

Vocabulary Learning Assisted by Mobile Phones: Perceptions of Chinese Adult Learners*

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Abstract:

This empirical study aims to reveal how mobile phone is perceived as a language learning tool and what opinions students have after the mobile phone learning experience. A total of 24 part-time adult learners majoring in English participated in this research. A questionnaire survey was conducted after a 4 week vocabulary learning experience assisted by mobile phones. Results support the idea that mobile phones provide an alternative source for adult learners to learn vocabulary and cater to the particular needs of adult learners to “learn any time and anywhere”. Vocabulary learning with mobile phones allows learners to be exposed to the distributed vocabulary items on the regular basis, which can be a complementary approach to massed vocabulary learning, as in the traditional paper-based vocabulary learning.

Key Words: Mobile Learning, Vocabulary Learning, Empirical Study

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1. INTRODUCTION

The prevalent use of mobile devices such as mobile phones is beginning to have an impact on how students learn, especially in the case of foreign language learning. These portable and readily-available devices offer more opportunities to improve student retentions and achievement and support different needs of the younger digital generation. Moreover, with a mobile device learners are more likely to have the option of mobile access to electronic learning materials, resources and people. Mobile learning promises to deliver closer integration of language learning with everyday communication needs and cultural experience (Kukulska-Hulme, 2006). Therefore, mobile devices are deemed as efficient tools for language learners with additional support for comprehension and communication and also accommodate different learning styles. Before designing and implementing large scale pedagogical practice of mobile learning design, it is necessary to explore how learners utilize and perceive this new mode of learning.

This paper aims at investigating the perception and opinions of adult language learners after experiencing vocabulary learning assisted by mobile phones. Such efforts can provide a guiding outline for research activities and pedagogical practice in the field of Mobile Assisted Language Learning (MALL).

2. LITERATURE REVIEW

In this review, I will first review the current development of mobile learning. Then I will introduce the recent trend in researching vocabulary learning and discuss vocabulary studies via mobile phones in detail.

2.1 Mobile Learning

Mobile devices have brought a vast number of learning possibilities which are convenient and compatible to the mobile lifestyle. Mobile technology can support quick feedback or reinforcement; immersive experiences such as mobile investigations or games; situated learning in an authentic context; access to information while moving around a specific environment; information sharing in collaborative learning; record keeping in informal and lifelong learning; and coordination of learning and resources (Kukulska-Hulme et al., 2004). Mobile devices are best viewed as mediating tools in the learning process during which the learners, teachers and content interact with each other. Kukulska-Hulme (2006) has predicted language may be a fruitful area for informal learning with mobile devices.

As there is a growing trend in exploiting the innovative design and pedagogical practice of mobile learning, it is necessary to clarify what we mean by “mobile learning” since the concept has developed rapidly and there are different understandings of what is meant by “mobile”. At the stage of infancy, researchers defined mobile learning from different perspectives. Geddes (2004) defined mobile learning as the acquisition of any knowledge and skill through using

mobile technology, anywhere, anytime that results in an alteration in behavior. Mobile learning is considered as the application of mobile or wireless devices for learning when the learner is moving. Thus, flexible, accessible and personalized learning activities are considered as the advantages provided by mobile learning. Sharples (2006) and Laurillard (2007) argued that a typical m-learning activity could build more opportunities for digitally- facilitated site-specific activities, and for ownership and control over what the learners do.

The early research in relation to the concept of mobile leaning was closely related to devices and the potential for enabling lifelong learning. It soon became clear that rather than focusing on the device, research should be on the mobility of the learner. Mobile assisted language learning characterizes the use of personal, portable devices that enable new ways of learning, emphasizing continuity or spontaneity of access and interaction across different contexts of use.

... the mobile technology, while essential, is only one of the different types of technology and interaction employed. The learning experience cross spatial, temporal and/or conceptual borders and involve interactions with fixed technologies as well as mobile devices. Weaving the interaction with mobile technology into the fabric of pedagogical interaction that develops around them becomes the focus of attention (Kukulska-Hulme et al., 2009).

Thus, the key to understand mobile learning practice is the learning experience, especially how learners interact with the mobile devices rather than the technology itself. In other words, it is the human experience and perception, cognitive, psychological and affective, that lead to the insight in understanding the new mode of learning. So far, however, there has been little discussion about the adult learners and this study will focus on this particular group of learners.

2.2 Studies of Vocabulary Learning

Vocabulary learning is a fundamental component of foreign language acquisition. A minimal amount of vocabulary is indispensable for effective communication. Wilkins (1972) argued that “Without grammar very little can be conveyed, and without vocabulary nothing can be conveyed”. Therefore, vocabulary is considered the building block for the capacity of communication. Previous vocabulary studies can be categorized into studies with technology and those without technology (Zhang et al., 2011). They have found that the majority of the studies researches vocabulary learning from the perspective of mnemonic devices, learning strategies, the impact of reading, the role of context, as well as syntactic and thematic analysis.

Technological advances, in fact, provide more possibilities and chances to enhance vocabulary learning. As Ellis (1995) argued, “CALL has numerous roles in the general training of explicit skills for memorizing the meaning of vocabulary, and in the particular presentation of mnemonic mediators for specific items of vocabulary”. He also emphasized the basic educational role of computers as programmed providers of drill, practice, and test. Currently an

important strand of researching vocabulary learning is the exploration of mobile assisted vocabulary acquisition. The mobile devices have multiplied the opportunities to access learning resources. Another obvious function of mobile devices is the way they facilitate contextual learning, i.e. allowing the information available in learners' location, and relevant to their needs, to be captured or delivered in context (Kukulska-Hulme, 2006). If the acquisition of the new vocabulary items occurs at the right time and right place, learners will understand and use what they have learned with less effort.

Research findings suggest that learning assisted by mobile technologies provide EFL learners with additional exposure to target content anytime, anywhere. Mobile devices have numerous advantages for language learning. In many cases, such devices are readily available. The portability is another obvious benefit. They can be easily accessed in the classroom or outside of classroom. Learners can study manageable chunks of information in any place on their own time, thereby taking advantage of their convenience. As pioneers in MALL, researchers at Stanford Learning Lab envisioned that a good approach would be to fill the gaps of time by short (from 30 seconds to 10 minutes) learning modules in order to use the highly fragmented attention of the user while on the move. Function for utilizing fragmented time is the distinctive feature for MALL.

Inspired by the mobile language learning research initiated by Stanford Learning Lab, researchers have started various designs exploiting the functions of mobile devices. One of the most straightforward applications of mobile devices for the educational purpose is text message. The cost for text message learning design is much lower than those supported by the computer means. The learners' familiarity with this function also offers equal access and they don't need take much time to familiarize themselves with operation as such. Therefore, the application of mobile-assisted vocabulary learning would be highly practical and convenient for language learners. Such practice will contribute to meaningful vocabulary learning when the learning process is integrated with social, cultural and life contexts (Chen & Li, 2010).

A closer examination of the learning theories underpinning these designs draws our attention to the crucial factors for the design and application of mobile affordance. The classification of activities in this paper is based on the main themes mentioned in Literature Review on Mobile Technologies and Learning (Naismith et al., 2004):

- behaviorist activities
- constructivist activities
- situated activities
- collaborative activities
- informal and lifelong activities

The five activity types classified above enable us to know better what happens on the learners' part. What experience, behaviorally, cognitively, psychologically or socially, can be triggered during the mobile vocabulary learning process? It will bring more constructive ideas to mobile learning design if understanding of another dimension added – role of the teacher in the mobile learning design. The relationship between the behaviorist mobile vocabulary learning activities and the role of the teacher is briefly discussed below.

Behaviorist activities constitute the basic mobile vocabulary learning designs in the early stage of mobile learning projects. In the behaviorist paradigm, learning is thought to be best facilitated through the reinforcement of an association between a particular stimulus and a response (Naismith et al., 2004). Various functions of the mobile devices act as a medium for stimulating such a response. The content delivery by text messages is often used in the behaviorist research design. Specifically, learners receive specific content and provide instant feedback via mobile phones. The vocabulary learning designs underpinning this mode take advantage of the unique features of mobile devices: portability and mobility, which help learners get access to the learning contents out of schools. Majority of mobile vocabulary learning designs are conducted from the behaviorist stance.

The teachers' perspective is important for examining the pedagogical model because they are responsible for directing an activity and how much freedom the learners have. When addressing the pedagogic models via mobile device, McFarlane, Roche and Triggs classified three main 'emerging models of use', namely, teacher-directed activity, teacher-set activity and autonomous learning activity (cited in Kukulska-Hulme, 2010). Although it is not easy to separate distinct models, it is possible to recognize a continuum, with teacher-directed activities at one end and autonomous ones at the other. This continuum provides us different lens to examine the activity types of mobile vocabulary learning design classified in this paper. The behavioral activities are more teacher-directed while the constructivist activities, situated activities and collaborative activities are generally teacher-set because "teacher sets the task and the general outcome, but the processes and format of the outcome are largely defined by the learner"(Kukulska-Hulme, 2010). The informal and lifelong ones are more learner-driven because learners perform mobile learning tasks unasked. In this sense, mobile technology can be a catalyst for learners to initiate autonomous learning activities. In the current study, the teacher-directed stance is undertaken because the guidance from the teacher helps learners develop the mobile learning awareness and the teacher plays the dominant role in monitoring the whole vocabulary learning process.

The above section has discussed vocabulary learning on the basis of activities enabled through the use of mobile devices with a reference to the role of teacher. A further dimension of mobile enhanced vocabulary learning can be explored from the point of view of the personal and portable nature of the device, coupled with the interaction with other learners and environment.

Klopfer et al. (cited in Naismith et al., 2004) identify five properties of mobile devices which provide the unique educational affordance:

- portability
- social interactivity
- context sensitivity
- connectivity
- individuality

These features are closely related to the above mentioned activities stimulated in the mobile learning process and, therefore, are essential consideration for designing and implementing mobile language learning. The mobility of learners can help learners gain new knowledge, skills and experience as “learning is a cumulative process involving connections and reinforcement among a variety of learning experiences, across formal and informal learning context”(Kukulska-Hulme et al., 2009). Traxler (2007) claims that mobile technologies can support diverse teaching and learning styles and lend themselves particularly well to personalized, situated, authentic and informal learning(cited in Kukulska-Hulme et al., 2009).

Recently, a few studies have investigated the pedagogical use of mobile phones for vocabulary learning. The projects (Thornton & Houser, 2005;Cavus & Ibrahim, 2009; Nwaocha, 2010; Lu, 2008; Zhang et al.,2011) integrating text message and vocabulary learning were generally well received. Students learn more effectively when exposed to spaced-repetition of vocabulary than massed repetition. These findings echo the claim of Nation (2001) that spaced repetition of vocabulary items seems more effective than massed repetition. Compared with the traditional paper-based self-directed vocabulary learning, mobile phones provide learners with opportunities for the exposure of spaced vocabulary items. Thornton &Houser (2005) compared the effect of different vocabulary learning modes, one using paper material and the other supported by mobile phones and the results showed that mobile phone group gained significantly more vocabulary than the paper group. The success of such vocabulary learning is mainly due to the “push media” effect, which promote frequent rehearsal and spaced study, and utilize recycled vocabulary (Thornton & Houser, 2005). They argue the “spacing effect” generated by the regular delivery of target words facilitates the retrieval of the vocabulary. Lu (2008) and Song (2008) state that flexibility and motivation afforded by mobile phones enable learners to learn anywhere and anytime. This spacing effect is considered as the major contributor to enhancing vocabulary learning via text-messaging (Derakhshan & Khodabakhshzadeh, 2011). The items are presented and then immediately repeated (massed practice) is not as effective as those repeated after a period of time. Moreover, vocabulary items monitored by mobile devices can help deliver regular and repeated learning content and such frequent encounter with new items at spaced intervals, and in a variety of contexts, tend to enhance memory. The long-term effect of the spaced learning, however, is still open to

discussion, and need further testing and research. As both the traditional vocabulary learning and mobile vocabulary learning have their innate advantages and disadvantages, a blended approach is recommended for learners to meet their particular needs (Zhang et al., 2011).

Cavus & Ibrahim (2009) also investigated the use of wireless technologies in education with particular reference to the potential of learning new technical English language words using SMS text messaging. This regularly-delivered intensive content represents a form of deliberate learning beyond the classroom context and such activities aim at vocabulary development predominantly. The system, called mobile learning tool (MOLT) in their design, has been tested with 45 1st-year undergraduate students. The knowledge of students before and after the experiment has been measured. The results show that students enjoyed and learned new words with the help of their mobile phones. Therefore, using the MOLT system as an educational tool expands the learning experience into the informal setting and particularly contributes to EFL language learners' achievement.

Despite rising number of studies with regard to vocabulary learning assisted by mobile phones, further investigation is needed due to the following two considerations. First, few studies have been conducted in the mainland China context to investigate adult learners' perception and attitude. Learners in different region may have different characteristics and different response. It is of significance to investigate the mobile pedagogical application in the current Chinese social cultural context and figure out the context specific features for future guidelines. More specifically, adult learners should be taken into consideration for mobile assisted learning. Mobile learning is considered major means for informal learning and continuing education; however, it has failed to draw attention of practitioners and researchers (Yang et al., 2010). Adult learners have to attend class during their spare time and have great difficulty in maintaining the regular study. Guidance and support of autonomous learning from their teachers are particularly needed when they are off campus. Mobile phones can act as a facilitating tool for autonomous learning. Second, a preliminary investigation of learners' experience and attitude is necessary for future large-scale mobile learning pedagogical application. As an emerging pedagogical application of modern technology, mobile assisted language learning is still facing uncertainties. Before large-scale application, it is necessary to take learners experience into consideration and examine their attitude and response. Hence, the present study is dedicated to find out the adult learners' perception and experience of mobile assisted vocabulary learning in the Chinese context.

3. RESEARCH DESIGN

3.1 Research questions

The initial stage of the research was to conduct a survey to find out how they learn vocabulary with their mobile phones and what their attitudes are towards vocabulary learning assisted by mobile phones. A short paper-based survey was conducted to address the following research questions:

1. How adult learners learn vocabulary with mobile phones?
2. How adult learners perceive vocabulary learning assisted by mobile phones?

3.2 Participants

An intact class of second-year adult learners (N=24) of English major participated in this project. These part-time adult learners (M=4, F=20) joining in this 3 year Bachelor Degree program have to attend class after work three times a week, totaling 12 hours. Most of them are at the age of 20-30 and on average they have intermediate English proficiency level. As part-time students, they are confronted with the challenge of lacking exposure to English. Meanwhile, teachers need try every means to utilize the limited class sessions and there is an urgent need for these learners to find an effective approach to expand their vocabulary size.

3.3 Design

This study is designed to adopt Fetion text message as a tool for delivering the new vocabulary items. Fetion, a free text message software provided by China mobile, is applied in this empirical studies. The teacher downloaded Fetion on the PC software and then invited learners to start their Fetion service on their mobile phones and joined the class Fetion group. The teacher chose new word items from the word list from the comprehensive reading texts and delivered a text message of five items a day at 11 am on week days. Each item includes the spelling and explanation in both Chinese and English. The experiment has lasted for four weeks and adult learners were asked to respond to a questionnaire survey. The first section of the survey covers the learners' personal information and the second section is about the mobile phone use with regard to language learning. The third section with 22 items (16 five-point Likert scale item and 6 open questions) addresses learners' perception of the mobile learning experience. Descriptive statistical analysis was conducted with SPSS after the questionnaires were collected.

4. FINDINGS AND DISCUSSIONS

4.1 Adult learners' practice of vocabulary learning assisted by mobile phones

To see how learners utilize mobile phone message, we firstly need know how often they read the message and how they deal with the message after reading. As the results show, most learners (95.7%) read the messages. After reading the new message, most of those who read the text message lessons (78.3%) kept the message for future reference while some (21.7%) deleted it. As for the location of vocabulary learning with mobile phone, a majority of them preferred to read message during commuting or the "fragmented time", such as waiting or queuing. Due to its portability and accessibility, mobile phones create opportunities for adult learners to make use of such fragmented time. It becomes their preferred practice of vocabulary learning off campus.

4.2 Adult learners' attitude of vocabulary learning assisted by mobile phones

In the questionnaire section with regard to adult learners' attitude toward vocabulary learning assisted by mobile phones, learners were required to choose one from the five scales (1=strongly disagree, 2 slightly disagree, 3=neutral, 4= slightly agree, 5=strongly agree).

The overall response to vocabulary learning assisted by mobile phones was significantly positive. The majority of the adult learners favored this novel medium for vocabulary learning with average scores of 4.13 and 4.30 on a scale from 1 to 5 before and after the experiment respectively (Table 1). Comparison between the two groups was conducted with paired sample t-test. As it is shown in Table 2, there is a significant rise in the learners' positive attitude toward the mobile vocabulary learning ($t=-2.152$, $p=0.043<0.05$). This indicates that the mobile phone learning experience has contributed to positive feedback. Specifically, Table 1 shows the average scores are 4.74 and 4.43 respectively with regard to the statement "willing to receive vocabulary text message" and "willing to exploit functions of other mobile learning". These results show they prefer learning vocabulary via mobile phones and look forward to continue language learning via mobile phones. Besides, only a handful of adult learners (1.74) agree with the statement that "vocabulary text message disturb their life and study". This also confirms the learners' preference of mobile learning. All these findings prove that the adult learners' overall attitude toward this new mode of vocabulary learning is very positive.

Table 1 Attitude towards the vocabulary learning via mobile phones

| | N | Max | Min | Mean | SD |
|---|----|-----|-----|------|------|
| General attitude before the mobile practice | 23 | 2 | 5 | 4.13 | .815 |
| General attitude before the mobile practice | 23 | 2 | 5 | 4.30 | .876 |
| Willingness to receive vocabulary text message | 23 | 4 | 5 | 4.74 | .449 |
| Considering vocabulary text message as distraction | 23 | 1 | 5 | 1.74 | .915 |
| Willingness to continue vocabulary learning via mobile phones | 23 | 4 | 5 | 4.78 | .422 |
| Willingness to exploit functions of other mobile learning | 23 | 2 | 5 | 4.43 | .788 |

Table 2 Attitude change of vocabulary learning via mobile phones

| Mean | SD | SE | T | Df | Sig(two-tailed) |
|-------|-------|-------|--------|----|-----------------|
| 0.174 | 0.388 | 0.081 | -2.152 | 22 | 0.043 |

To gain further understanding of the adult learners' perception of vocabulary learning via text message, a comparison of different modes of vocabulary learning, i.e. paper-based one and mobile-phone-based one, was conducted. As it is indicated in Table 3, adult learners are, on average, accustomed to vocabulary learning via paper material (4.00) and mobile phones (4.04). Although learners have a brief experience of vocabulary learning via mobile phones, portability and easy access help learners adapt to this new learning mode. Besides, adult learners give positive feedback to the effect of mobile vocabulary learning on the whole. Compared with the effect of paper material (4.00), the effect of mobile phones is slightly lower (3.78) but still quite positive. Figure 1 also indicates that the positive opinion for the effect of the different modes account for the majority (paper material=82.6%; mobile phone=69.6%). Despite the brief experience of mobile vocabulary learning, adult learners hold that mobile phones help them memorize new words in a convenient manner, thus indicating its pedagogical potential.

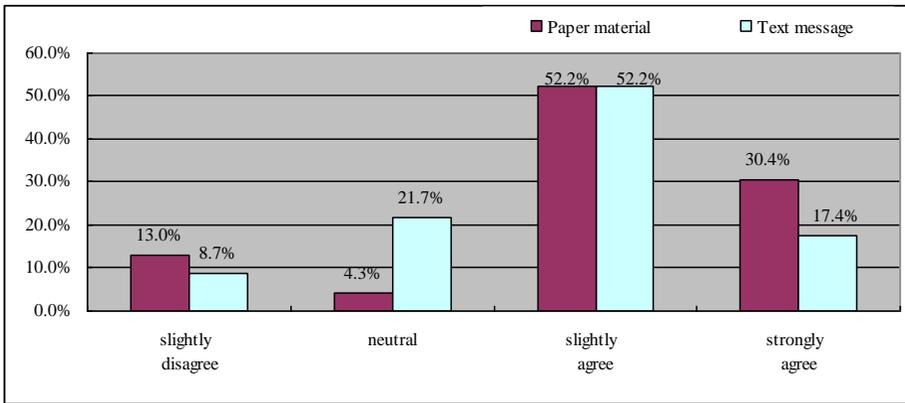


Figure 1 Learners perception of the vocabulary learning effect

Compared with the paper-based vocabulary learning, mobile assisted vocabulary learning is favored by the adult learners due to the following features as is shown in Table 3. Firstly, most students (4.65) responded very positively to “accessibility of mobile phones”. Some learners reported that they can employ the convenience of the mobile phone for learning when they fail to use computer or textbook during business trip or personal travel. Despite the limited words offered, they can build their repertoire of vocabulary on the daily basis. Second, most learners favor this project for “instant vocabulary text message as a reminder for autonomous learning” (4.00). They think vocabulary text message can remind the adult learners of vocabulary task when they lack the initiative to learn the new words. These adult learners are often busy with their work and family and tend to neglect their learning. By reminding them of new words via mobile phones, the teacher could monitor the learning process of the adult learners off campus. Third, mobile text message contributes to exploiting the “fragmented time” (4.48), therefore, it is a great advantage for adult learners who can hardly find intact learning time. To meet the demand for learning during the fragmented time, content delivered by mobile phones need be as concise as possible. In terms of memorizing vocabulary, mobile assisted vocabulary learning can relieve the burden of learning. Adult learners consider the vocabulary learning tasks as less daunting and their interest in vocabulary learning was sustained. Based on the above comparison, vocabulary learning assisted by mobile phones create for adult learners learning opportunities, which can not be offered by conventional means.

In all, adult learners generally displayed a positive response to the new mode of vocabulary learning. The following factors may account for the success. Firstly, it is the current social mobile practice that paves the way for learning via mobile phone. Due to the integration of mobile phones in the daily life, these learners readily adapted to learning new words via text message. Secondly, the intrinsic characteristics of vocabulary learning assisted by mobile phones leads to the affordance for adult learners’ vocabulary learning. The following part will discuss these advantages in detail.

Table 3 Advantages of learning vocabulary via mobile phones

| | N | Min | Max | Mean | SD |
|---|----|-----|-----|------|-------|
| Get used to vocabulary learning via paper material | 23 | 2 | 5 | 4.00 | .905 |
| Get used to vocabulary learning via mobile phones | 23 | 2 | 5 | 4.04 | .825 |
| Effectiveness of vocabulary learning via paper material | 23 | 2 | 5 | 4.00 | .953 |
| Effectiveness of vocabulary learning via mobile phones | 23 | 2 | 5 | 3.78 | .850 |
| Accessibility of mobile phones | 23 | 3 | 5 | 4.65 | .573 |
| Instant vocabulary text message as a reminder for autonomous learning | 23 | 2 | 5 | 4.00 | 1.168 |
| Vocabulary learning via mobile phones during fragmented time | 23 | 2 | 5 | 4.48 | .790 |

Mobile phone technology has the potential to increase learners' efficiency, especially in situation where self-regulated learners lack the ability to learn well in an autonomous manner (Zhang et al., 2011). It is exactly the case for the part-time adult learners. These learners have very limited amount of time for lectures on campus. They need devote most of their time to autonomous learning. Due to their busy work, however, they find it difficult to sustain the self-directed autonomous learning. Thus, mobile phones act as an effective media to facilitate vocabulary learning on the daily basis.

The portability and immediacy of mobile phones can also account for the positive response of these adult learners. These advantages afford learners easy access and repeated exposure to the learning materials. The current study seems to be consistent with Lu (2008) and Zhang et al. (2011). They argue the desirable short-term effect of vocabulary learning via mobile phones is due to the easy access to mobile phones and the repeated exposure to vocabulary items on daily basis is conducive to enhanced vocabulary learning. According to Hulstijn & Laufer (2001), such repeated exposure to target vocabulary items "enhances the information processing activities, makes the activation and recognition automatic, and leads to greater retention". Likewise, adult learners in the present study favor the mobile assisted vocabulary learning because of the convenience facilitated by the portability and accessibility. Because these part-time learners have very busy schedule, they have difficulty in studying the lengthy paper vocabulary lessons when they can not devote themselves to study in a fixed location. In contrast, vocabulary items delivered by mobile phones are separated into small chunks, which are manageable and appealing to adult learners. They can conveniently study new words any

time anywhere. Such constant and distributed learning has more beneficial effect on memory and learning.

5. CONCLUSIONS AND IMPLICATIONS

In conclusion, the current findings provide additional insights into the perception of vocabulary learning via mobile phones from Chinese adult learners in EFL settings. The major research findings show the majority of adult learners favor vocabulary learning via mobile phones due to the convenience facilitated by the portability and accessibility of the mobile phones. By this means, they can take advantage of fragmented time, which is crucial for adult learners. It is also shown that regular and immediate vocabulary text message may act as an effective reminder to adult learners to exercise autonomous vocabulary learning. Furthermore, vocabulary learning via mobile phones provides learners with frequent exposure to target words, which is considered conducive to memorizing new words. Meanwhile, the teacher divided a huge series of unit vocabulary into sequential mini-tasks, which relieved the cognitive and psychological burden of the adult learners. The evidence from this study suggests the potential application of mobile phones in vocabulary learning. By looking at small-scale mobile vocabulary learning practice, we can get a closer understanding of learners' mobile learning experiences and perception and design new learning projects which are highly situated, personal, collaborative and long term. The findings of the current research not only inform teachers and educators, but software developers of the potential pedagogical application of the mobile technology.

However, the role of mobile devices in language learning should not be overstated. Colpaert (2004) emphasizes the importance of developing the language learning environment before deciding on the role of mobile technologies and further emphasizes focusing on the learner ahead of technology. The above comment on the relationship between technology and learning implies that technology is not the solution to all the difficulties in learning. Although mobile technology is proving to be a fertile ground for innovation, human nature should be firmly anchored at the center of the developments when we deal with technologies. It is important to realize that the success of mobile learning will depend on human factors in the use of the new mobile and wireless technologies. It is conceivable that more practice of mobile learning on a larger scale, and with diverse population of learners involved will enable us to have a deeper understanding of this field.

Another issue that the instructor ought to bear in mind is the learners' preparedness for mobile learning. It may take longer time than we expect to integrate mobile learning and language learning. Wang and Higgins (2006) pointed out that the barriers that limit the use of mobile phones for language learning are technological, pedagogical and psychological. They argue that it is time-consuming for learners to embrace new technologies, and it is not possible to expect all learners to accept the new learning mode at the same rate. In a survey about the integration of SMS into learning, Petrova&Sutedjo (2004) conclude that specific learners' group needs and

their learning style are the major considerations for the mobile assisted learning. Therefore, further understanding of the preferred communication modes such as frequency and the most suitable time for mobile learning activity is necessary for identifying the most efficient and potentially successful applications of mobile learning.

Limitations of the current small-scale research provide directions for future research. First, it would be interesting to investigate a larger sample size in different context, either in terms of learning mode (traditional learning or online learning) or majors. This study used an intact class of small sample size for convenience and all the adult learners in this research major in English. Whether the same findings would be obtained with learners from other backgrounds majoring in other disciplines other than English remains to be explored. Second, further experimental investigations are needed to assess the learners' long-term response because the short-term experience may affect the objectivity of the learners' attitude. Adult learners respond very positively to the new mode of vocabulary learning might be partly due to the novelty of their experiences. Third, future designs for producing the target words will be more interesting to gain knowledge about the facilitative role of the mobile phones and such different productive experience of learning vocabulary may yield other findings. Last, variety of data collecting method will add to the reliability of the design. The current study simply adopted a questionnaire survey to investigate the research questions. More work will need to be done to adopt qualitative means such as interviews or observations. Qualitative data about how learners use mobile phones for learning purpose may add comprehensive information to this new field. Given all these limitations, the present preliminary research draws the attention of researchers and practitioners to the application of mobile phones in the pedagogical practice in China. As Lu (2008) concluded in her study of learners at vocational level in Taiwan, mobile phones can be "an alternative instructional tool for learners of special needs or complementary teaching material that offers multiple learning opportunities". The current findings of mobile vocabulary designs provide further understanding of adult learners' perception and attitude of mobile learning experience and will serve as a base for future studies and pedagogical application mobile devices. These empirical findings concerning the adult learners add to a growing body of literature of mobile learning design and narrow the gap between the mobile learning practice and potential mobile vocabulary learning design.

It can't be denied that mobile devices are finding their way into language classrooms. Kukulska-Hulme (2006) argues that those who conduct new design for language learning should bear in mind context, continuity and openness to the unexpected. It is true of vocabulary learning, which is considered the foundation for language learning. The findings and discussions presented in this paper, hopefully, will provide insights into MALL for those who want to integrate mobile technologies into language teaching and learning.

As is predicted, the potential of mobile technology for the next generation will change daily

activities by capturing details about the time, location, people and the learning will involve making rich connections within these environments to both resources and to other people. Thus, language teachers, engaging in purposeful activities to provide pedagogical affordance to learners, need understand and properly utilize mobile vocabulary learning activities as additional resources for the conventional teaching and learning of English.

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