READINESS FOR MOBILE LEARNING AMONG CHINESE AS A SECOND LANGUAGE LEARNERS IN A PRIVATE UNIVERSITY COLLEGE IN MALAYSIA

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Abstract:

Although learning Chinese as a second language (CSL) is becoming increasingly important due to the rapid development of China's comprehensive national power, CSL learning abroad faces great challenges. This study proposes to use mobile learning (m-learning), especially mobile assisted language learning (MALL), to facilitate CSL learning. This research aimed to investigate learners' readiness to engage in m-learning, their levels of mobile perception, mobile motivation, and mobile self-efficacy, as well as the correlations between these constructs. Respondents were selected using the purposive sampling method from a private university college in Melaka, Malaysia. The total number of valid cases was 95. The three instruments which were adopted to collect data in this study were examined the reliability and validity with pilot study. Descriptive analysis revealed that respondents had moderate levels of mobile perception, mobile motivation, and mobile self-efficacy. Bivariate correlation analysis revealed that all three constructs were highly correlated. Perceived usefulness (PU) ranked comparatively first, followed by perceived ease to use (PEOU) and perceived difficulty (PD). Respondents who perceived difficulty found mobile apps less useful. Respondents who perceived ease to use and usefulness were more motivated than respondents who perceived difficulty. Respondents who perceived difficulty preferred more outside help rather than relying on themselves. Respondents with moderate self-efficacy (MSE) were more motivated than respondents with high self-efficacy (HSE). In general, respondents in the higher education system have their own mobile device and are ready for m-

learning. Therefore, policy makers and teachers should consider integrating m-learning and MALL into the classroom to improve formal teaching.

Introduction

With the rapid development of China's comprehensive national power, Chinese is becoming one of the most popular second languages for non-Chinese students at various educational levels worldwide (Lu et al., 2014). In light of this, some nations and regions, such as Malaysia, have dedicated themselves to promoting the development of CSL in their educational systems (Abdullah et. al., 2019). However, it cannot be overlooked that CSL teaching abroad faces great challenges (Fang, 2016).

Since m-learning is capable of supporting situated learning, collaborative learning, independent learning, lifelong learning, ubiquitous learning, differentiated learning, and seamless learning, etc., many researchers, teachers, and learners have expressed their interest and enthusiasm for mobile assisted language learning (MALL), including CSL learning (Cheon et al., 2012; Hsu, 2013; Lu et al., 2014; Kumar et al., 2016; Abdullah et. al., 2019).

To take full advantage of mobile technologies and improve learners' achievement, it is necessary to investigate their readiness to engage in m-learning (Al-Adwan et al., 2018). However, there is no consensus on the definition and scope of readiness. Moreover, there are no widely accepted instruments to measure it. Since m-learning is closely related to e-learning and online learning, this study selected several representative instruments to measure e-learning, online learning, and m-learning readiness to obtain a comprehensive picture of m-learning readiness.

For example, to ensure that learners are adequately prepared to succeed in the e-learning environment, Watkins et al. (2004) developed a questionnaire to measure learners' readiness for e-learning, whose dimensions include technology access, online skills and relationships, motivation, online audio/video, Internet discussions, and importance to your success.

Hung et al. (2010) developed a multidimensional instrument to assess readiness for online learning, which included self-directed learning, learner control, online communication self-efficacy, computer/Internet self-efficacy, and motivation for learning. Similarly, Al Mamun et al. (2022) included online motivation and online self-efficacy as two of the factors in the questionnaire to assess learners' readiness for online learning.

Cheon et al. (2012) used the theory of planned behaviour to assess college students' readiness for m-learning. In this study, they equated the concept of readiness with the concepts of intention to use and acceptance of m-learning. The questionnaire included attitudinal beliefs, normative beliefs, and control beliefs.

Al-Adwan et al. (2018) investigated learners' readiness for mobile learning in Jordanian higher education. In this study, mobile readiness was synonymous with intention to engage in m-

learning and included seven predictors, e.g., relative advantage, complexity, facilitating conditions, perceived enjoyment, social influence, and self-management, etc.

As shown in the above instruments, e-learning, online learning and m-learning readiness consist of multiple aspects. Although they are all different, there are some common factors included in these instruments, such as motivation (Watkins et al., 2004; Al Mamun et al., 2022) and self-efficacy (Hung et al., 2010; Al Mamun et al., 2022). Similarly, as reviewed by Wong (2018) and Bettayeb et al. (2020), motivation and self-efficacy were two of the most commonly used variables addressed in related previous research to explain the impact of m-learning.

In addition, perception is also a common factor. For example, online skills and relationships in Watkins et al. (2004) focused on learners' ability to use online technologies to complete tasks, which is similar to perceived ease of use (PEOU), a concept derived from mobile perception in Davis' (1989) TAM model. In the model mentioned in Cheon et al. (2012), the attitudinal beliefs is similar to the concept of mobile perception derived from Davis' TAM model, which consists of PEOU and perceived usefulness (PU). Beside, in Al-Adwan et al.'s (2018) questionnaire, relative advantage was similar to PU from Davis' TAM model and complexity was the antonym of the concept PEOU in the TAM model. Wong (2018) also pointed out that PU and PEOU are two of the most common indicators used to evaluate the effectiveness of m-learning.

Furthermore, based on previous research, Bettayeb et al. (2020) hypothesized that motivation, self-efficacy, and usefulness could positively affect the effectiveness of m-learning. Chou et al. (2019) stated that m-learning acceptance, which was also derived from Davis' TAM model, similar to the concept of mobile perception in this study, was the most important predictor of the m-learning effectiveness. Motivation and self-efficacy were the other two important predictors to the m-learning effectiveness.

Therefore, in order to comprehensively capture more and frequent aspects of m-learning readiness, this study included the levels of mobile perception, mobile motivation, and mobile self-efficacy of CSL learners to investigate their m-learning readiness. Since the respondents participated in an experiment on learning CSL with the support of ChineseSkill, m-learning refers specifically to learning Chinese with ChineseSkill in this study.

Literature Review

Mobile Perception
Learners are more likely to accept m-learning if they believe it is useful and easy to use (Cheon et al., 2012; Al-Adwan et al., 2018; Sun & Gao, 2020). Therefore, learners' mobile perceptions should be investigated to ensure that they are ready to engage in m-learning. On this topic, some researchers from different countries and districts have directly sent questionnaires to collect relevant data, which provide not only research results but also measurement tools as references for this study.

Specifically, Hsu (2013) conducted a cross-cultural experiment to investigate ESL learners' perceptions of MALL in Taiwan, China. Although all participants indicated that MALL had the potential to enhance ESL learning, the differences between respondents with different

cultural backgrounds were significant, suggesting that cultural background might influence mobile perceptions.

Similarly, Cheng et al. (2010), Wang et al. (2011), Chen (2013), Cheng and Chen (2019), and Sun and Gao (2020) conducted various surveys in different areas of China to investigate ESL learners' mobile perceptions. In general, all respondents had basic technological knowledge and positive perceptions toward m-learning. In addition, Cheng et al. (2010) reported that learners thought PU was much more important than PEOU. Cheng and Chen (2019) concluded that PU has a significant impact on achievement: the higher the level of PU, the higher the achievement.

In addition, Rahamat et al. (2011), Soleimani et al. (2014), Kumar et al. (2016) adapted questionnaires to investigate learners' mobile perception in Malaysia. They found that the respondents expressed their willingness and positive attitude towards MALL and showed a high level of mobile perception. Moreover, Kumar et al. (2016) summarized that learners considered m-learning to be more useful than textbook-based learning.

Furthermore, researchers also investigated learners' mobile perceptions in some other countries. For example, Qin (2015) and Odede (2021) reported that learners in African countries had positive mobile perception. Qin (2015) also found that learners' perceptions toward MALL increased after mobile devices were integrated into the classroom. Ji et al. (2017) studied the mobile perception and motivation of CSL learners in America and found that the correlation between the perception of learning Chinese and student motivation was significant. Ying et. al (2017) conducted a case study in Indonesia, according to which participants and teachers were satisfied with MALL and thought it was more interactive and engaging.

Similarly, Lizamuddin et al. (2019) and Dahio et al. (2022) conducted research in Indonesia and Pakistan respectively, to investigate ESL learners' mobile perceptions. They all found that respondents had positive perceptions toward mobile assisted ESL learning. Similarly, Andujar et al. (2020) reported that ESL respondents' had positive perceptions and were satisfied with the flipped learning experience using mobile devices.

Chou et al. (2019) reported that tertiary learners had positive perceptions of mobile devices. They also indicated that PU, perceived enjoyment, and perceived innovation had significant effects on m-learning acceptance. However, the significant effect of PEOU on m-learning acceptance was not supported. The authors explained that this was probably because the apps downloaded by the respondents were not that difficult to use.

In summary, learners from different countries and regions have positive mobile perception. Of all the instruments used to measure mobile perceptions, most researchers such as Cheng et al. (2010), Rahamat et al. (2011), Chen (2013), Soleimani et al. (2014), Lizamuddin et al. (2019), Andujar et al. (2020), and Dahio et al. (2022) adapted questionnaires derived from Davis' technology acceptance model (TAM) (1989). Therefore, a questionnaire based on Davis' TAM model was also used in this study.

Mobile Motivation

Student learning motivation in the classroom plays an important role for teachers and course developers (Chang et al., 2016; Sun & Gao, 2020). In this case, many researches have been conducted in m-learning context to evaluate learners' motivation. However, some of them mainly focused on general/language motivation rather than mobile motivation.

For example, Su and Cheng (2015) investigated the effects of m-learning on learners' motivation and achievement using a mobile app to facilitate science learning in Taiwan, China. Wu (2018), Elaish et al. (2019), and Refat et al. (2020) conducted studies to investigate the effect of m-learning to improve ESL learners' learning achievement and motivation in Taiwan (China), Arabic countries, and Malaysia respectively. They all claimed that m-learning could improve both achievement and motivation more effectively compared to the control group. Similarly, Önal et al. (2019) and Taskiran (2019) carried out researches in Turkey and revealed that mobile learning technologies could positively influence learners' English language motivation. Besides, Imamyartha et al. (2022) performed a study in Indonesia and reported that there was a positive correlation between team-based mobile learning with WhatApp and ESL motivation. Honarzad and Rassaei (2019) reported that informal m-learning activities could increase the language motivation of Iranian ESL learners.

Huang et al. (2016) conducted a quasi-experimental study on the relationship between general motivation and achievement, using a questionnaire based on Keller's ARCS model (1987). They demonstrated that in the experimental group, the differences related to A (Attention) and S (Satisfaction) were significant, while the differences related to R (Relevance) and C (Confidence) were not. In addition, according to the survey, students at different levels admitted that collaboration would improve their performance.

However, in contrast to the above research, Miller and Cuevas (2017) indicated that while student motivation increased when mobile devices were introduced into the classroom, achievement did not significantly improve. This finding suggests that MALL and m-learning can improve student motivation, but higher motivation may not lead to better achievement.

In addition, Chang et al. (2016) used a quasi-experimental study to investigate the effects of m-learning and ARCS motivational theory on ESL learners' motivation and achievement in Taiwan, China. They reported that students in the experimental group generally showed higher motivation to learn. However, students in the two groups showed an insignificant difference in post-achievement. This study somewhat agreed with Miller and Cuevas (2017) that the correlation between motivation and achievement may not exist.

In the context of m-learning, other than investigating the general motivation some research also examined the mobile motivation. For example, Moreno and Vermeulen (2015) conducted a small case study in Belgium, which revealed that while Spanish students showed higher motivation for m-learning and were more willing to make recordings, comments, and suggestions, Belgian students who were less motivated performed better.

Moreover, Chang et al. (2020) conducted a study in Taiwan, China, to investigate the effect of m-learning to improve ESL vocabulary learning, according to which students' performance improved significantly and they also showed high levels of mobile motivation. This result is in contradiction with Moreno and Vermeulen (2015).

Furthermore, Sun and Gao (2020) investigated the correlation between intrinsic motivation and the two dimensions of perception, namely PE and PEOU. They reported that although the bivariate correlation analysis revealed a significant positive correlation between intrinsic motivation and PU and PEOU, the revised path model of this study did not support the significant positive correlation between intrinsic motivation and PEOU.

In summary, although these research were conducted in the m-learning environment, most of them were related to general motivation rather than mobile motivation, which leaves a large gap that needs to be filled. Moreover, while some researchers have reported that m-learning can improve both learner motivation and performance (Chaiprasurt & Esichaikul, 2013; Su & Cheng, 2014; Huang et al., 2016; Wu, 2018; Refat et al., 2020; Chang et al., 2020), some researchers claimed that the positive correlation between general/mobile motivation and achievement may not exist (Chang et al., 2016; Miller & Cuevas, 2017). Since Keller's (1987) ARCS model is very influential in measuring motivation, it has been used by researchers from different countries and regions in different contexts, e.g., Su and Cheng (2015), Chang et al. (2016), Huang et al. (2016), and Chang et al. (2020). This study also used a questionnaire based on this model to measure mobile motivation.

Mobile Self-efficacy
In the field of MALL, some researchers have tried to investigate the effect of MALL on students' language self-efficacy and achievement (Kondo et al., 2012; Yükseltürk et al., 2018; Aktaş & Can, 2019; Na & Ng, 2020). They all found that MALL can improve both self-efficacy and achievement of ESL or CSL students. Although these researches were related to general or language self-efficacy instead of mobile self-efficacy, they were conducted in the m-learning context and proved that MALL can be integrated into both formal and informal second language learning environments, so the results should be considered as references.

Besides, Rachels and Rockinson-Szapkiw (2018) investigated the effects of teaching Spanish with Duolingo, a language learning app in an American elementary school. They reported that the differences in achievement and academic self-efficacy between the experimental group taught with Duoligo and the control group taught with traditional teaching methods were not significant. Besides, Honarzad and Rassaei (2019) revealed that out-of-class m-learning activities could increase the general self-efficacy of Iranian ESL learners.

Some studies have investigated not only language self-efficacy but also mobile self-efficacy. For example, Sun et al. (2015) found that language self-efficacy was positively correlated with achievement, while mobile self-efficacy had no significant effect on achievement. They also found that participants' mobile self-efficacy decreased slightly, although the difference was not significant.

Similarly, some researchers have examined the level of mobile self-efficacy in different countries and regions. For example, Mahat et al. (2012), Yang (2012), Ayub et al. (2017), Nikolopoulou and Gialamas (2017), Yorganci (2017), and Odede (2021) reported that respondents had sufficient, moderate or relatively high levels of mobile self-efficacy. In addition, Yang (2012) indicated that learners' motivation had increased and they intended to extend m-learning to informal learning outside the classroom. In addition, Mahat et al. (2012) claimed that students believed they could engage in m-learning with proper training or support. Nikolopoulou and Gialamas (2017) found that a stronger sense of self-efficacy indicated a

greater willingness to engage in m-learning. Yorganci (2017) concluded that the more m-learning experience learners had, the higher their mobile self-efficacy.

However, the instrument to measure mobile self-efficacy is not yet mature. Some researchers such as Yang (2012) and Mahat et al. (2012) investigated m-learning self-efficacy adapted from Internet self-efficacy. Some researchers such as Wang and Wang (2008) and Tasi et al. (2010) have developed instruments to assess mobile self-efficacy. All of these instruments are not yet widely used.

In summary, MALL can increase language self-efficacy and achievement (Kondo et al., 2012; Yükseltürk et al., 2018; Aktaş & Can, 2019). Beside, although researchers such as Mahat et al. (2012), Yang (2012), Ayub et al. (2017), Nikolopoulou and Gialamas (2017), and Yorganci (2017) reported that learners have sufficient, moderate, or high levels of mobile self-efficacy and pointed out the importance of mobile self-efficacy, Sun et al. (2015) indicated that mobile self-efficacy decreased during treatment. In addition, there is no widely accepted instrument to measure mobile self-efficacy yet.

In this study, the MCSE instrument developed by Wang and Wang (2008) was selected to investigate students' mobile self-efficacy. The reasons are as follows: 1) the items in this survey are entirely based on Bandura's (1977) self-efficacy theory, which is one of the most popular theories of self-efficacy; 2) compared with other surveys, the survey is related to mobile self-efficacy and the respondents were adults from different backgrounds, which is more appropriate for the present study; and 3) Wang and Wang's (2008) survey showed a fairly high level of validity and reliability.

Research Methodology

Participant
The purposive sampling method was used to recruit respondents from a private university college in Melaka, Malaysia. Three classes of respondents who were pursing diploma degree were involved in this study. They were all CLS beginners who were asked to use ChineseSkill, a Chinese language learning mobile app, to learn Mandarin for 20 minutes each class. This experiment lasted for about 10 weeks. The total number of participants was 107, of which 11 cases were deleted from the dataset due to the straight line problem. In addition, one more case was removed due to the outlier problem. The number of valid cases was 95.

Instrument
The 20-item instrument measuring mobile perception was based on Davis' TAM model. 10 of them were used to assess PU and the other 10 items were used to assess PEOU (Davis, 1993). The instrument which was used to measure mobile motivation was based on Keller's motivational model ARCS, which includes attention, relevance, confidence, and satisfaction (Keller, 1987). The current instrument included 17 items. Fifteen of them were adopted from Liu and Chu's (2010) study, and the other two items were adopted from Chen's (2013) satisfaction questionnaire. The mobile self-efficacy instrument was adopted from Wang and Wang's (2008) MCSE survey, which included a total of 10 items.

They were all based on a 5-point Likert scale. According to Mahat et al. (2012), the mean scores whose ranges are $M \geq 3.68$, $2.34 \leq M \leq 3.67$, and $M \leq 2.33$ belong to high, moderate, and low levels respectively. The questionnaire was reviewed by three experts for content validity. A pilot study was conducted to investigate the reliability and validity of the questionnaire.

Exploratory factor analysis (EFA) was used to extract factors from the original instruments. According to the results of EFA, the original 10 items used to measure PU were assigned to PU, the five odd-numbered items of PEOU were distributed to perceived difficulty (PD), and the five even numbered items of PEOU were distributed to PEOU. All items of the ARCS instrument were assigned into one factor which was labled as mobile motivation. The first four items of mobile self-efficacy belonged to moderate self-efficacy (MSE), while the last six items were assigned to high self-efficacy (HSE). Common method bias (CMB) was then examined, which was not a major problem in this study.

Research Findings

Demographic Analysis
Table 1 shows that there were 76 female and 19 male learners, representing 80.0% and 20.0% respectively. In addition, their ages ranged from 19 to 25 years old. Specifically, 48.4% ($N = 46$) of them were 19 years old, 22.1% ($N = 21$) of them were 20 years old, 24.2% ($N = 23$) of them were 21 years old. There were 3 (3.2%), 1 (1.1%), and 1 (1.1%) learners who were 22, 24, and 25 years old respectively. In addition, 41 (43.2%) of them used Android operating system, 48 (50.5%) of them used iOS operating system, and six (6.3%) of them used both Android and iOS operating systems.

Table 1: Demographic Information for Respondents ($N = 95$)

Variable	Category	Frequency (N)	Percentage (%)
Gender	Female	76	80.0
	Male	19	20.0
Age	19	46	48.4
	20	21	22.1
	21	23	24.2
	22	3	3.2
	24	1	1.1
	25	1	1.1
Operating system	Android	41	43.2
	iOS	48	50.5
	Both	6	6.3

Levels of Mobile Perception, Motivation, and Self-Efficacy
Based on Table 2, the Cronbach's alpha coefficients for mobile perception, mobile motivation, and mobile self-efficacy were .936, .951, and .929 respectively, indicating that the internal consistency reliability for these variables were acceptable.

Table 2: Reliability Statistics for Mobile Perception, Motivation, and Self-efficacy

	Cronbach's Alpha	*N* of Items
Perception	.936	20
Motivation	.951	17
Self-efficacy	.929	10

Regarding the level of mobile perception, according to Table 3, the mean was 3.175 (*SD* = .726), suggesting that respondents had a moderate level of mobile perception. For the lower constructs, PEOU showed the highest mean score (*M* = 3.339, *SD* = .916), which followed by PU (*M* = 3.137, *SD* = .089) and PD (*M* = 3.085, *SD* = .813), indicating that although some respondents perceived that MALL was difficult for them, the level of PEOU and PU was comparatively higher than that of PD.

As for mobile motivation, the mean score for mobile motivation was 3.268 with a standard deviation of .792, which indicated that respondents had a moderate level of mobile motivation (Table 3).

In terms of mobile self-efficacy, as shown in Table 3, the mean score for mobile self-efficacy was 3.222 (*SD* = .836), implying that respondents held moderate level of mobile self-efficacy. For the lower constructs, the mean score for MSE (*M* = 3.237, *SD* = .950) was slightly higher than that for HSE (*M* = 3.197, *SD* = .889), indicating that respondents prefer to rely on themselves rather than on outside help. However, the difference was quite small.

Table 3: Descriptive Statistics for Mobile Perception, Motivation, and Self-Efficacy

	N	Mean	Std. Deviation
Perception	95	3.175	.726
PD	94	3.085	.813
PEOU	95	3.339	.916
PU	95	3.137	.890
Motivation	95	3.268	.792
Self-Efficacy	95	3.222	.836
MSE	95	3.237	.950
HSE	95	3.197	.889
Valid N (listwise)	94		

Correlations between Mobile Perception, Motivation, and Self-Efficacy
The correlations between mobile perception, mobile motivation, and mobile self-efficacy were examined with bivariate correlation analysis. According to the correlation matrix presented in Table 4, all correlations were significant. Specifically, although mobile perception was strongly influenced by PU (*r* = .899), PEOU (*r* = .824), and PD (*r* = .682), PU should be comparatively ranked first, followed by PEOU and PD. Besides, the correlation between PU and PD (*r* = .372) was less strong than that between PU and PEOU (*r* = .580), indicating that respondents who perceived difficulty found mobile apps less useful.

Similarly, the correlation between mobile motivation and PD (*r* = .531) and correlation between mobile motivation and PU (*r* = .706) were less strong than that between mobile motivation and

PEOU ($r = .783$), indicating that respondents who perceived ease to use and usefulness are more motivated than those who perceived difficulty.

The correlation between mobile self-efficacy and HSE ($r = .929$) was slightly higher than that between MSE ($r = .876$), implying that we should put more emphasis on HSE. In addition, the correlation between PD and HSE ($r = .705$) was much stronger than that between PD and MSE ($r = .491$), implying that respondents who perceived difficulty preferred to seek more outside help rather than relying on themselves. The correlation between mobile motivation and MSE ($r = .803$) was higher than that between mobile motivation and HSE ($r = .615$), implying that learners with MSE were more motivated than those with HSE.

Table Error! No text of specified style in document.: Correlation Matrix of Mobile Perception, Motivation, and Self-Efficacy

	Perception	PD	PEOU	PU	Motivation	Self-Efficacy	MSE	HSE
Perception	1							
PD	.682**	1						
PEOU	.824**	.551**	1					
PU	.899**	.372**	.580**	1	.			
Motivation	.828**	.531**	.783**	.706**	1			
Self-Efficacy	.744**	.675**	.712**	.542**	.763**	1		
MSE	.711**	.491**	.665**	.595**	.803**	.876**	1	
HSE	.661**	.705**	.646**	.428**	.615**	.929**	.655**	1

**. Correlation is significant at the 0.01 level (2-tailed).

Discussion and Conclusion

This study aimed to investigate CSL learners' readiness to engage at MALL. Specifically, learners' mobile perception, mobile motivation, and mobile self-efficacy were investigated. Regarding mobile perception, it is similar to the three other research which were also conducted in Malaysia, namely Rahamat et al. (2011), Soleimani et al. (2014), and Kumar et al. (2016), as well as the other research which were carried out in other countries and regions, such as Cheng et al. (2010), Wang et al. (2011), Chen (2013), Qin (2015), Ji et al. (2017), Ying et. al. (2017), Cheng and Chen (2019), and Sun and Gao (2020), this research found that the respondents had moderate levels of mobile perception.

As for the sub-dimensions of mobile perception, in addition to the two original dimensions derived from Davis' TAM model, namely PEOU and PU, the third dimension, i.e., PD, was extracted from the 20-item instrument. Although the mean score for PEOU (3.339) was higher than that for PD (3.085), some respondents thought ChineseSkill was difficult to use, suggesting that they may need more training, which is consistent with the views of Chang et al. (2010) and Mahat et al. (2012). Therefore, teachers should monitor learners' needs and provide them with timely support.

In addition, this study found that although both PU and PEOU were highly correlated with mobile perception, which was in line with Chou et al. (2019). Besides, PU should be prioritized over PEOU, which was confirmed by Cheng et al. (2010) who indicated that PU is much more

important than PEOU. However, this research also found that learners who perceived difficulty found mobile apps less useful. Therefore, designers should consider both usefulness and ease to use into consideration while developing mobile apps. Teachers should recommend appropriate mobile apps to learners.

As explained in the literature review, more research has been conducted on general or language motivation than on mobile device motivation (Su & Cheng, 2015; Wu, 2018; Elaish et al., 2019, Honarzad & Rassaei, 2019; Önal et al., 2019; Taskiran, 2019; Refat et al., 2020; Imamyartha et al., 2022). This study filled the gap and found that respondents had moderate levels of mobile motivation, which was consistent with Chang et al. (2020). However, the mean score for mobile motivation was not as high as Chang et al. (2020), where the mean scores of the four dimensions even reached as high as 4.5.

Regarding the dimensions of mobile motivation, the EFA results showed that the four original dimensions of Keller's (1987) ARCS model, namely motivation, attention, relevance, confidence, and satisfaction, were combined into a single factor (mobile motivation) because these dimensions were highly correlated. As a result, the original four dimensions of the ARCS motivation model were not examined as these research, i.e. Huang et al. (2016) and Chang et al. (2016).

As for the correlation between mobile motivation and other constructs, this study also found that respondents who perceived ease to use and usefulness were more motivated than those who perceived difficulty. To some extent this finding could be supported by Sun and Gao (2020). In addition, learners with MSE were more motivated than those with HSE. Therefore, to improve learners' mobile motivation their levels of PEOU, PU, and MSE should be paid attention to.

As for the level of mobile self-efficacy, the respondents in this study had moderate levels of mobile self-efficacy. This result is consistent with the findings of previous studies (Tsai & Tsai, 2003; Tsai et al., 2010; Mahat et al., 2012; Yang, 2012; Ayub et al., 2017; Nikolopoulou & Gialamas, 2017; Odede, 2021). They found that students had positive and sufficient self-efficacy in using the Internet/mobile self-efficacy.

As for the lower constructs of mobile self-efficacy, although there were only 10 mobile self-efficacy items in this study, moderate self-efficacy (MSE) and high self-efficacy (HSE) were extracted using EFA. The mean score for MSE was slightly higher than that for HSE, indicating that respondents preferred to rely on themselves rather than outside help.

As for the correlation between mobile self-efficacy and other constructs, this study found that the correlation between mobile self-efficacy and MSE was weaker than the correlation between mobile self-efficacy and HSE, indicating that we should pay more attention to outside help (HSE), which means that respondents who perceived difficulties preferred outside help rather than relying on themselves.

As claimed by Watkins et al. (2004) and Cheon et al. (2012), this study also confirmed from the demographic information that learners who are in higher education are very suitable to engage in m-learning because they usually own their own mobile devices and have basic technical skills. In addition, the questionnaire revealed that learners have moderate levels of

mobile perception, mobile motivation, and mobile self-efficacy, indicating that they look forward to and are ready for m-learning. Policymakers and teachers should therefore consider integrating m-learning and MALL into the classroom to improve formal teaching.

Limitations and Suggestions for Future Study

Apart from the variables included in this study, future studies could also examine the correlations between mobile perception, mobile motivation, and mobile self-efficacy with other variables, such as the correlation between mobile self-efficacy and willingness to use mobile devices, which was addressed by Wang and Wang (2008) and Nikolopoulou and Gialamas (2017); the influence of cultural background on mobile perception, which was reported by Hsu (2013); the effect of m-learning experience on mobile self-efficacy, which was examined by Yorganci (2017); and the relationship between gender and the four dimensions of the ARCS model, which was examined by Refat et al. (2020).

Furthermore. although the respondents in this study had a long practical experience with MALL, namely using ChineseSkill to facilitate CSL learning for about 10 weeks, the questionnaire was completed only once at the end of the experiment. In order to evaluate the improvement of learners' mobile perception, mobile motivation and mobile self-efficacy and their deep thoughts, such as Rachels and Rockinson-Szapkiw (2018), Honarzad and Rassaei (2019), and Na and Ng (2020), a future study could also use the longitudinal data collection method and additional face-to-face interview to collect data.

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