Learning Chinese Colloquialisms through Mobile Technology (基于移动通信技术的口语习语教学)

Yang, Jia
(杨佳)
University of Dayton
(代顿大学)
jyang2@udayton.edu

Yin, Chengxu
(尹承旭)
University of Notre Dame
(圣母大学)
cyin@nd.edu

Abstract: This is a study of the effectiveness of learning colloquialisms through the use of mobile technology. A within-subjects research design was adopted to expose all participants to learning colloquialisms through mobile phones and printed materials. The results indicate that distributing vocabulary-learning materials via mobile messages could suit learners' preference for using mobile devices and increase the possibility of incidental vocabulary learning. However, such a practice only promotes learners' short-term retention of the vocabulary. The study also reveals that the length of previous language learning experience did not have a significant effect on the outcome of mobile-assisted language learning. Furthermore, there were no statistical correlations between learners' attitudes toward mobile learning and their learning outcomes either. The results suggest that mobile-assisted language learning can be an effective teaching approach for L2 learners, regardless of their language proficiency levels. Learners can be engaged in the learning of new words even when they do not have positive attitudes toward the perceived usefulness of the mobile-assisted approach, as long as the mobile-assisted learning activities are designed to connect with in-class instruction.

摘要：本文旨在研究学习口语习语的过程中使用手机是否行之有效。本研究采用了组内设计的方法，以确保每个被试者既接受了手机辅助的教学，又接受了基于纸面教材的传统教学。研究结果显示，由于学生本来就有使用移动通信设备的习惯，通过短信来发送词汇学习材料可以因势利导，增加学生偶然性学习的机会。但是，这种手段只能促进学生对口语习语的短期记忆。本研究也发现，移动辅助语言学习的效果如何，在统计学意义上并不受学生之前的语言学习时间长短的影响；另外，从统计学意义上来说，学生对移动辅助语言学习的态度和教学效果之间也没有显著的相关性。由此可以得出结论：移动辅助语言学习的效果并不受学生外语水平的影响。只要把移动通信辅助教学和课堂教学有机地结合起来，即使学生对移动辅助语言学习的态度不甚积极，其教学效果也不会受到太大影响。

Keywords: Mobile assisted language learning, colloquialisms, *WeChat*

关键词: 移动辅助语言学习，口语习语，微信

1. Introduction

According to Kubler (2007), some colloquialisms that are used by native speakers even at the age of 2 or 3 are still challenging for non-native speakers to master. This is mainly because such colloquialisms rarely appear in the classroom or in textbooks and because L2 learners usually have very limited exposure to them in their interactions with native speakers, who tend to avoid using them when talking to non-native speakers. However, advancements in mobile technology can create opportunities to expand informal learning outside the classroom. These opportunities provide new ways to integrate the instruction of those colloquialisms into regular classroom teaching. This study examines the effectiveness of learning colloquialisms through the use of mobile phones. The data were collected from classes that were designed for the utilization of mobile technology.

2. Literature Review

A number of studies have appeared in recent years on the application of mobile technology in L2 vocabulary learning. One of the most investigated areas has been vocabulary lessons sent via mobiles phones or emails (Cavus & Ibrahim, 2009; Kierran & Aizawa, 2004; Lu, 2008; Miangah & Nezarat, 2012). Preliminary evidence suggests that text-based vocabulary learning messages sent via mobile devices generally lead to better learning outcomes than email-based or paper-based learning (Ma, 2017). However, as pointed out by Burston (2014), a number of mobile-assisted language studies fail to discuss some essential factors, such as the participant's level of language proficiency or the duration of the project. Few of those studies have language acquisition as their primary focus. More empirical studies are needed to examine whether the effectiveness of mobile-based learning varies across learners at different language proficiency levels and whether mobile-based instruction has a long-term effect on students' learning.

Studies have also found that certain factors might affect the learners' use of mobile technology for learning. For example, Stockwell (2007) reported that learners using mobile devices spent more time to complete vocabulary activities (such as choosing/writing a word to complete a sentence and choosing/writing a definition for a word) and achieved slightly lower scores than those completing the same activities on desktop computers. The difference in the two learning platforms might be caused by the limitations of the mobile phone interface, such as small screens and inconvenient keypads, and the environmental issues that students encounter when using mobile devices in a non-ideal learning environment (Stockwell, 2008). Similarly, Liu, Li, and Carlsson (2010)

reported that perceived near-term/long-term usefulness and personal innovativeness significantly influence learners' inclination to adopt mobile learning. Learning styles and needs, encouragement and support from peers and teachers, and learners' attitudes toward technology all factor in to the learners' disposition to integrate mobile technology in learning. From these findings arises the question of whether learners' attitudes toward mobile-based learning might influence their perceived usefulness of mobile-based instruction and consequently affect their learning outcomes. The present study aims to examine three questions:

- In comparison with the use of printed materials, does mobile-learning more effectively promote students' short-term and long-term retention of Chinese colloquialisms?
- Do students' previous instructional contact hours have an effect on the effectiveness of learning colloquialisms via mobile technology?
- Is there a correlation between learners' attitudes toward mobile learning and their learning outcomes?

3. Instructional Design

3.1 Theoretical Framework

As vocabulary knowledge is considered the core component in better comprehension in L2 learning (Nation, 1990; 2001), a number of studies have discussed effective methods in vocabulary instruction (Hulstijn, 1992; Rott, 1999; Schmitt & McCarthy, 1997). Research has shown that there is no one-size-fit-all approach. Effective instruction should include both explicit and implicit word learning through a variety of methods. The effective teaching methodology should encourage and enable learners to review and study the words taught in class on a more regular basis. Explicit and implicit learning in vocabulary acquisition can be effectively combined by taking advantage of students' interest in using mobile devices.

Ma (2014) proposed a memory-based strategic framework for vocabulary learning through a large-scale questionnaire study. In this framework, vocabulary learning involves four stages of processing: 1) perceiving the new word form in visual or/and auditory input; 2) accessing the meaning of the new word from the mental lexicon; 3) building the new word entry in the mental lexicon through the connection to the existing meaning; and 4) retrieving the new word from the mental lexicon for receptive or productive use so that the new word entry will be consolidated. According to Ma's framework, in-class instruction can be used for the first three stages to establish the new word entry in learners' mental lexicon while mobile technology can be used in the last stage to create opportunities for learners to retrieve the new word. Moving further in the direction suggested by Ma, we designed the following instruction method for learning colloquialisms.

3.2 Instructional Cycle

First, two colloquialisms were introduced during the first five minutes of each class period to help students comprehend their meaning and connect the meaning with existing knowledge. After class, instructional materials of these colloquialisms were sent to participants either via *WeChat* or via printed materials to create opportunities for retrieval. We chose to use *WeChat* as our app for its capability in multi-communication in text messaging, hold-to-talk voice messaging, broadcast (one-to-many) messaging, photo/video sharing, location sharing, and contact information exchange as well as its featured function of group discussion. (For more details about this app, see http://www.wechat.com/en/)

Students were encouraged to use these instructional materials to review the colloquialism taught in class. A within-subjects research design was adopted to expose all participants to learning colloquialisms by *WeChat* and by printed materials. Specifically, participants came from two classes. Students in class A received instruction via *WeChat* in week 1 and via printed materials in week 2. Students in class B received instruction in reverse order.

3.3 Instructional Materials

The researchers first selected 8 target colloquialisms that are commonly used in spoken language: 土 (tǔ) , Adjective + 成狗 (chénggǒu), 牛 (niú), 也是醉了(yěshì zuìle), 宅 (zhái)，给力 (gěilì), 二 (èr), and 打酱油 (dǎ jiàngyóu). A survey of eight native speakers (including three instructors of Chinese) was conducted to elicit usage examples. Each participant was asked to provide context-based examples for each of the target colloquialisms. In the end, only examples related to students' lives were selected for inclusion in the instructional materials. For each target colloquialism, the in-class instructional materials included a brief explanation (in English) of its usage, a few context-based examples, followed by two or three practice questions. The instructional materials sent via *WeChat* or handed out as printed materials included a brief summary of the usage in English and two example sentences that were not used in classroom instruction.

4. Research Design

4.1 Participants

Forty-six English-speaking learners of Chinese at two Midwest universities in the United States participated in this study. Participants in class A were from university A while participants in class B were from university B. Their ages ranged from 17 to 23. According to the length of formal Chinese instruction they received before the time of experiment, the participants were categorized into three groups: less than one year, 1-2

years, and more than 3 years. Participants' significant background information and the instructional sequence are summarized in table 1.

Table 1 Summary of Participants' Background Information and Instructional Sequence

Length of Formal Chinese Instruction Before treatment	Class	N	Instructional Sequence
Less than one year	A	7	Instruction via *WeChat* -> Instruction via printed materials
	B	7	Instruction via printed materials -> Instruction via *WeChat*
1-2 years	A	8	Instruction via *WeChat* -> Instruction via printed materials
	B	8	Instruction via printed materials -> Instruction via *WeChat*
More than 3 years	A	8	Instruction via *WeChat* -> Instruction via printed materials
	B	8	Instruction via printed materials -> Instruction via *WeChat*

4.2 Instruments

The vocabulary knowledge scale (VKS) developed by Paribakht and Wesche (1993) was used to design the pre-, post-, and delayed post-tests to examine students' retention of the knowledge of the instructed colloquialisms. The VKS included five statements to assess how well students know a target word:

1. *I've never seen/heard this word/phrase before.*
2. *I've seen/heard this word/phrase before, but I don't know what it means.*
3. *I've seen/heard this word before and I think it means* _____.
4. *I know what this word means. It means* _____.
5. *I know what this word/phrase means (fill the meaning in the blank in number 4) and I can use it in a sentence. Write your sentence here* _____.

The questionnaire developed by Suwantarathip and Orawiwatnakul (2015) was adapted to create 11 Likert items (see Table 2) to investigate students' attitudes toward

learning vocabulary through *WeChat*. Three open-ended questions were also included in the questionnaire to investigate students' general perceptions of the vocabulary learning experience via *WeChat*: 1) What in your experience are the benefits of using *WeChat* for learning new words/expressions? 2) What are the drawbacks of using *WeChat* for learning new words/expressions? 3) Do you have any suggestions for the use of *WeChat* in learning new words/expressions?

Table 2 Likert Items to Investigate Students' Attitudes Toward *WeChat* Assisted Vocabulary Learning

Learning vocabulary through *WeChat* was convenient	1	2	3	4	5
Learning vocabulary through *WeChat* made learning materials easier to access	1	2	3	4	5
Learning vocabulary through *WeChat* enabled me to review the vocabulary more frequently	1	2	3	4	5
Learning vocabulary through *WeChat* made learning more engaging	1	2	3	4	5
Learning vocabulary through *WeChat* was a more effective way to learn	1	2	3	4	5
Learning vocabulary through *WeChat* provided flexibility of learning	1	2	3	4	5
Learning vocabulary through *WeChat* made me feel more motivated to learn new words/expressions	1	2	3	4	5
Learning vocabulary through *WeChat* made me learn more and better	1	2	3	4	5
Learning vocabulary through *WeChat* made the learning fun	1	2	3	4	5
I prefer the learning through *WeChat* to a printed handout.	1	2	3	4	5
Learning vocabulary through *WeChat* should be integrated into our course	1	2	3	4	5

4.3 Data Collection

The four-week study was conducted in spring of 2018. One day before the instruction started, all participants received a pre-test to examine their prior knowledge of the target colloquialisms. A post-test was conducted for participants after the two-week-long instruction was completed. Two weeks after the post-test, participants received the delayed post-test and the attitudinal questionnaire. All the pre-, post-, and delayed post-tests and the attitudinal questionnaire were conducted in class. Participants were asked to complete the tests without using dictionaries or class notes.

5. Results

This section presents the descriptive statistics (see Table 3) comparing the *WeChat*-based approach and the paper-based approach on the pre-test, post-test, and delayed post-test. The results show that the mean scores of the *WeChat*-based approach were higher than those of the paper-based approach on the post-test and delayed post-test. The paired-samples *t*-test was used to further examine whether the differences of mean scores between the *WeChat*-based approach and the paper-based approach were statistically significant. One-way MANOVA analysis was employed to examine if students' previous classroom instruction length has any effect on the mean test scores of the *WeChat*-based approach. As shown in Table 4, the paired-samples *t*-test results indicate that the difference between the post-test scores of the *WeChat*-based instruction and the paper-based instruction was at a significant level ($p < .05$). Since the mean test scores of *WeChat*-based instruction are higher than that of the paper-based instruction, the results indicate that while both methods of instruction enhanced the participants' knowledge of the target colloquialisms, *WeChat*-based instruction contributed to significantly better learning outcomes. In the delayed post-test, however, the test scores of *WeChat*-based instruction were not significantly better than those of the paper-based instruction. The conclusion, therefore, is that *WeChat*-based instruction promoted students' short-term retention of Chinese colloquialisms but did not contribute to better long-term retention.

Table 3 Descriptive Statistics of Pre-, Post- and Delayed Post-Tests

Test	Instruction	N	Minimum	Maximum	Mean	Std. Deviation
Pre-test	***WeChat***	46	5.00	12.00	7.17	1.64
	Paper	46	4.00	12.00	6.74	1.54
Post-test	***WeChat***	46	8.00	20.00	16.20	3.40
	Paper	46	8.00	20.00	14.50	3.76
Delayed post-test	***WeChat***	46	6.00	20.00	13.96	3.49
	Paper	46	6.00	20.00	12.98	3.95

Table 4 The Paired-Samples *T*-test Results

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pre-test	***WeChat* Paper**	.43	1.67	.25	-.06	.93	1.77	45	.084
Post-test	***WeChat* Paper**	1.70	3.85	.57	.55	2.84	2.99	45	.005
Delayed post-test	***WeChat* Paper**	.98	4.67	.69	-.41	2.37	1.42	45	.163

The one-way MANOVA analysis results (see Table 5) indicate that there were no statistically significant differences in the mean pre-, post-, and delayed post-test scores of the *WeChat*-based approach among students with different lengths of previous classroom instruction. This suggests that the length of students' previous exposure to the target language did not significantly affect the learning effectiveness via *WeChat*.

Table 5 The One-way MANOVA Analysis Result

Source	Dependent Variable	Type III Sum of Squares	df	Mean Square	F	Sig.
Length of Instruction	**Pre-test: *WeChat***	12.14	2	6.07	2.40	.102
	Post-test: *WeChat*	.84	2	.42	.04	.966
	Delayed post-test: *WeChat*	24.87	2	12.43	1.02	.368

The results of the attitudinal questionnaire show that students generally held a positive attitude toward *WeChat* learning (see Table 6). Most students agreed that learning vocabulary through *WeChat* provided greater convenience and easier access to learning materials. The majority of them also supported the integration of learning vocabulary via *WeChat* into the regular course. Two items ("learning vocabulary through *WeChat* enabled me to review the vocabulary more frequently" and "I prefer the [sic] learning through *WeChat* to a printed handout") received a mean lower than three. Students' responses to the open-ended questions provided more information regarding why they gave relatively lower ratings on those two items. For example, some students reported that mobile learning might not always provide the expected mobility of learning at any time and in any place. Some students preferred to read hard copies of the instructional materials while it was not convenient to print materials sent by *WeChat*. Students also reported that the *WeChat* assisted learning did not increase opportunities for vocabulary review because they sometimes forgot to check the sent messages. Some first-time users of *WeChat* also reported that unfamiliarity with the interface of *WeChat* prevented them from fully taking advantage of the functions provided by *WeChat*, such

as checking the translation of the sentences, and copying and pasting words. These findings echo Stockwell's (2008) finding that the limitations of the mobile phone interface might affect learners' perception of the effectiveness of mobile learning.

In order to further investigate whether students' perceived usefulness of the *WeChat* assisted instruction might affect their learning outcomes, our study examined the correlations between the means of students' attitudes toward the *WeChat*-based approach and their mean scores on the post-test and delayed post-test. The results found that none of those correlations was significant (see Tables 7 and 8). This indicates that even though students might have negative attitudes toward mobile learning, these negative attitudes did not significantly affect the effectiveness of mobile learning.

Table 6 Descriptive Statistics of Students' Attitudes Toward Learning via *WeChat*

	N	Min.	Max.	Mean	Std. Deviation
Learning vocabulary through *WeChat* was convenient	46	2.00	5.00	3.85	.76
Learning vocabulary through *WeChat* made learning materials easier to access	46	1.00	5.00	3.83	1.08
Learning vocabulary through *WeChat* enabled me to review the vocabulary more frequently	46	1.00	5.00	2.98	.93
Learning vocabulary through *WeChat* made learning more engaging	46	2.00	5.00	3.22	1.03
Learning vocabulary through *WeChat* was a more effective way to learn	46	2.00	5.00	3.07	.74
Learning vocabulary through *WeChat* provided flexibility of learning	46	1.00	5.00	3.65	.87
Learning vocabulary through *WeChat* made me feel more motivated to learn new words/expressions	46	1.00	5.00	3.09	.94
Learning vocabulary through *WeChat* made me learn more and better	46	1.00	5.00	3.15	.89
Learning vocabulary through *WeChat* made the learning fun	46	1.00	5.00	3.28	.96
I prefer the learning through *WeChat* to a printed handout	46	1.00	5.00	2.74	1.25
Learning vocabulary through *WeChat* should be integrated into our course	46	1.00	5.00	3.83	.90

Table 7 Pearson Correlations Between the Means of Attitudes and the Means of *WeChat* Post-test Scores

	Correlations	Sig-(2-tailed)
Learning vocabulary through *WeChat* was convenient	.23	.12
Learning vocabulary through *WeChat* made learning materials easier to get access to	.11	.46
Learning vocabulary through *WeChat* enabled me to review the vocabulary more frequently	.06	.70
Learning vocabulary through *WeChat* made learning more engaging	.22	.15
Learning vocabulary through *WeChat* was a more effective way to learn	.19	.21
Learning vocabulary through *WeChat* provided freedom of learning	.06	.699
Learning vocabulary through *WeChat* made me feel more motivated to learn new words/expressions	.09	.57
Learning vocabulary through *WeChat* made me learn more and better	.09	.54
Learning vocabulary through *WeChat* made the learning fun	.28	.06
I prefer the learning through *WeChat* to a printed handout.	.20	.18
Learning vocabulary through *WeChat* should be integrated into our course	.29	.05

Table 8 Pearson Correlations Between the Means of Attitudes and the Means of *WeChat* Delayed Post-test Scores

	Correlations	Sig-(2-tailed)
Learning vocabulary through *WeChat* was convenient	.03	.84
Learning vocabulary through *WeChat* made learning materials easier to get access to	.08	.60
Learning vocabulary through *WeChat* enabled me to review the vocabulary more frequently	.14	.34
Learning vocabulary through *WeChat* made learning more engaging	.26	.09
Learning vocabulary through *WeChat* was a more effective way to learn	.22	.13
Learning vocabulary through *WeChat* provided freedom of learning	.14	.35
Learning vocabulary through *WeChat* made me feel more motivated to learn new words/expressions	.12	.44
Learning vocabulary through *WeChat* made me learn more and better	.12	.41
Learning vocabulary through *WeChat* made the learning fun	.28	.06
I prefer the learning through *WeChat* to a printed handout.	.-01	.93
Learning vocabulary through *WeChat* should be integrated into our course	.65	.07

6. Discussion

Our research finds that sending vocabulary-learning materials via mobile messages can take advantage of learners' preference for using mobile devices, and thereby increase the opportunity of incidental vocabulary learning. However, such a mechanism only promotes learners' short-term retention of the vocabulary. In order to promote learners' long-term retention, a greater variety of instructional activities should be designed to engage learners in the retrieval of the newly learned words on a regular basis. For example, learning materials and practice questions can be sent to students via messages on an regular interval basis. This study also finds that the length of previous language learning experience does not have a statistically significant role in the effectiveness of mobile-assisted vocabulary learning. This suggests that mobile-assisted learning can be effective for teaching L2 learners at beginning, intermediate, and advanced levels. Moreover, the study reveals that there are no statistical correlations between learners' attitudes toward mobile learning and their learning outcomes. Learners can still be engaged in the learning of new words even when they do not have very positive attitudes toward the perceived usefulness of the mobile-assisted approach, as long as the mobile-assisted learning activities are designed to connect with in-class instruction.

Comments by students on their learning experiences reveal that information was delivered fast and direct via *WeChat* messages so that they could look at the learning materials sooner and more easily than the printed materials. Mobile-assisted learning provided learners with easy access and mobility for reviewing the learning materials outside of class. Several students mentioned that the mobile device enabled them to get feedback more quickly since they could ask questions about the new words and get responses from teachers or peer students instantaneously through *WeChat* messages. A few students also reported that they could use the translation function of *WeChat* to see what a word means, which helped their understanding of the learning materials. This suggests that mobile devices not only provided mobility and accessibility for vocabulary learning, but also offered other functions (such as instant chatting, dictionary, or translation) to help learners resolve questions encountered in self-learning.

7. Conclusion

The learning of new vocabulary requires students to invest time and effort in order to have the new information processed in the brain. Mobile learning provides great potential to engage learners in learning activities to process new information via both audio and visual sensory channels in or outside of class. Moreover, the prevalent use of mobile devices among the young generation of learners facilitates the creation of an environment in which their daily routines and learning activities coalesce to help them notice or retrieve the new words. This study confirms that mobile-assisted learning can promote students' short-term retention of vocabulary regardless of their previous language learning experiences or their attitudes towards mobile learning. Therefore,

mobile learning can be utilized effectively to assist vocabulary learning in foreign language instruction at all levels, even when students may not all have a positive attitude toward mobile learning. Our study only employed mobile devices as a means to present and deliver the learning materials and found that, compared to the traditional method of delivering paper-based instructional materials, mobile devices are a more effective medium to promote short-term retention. More investigation is needed to ascertain if adding more variety to the types of learning activities (such as using the new words to interact with other peer students) would more actively engage students and promote long-term retention of the new words.

References

Burston, J. (2014). The reality of MALL: Still on the fringes. *CALICO Journal, 31*(1), 103–125.

Cavus, N., & Ibrahim, D. (2009). M-Learning: An experiment in using SMS to support learning new English language words. *British Journal of Educational Technology*, 40, 78-91.

Hulstijn, J. H. (1992). Retention of inferred and given word meanings: Experiments in incidental vocabulary learning. In P. Arnaud & H. Bejoint (Eds.), *Vocabulary and applied linguistics* (pp. 113-125). London: MacMillan.

Kiernan, P.J., & Aizawa, K. (2004). Cell phones in task based learning--Are cell phones useful language learning tools? *ReCALL*, *16*(1), 71-84.

Kubler, C. (2007). Teaching advanced-level spoken Chinese grammar and vocabulary to non-native learners. In X. Cui (Ed.), *Chinese language pedagogy: Interaction and mutual complementation in China and overseas* (pp. 169-184). Beijing, China: The Commercial Press. [Kubler, C. (2007). 高级汉语口语语法与词汇的训练：对汉语非其母语学生的教学法研讨. 崔希亮（主编）, *汉语教学：海内外教学的互动与互补* (pp. 169-184), 北京：商务印书馆.]

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

Lu, M. (2008). Effectiveness of vocabulary learning via mobile phone. *Journal of Computer Assisted Learning*, *24*(6), 515-525.

Ma, Q. (2014). A contextualized study of EFL learners' vocabulary learning approaches: Framework, learner type and degree of success. *Asia TEFL*, *11*(3): 33–71.

Ma, Q. (2017). Technologies for teaching and learning vocabulary. In C. A. Chapelle & S. Sauro (Eds.), *The handbook of technology and second language teaching and learning* (pp. 45-61). Hoboken, NJ: Wiley-Blackwell.

Miangah, T. M., & Nezarat, A. (2012). Mobile-assisted language learning. *International Journal of Distributed and Parallel Systems*, *3*(1), 309-319.

Nation, I. S. P. (1990). *Teaching and learning vocabulary*. New York: Newbury House.

Nation, I. S. P. (2001). *Learning vocabulary in another language*. New York: Cambridge University Press.

Paribakht, T.S., & Wesche, M. (1993). The relationship between reading comprehension and second language development in a comprehension-based ESL program. *TESL Canada Journal*, *11*(1), 9-29.

Rott, S. (1999). The effect of exposure frequency on intermediate language learners' incidental vocabulary acquisition and retention through reading. *Studies of Second Language Learning*, *21*(4), 589-619.

Schmitt, N., & McCarthy, M. (1997). *Vocabulary: Description, acquisition and pedagogy*. New York: Cambridge University Press.

Stockwell, G. (2007). Vocabulary on the move: Investigating an intelligent mobile phone-based vocabulary tutor. *Computer Assisted Language Learning*, *20*(4), 365–383.

Stockwell, G. (2008). Investigating learner preparedness for and usage patterns of mobile learning. *ReCALL*, *20*(3), 253–270.

Suwantarathip, O., & Orawiwatnakul, W. (2015). Using mobile-assisted exercises to support students' vocabulary skill development. *The Turkish Online Journal of Educational Technology*, *14*(1), 163-171.

