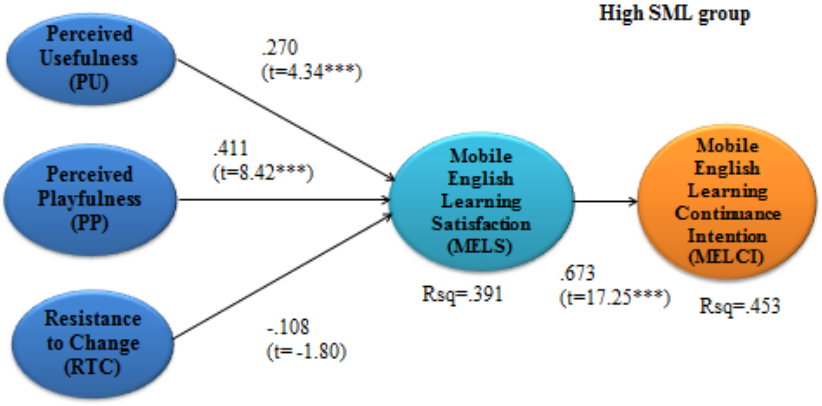
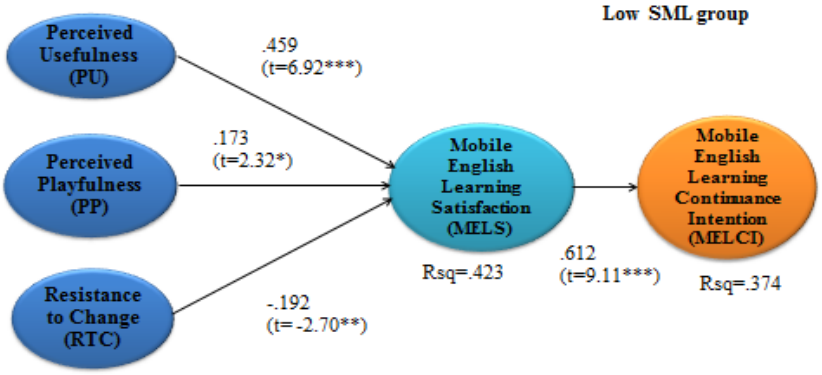


Figure 2. PLS solution for full data set



*p < 0.05, **p < 0.01, ***p < 0.001

Figure 3. PLS solution for High SML group



*p < 0.05, **p < 0.01, ***p < 0.001

Figure 4. PLS solution for low SML group

Table 2. Confirmatory factor analysis of each model

Items	FM	CR	AVE	α	High SML	CR	AVE	α	Low SML	CR	AVE	α
PU		.92	.74	.88		.92	.74	.88		.92	.73	.88
PU1	.84				.84				.83			
PU2	.90				.89				.90			
PU3	.86				.87				.85			
PU4	.85				.85				.85			
PP		.93	.82	.89		.92	.80	.87		.92	.79	.87
PP1	.89				.89				.85			
PP2	.92				.92				.92			
PP3	.90				.87				.90			
RTC		.92	.73	.88		.91	.73	.88		.91	.72	.87
RTC1	.80				.81				.79			
RTC2	.80				.79				.83			
RTC3	.94				.95				.93			
RTC4	.88				.89				.87			
MELS		.91	.78	.86		.92	.80	.88		.90	.75	.83
MELS1	.82				.87				.79			
MELS2	.92				.92				.93			
MELS3	.89				.90				.89			
MELCI		.92	.79	.87		.92	.80	.87		.90	.76	.84

MELCI1	.90	.92	.88
MELCI2	.91	.93	.87
MELCI3	.86	.83	.87

Notes. FM, full model; High SML, high self-management of learning; Low SML, low self-management of learning; PU, perceived usefulness; PP, perceived playfulness; RTC, resistance to change; MELS, mobile English learning satisfaction; MELCI, mobile English learning continuance intention; CR, Composite Reliability; AVE, Average Variance Extracted; α, Cronbach's Alpha.

Table 3. The Correlations of each latent variable among different models

Full Model	PU	PP	RTC	MELS	MELCI
Perceived Usefulness (PU)	.86				
Perceived Playfulness (PP)	.44	.90			
Resistance to Change (RTC)	-.35	-.18	.85		
Mobile English Learning Satisfaction (MELS)	.56	.49	-.31	.88	
Mobile English Learning Continuance Intention (MELCI)	.58	.45	-.41	.65	.88
High SML	PU	PP	RTC	MELS	MELCI
Perceived Usefulness (PU)	.86				
Perceived Playfulness (PP)	.46	.89			
Resistance to Change (RTC)	-.36	-.15	.85		
Mobile English Learning Satisfaction (MELS)	.49	.55	-.26	.89	
Mobile English Learning Continuance Intention (MELCI)	.59	.52	-.34	.67	.89
Low SML	PU	PP	RTC	MELS	MELCI
Perceived Usefulness (PU)	.85				
Perceived Playfulness (PP)	.32	.88			
Resistance to Change (RTC)	-.41	-.31	.84		
Mobile English Learning Satisfaction (MELS)	.59	.38	-.43	.86	
Mobile English Learning Continuance Intention (MELCI)	.53	.28	-.58	.61	.87

Notes. Diagonal elements are the square root of Average Variance Extracted

Table 4. Statistical comparison of moderating effect models

Hypothesis	Path	High SML (N=194)		Low SML (N=195)		Comparison
		Path coefficient	Standard Error	Path coefficient	Standard Error	
H5	PU→MELS	.270	.062	.459	.066	-29.11***
H6	PP→MELS	.411	.048	.173	.074	37.61***
H7	RTC→MELS	-.108	.060	-.192	.071	-12.60***
H8	MELS→MELCI	.673	.039	.612	.067	10.97***

Notes. PU, perceived usefulness; PP, perceived playfulness; RTC, resistance to change; MELS, mobile English learning satisfaction; MELCI, mobile English learning continuance intention.
*$p < 0.05$. **$p < 0.01$. ***$p < 0.001$.

Discussions and implications

In accordance with previous research, the study results have shown that perceived usefulness (Arbaugh, 2000; Roca et al., 2006; Sun et al., 2008), playfulness (Hsu & Chiu, 2004; Kang et al., 2009; Kang & Lee, 2010), and resistance to change could be closely related to mobile learning satisfaction (Al-Somali et al., 2009). Additionally, it has been demonstrated that the study findings are in line with previous suggestions (Abar & Loken, 2010; Zou & Zhang, 2013; Moos, 2010), which indicate that self-management of learning could moderate the relationships between key mobile learning determinants, satisfaction, and continuance intention (see table 4).

With specific regard to learners with higher SML, it has been found that playfulness of mobile devices, an intrinsic motivation, could play the most important role in determining mobile learning satisfaction, probably because they are more intrinsically motivated by the playfulness of mobile devices (Moos, 2010). Conversely, it has been revealed that learners with lower SML could focus more on usefulness of mobile devices, maybe because the useful functions of mobile devices, an extrinsic motivation, could be more helpful and valuable to them especially in increasing mobile learning performance (Davis 1989; Moos, 2010; Roca et al., 2006). It is implied that if instructors would like to help mobile learners with higher SML, intrinsic motivators could play key roles in facilitating them to have more positive learning achievement and deep learning, whereas with respect to mobile learners with lower SML, extrinsic motivators could be more suitable for them in order to help them enhance their learning outcome (Moos, 2010). Accordingly, in order to facilitate learners to achieve better mobile learning performance, it is important that more attention should be given to mobile learning designs that address learners with different SML capabilities.

Moreover, it has been demonstrated that learners with higher SML could have a stronger relationship between mobile learning satisfaction and continuance intention than those with less SML. The study findings, consistent with previous reports (Abar & Loken, 2010; Zou & Zhang, 2013), have further indicated that SML could play a moderating role in determining mobile learning outcomes. In order to improve mobile learning outcome, it is critical that researchers and practitioners should focus more on learners' SML capabilities than on mobile technology adoption, and more efforts should be directed toward instructional strategies which could improve students' SML capabilities. For example, motivating students to write learning protocol or facilitating them to get further trainings in self-assessment and task-selection skills could be key ways to help learners with less SML enhance their mobile learning achievements (Kostons, Gog, & Paas, 2012; Nückles, Hübner, & Renkl, 2009).

Last but not least, in terms of the effect of resistance to change on mobile learning, the study results are partially consistent with previous reports (Kim & Kankanhalli, 2009; Manzoni & Angehrn, 1997; Nov & Ye, 2008), which reveal that with particular respect to learners with higher SML, resistance to change could have no influence on mobile learning satisfaction. It is implied that more work should be done on minimizing the resistance to change especially for learners with lower SML, mainly because they could be more reluctant to take mobile learning, which in turn could have a negative impact on mobile learning outcome.

Limitations and conclusions

First, with respect to the generalization and extrapolation of study results, it is important that study findings should be interpreted with caution, mainly because of limited resources available for data analysis. Moreover, it is suggested that the moderating roles of age differences and user experience, which could be closely linked to the success of mobile learning, should be further examined in future studies (Lin, 2011). In conclusion, the study results have not only added to the body of knowledge in the educational technology and mobile learning field, but also provided researchers and practitioners with useful information to improve mobile learning designs. As mobile learning has gradually become more indispensable in our lives, the self-management of learning will play a more important role in lifelong learning. Thus, it is necessary that more attention and research should be devoted to the moderating effect of self-management of learning on mobile learning outcomes.

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Appendix

Mobile English learning questionnaire

Construct	Item
Perceived Usefulness	PU1.Using electronic dictionary to learn English could improve my English learning performance. PU2.Using electronic dictionary to learn English could enhance my English learning effectiveness. PU3.Using electronic dictionary to learn English could make English learning easier. PU4. I found the electronic dictionary to be useful to me in my English learning.
Perceived Playfulness	PP1.Using electronic dictionary to learn English is one of my enjoyments. PP2.Using electronic dictionary to learn English gives learning fun to me. PP3.Using electronic dictionary to learn English is pleasurable to me.
Resistance to Change	RTC1. I am not interested in new mobile learning technological developments. RTC2. I feel uncomfortable in changing my current learning methods and using electronic dictionary to learn English. RTC3. I am not interested to use electronic dictionary to learn English. RTC4. I am not used to using electronic dictionary to learn English.
Self-Management of Learning	SML1. When it comes to learning and studying, I am a self-directed person. SML2. In my studies, I am self-disciplined and find it easy to set aside reading and homework time. SML3. I am able to manage my study time effectively and easily complete assignments on time. SML4. In my studies, I set goals and have a high degree of initiative.
Mobile English Learning Satisfaction	MELS1. I am satisfied with my electronic dictionary. MELS2. I feel that using electronic dictionary serves my need for learning English very well. MELS3. My decision to use electronic dictionary to learn English is a wise one.
Mobile English Learning Continuance Intention	MELCI1. I will continue to use electronic dictionary to learn English in the future. MELCI2. I intend to regularly use electronic dictionary to learn English. MELCI3. I would recommend to other students to use electronic dictionary to learn English.