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EMPOWERING THE USE OF MOBILE-BASED VOCABULARY NOTEBOOKS

Research Article

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Abstract

The high demand on the mobile devices like smart phones and ipads in daily life has given a rise to mobile learning trends in second or foreign language learning. The main purpose of this study was to investigate the differences in vocabulary achievement level of students keeping mobile-based and paper-based vocabulary notebooks in English language learning. The study was designed through a mixed method where a pre-post test control group quasi-experimental study was conducted. Data were collected through a vocabulary achievement test used as pre and post tests. The results indicated mobile-based vocabulary notebooks have positive effects on students' vocabulary achievement.

Keywords: mobile Learning, mobile applications, vocabulary notebooks, vocabulary achievement in English

1. Introduction

In recent years, developments in technology have started to affect almost every part of our daily lives, and in education they have started to profoundly affect teaching and learning. Emerging technologies have led to major changes in the teaching and learning processes (Pavlik, 2015). Especially in the last decades, teachers have integrated technology into the teaching and the learning processes through computers and web programs in order to add variety to teaching and improve student motivation. Nowadays, considering the profile of the students in this century, technology should be utilized by teachers more than ever as the students in this century are often technology and internet addicts. Technological devices like computers and especially smart phones are part of their daily life style. Regarding their habits, learning can be shaped according to students' lifestyles and thus the quality of learning and teaching can be increased by meeting students' needs and desires. To this end, first Computer-Assisted Language Learning (CALL) has emerged as one of the fastest growing trends in today's education (Weinstein & Palmer, 2002). The integration of technology has affected language learning positively by offering various activities which can be done inside or outside class in each skill. For example, with the help of using blogs or wikis, students could practice writing through online tools. Moreover, students could receive online tutorials outside class from their teachers using online tools like Skype. Apart from the integration of such online tools, some educational games have been integrated into curriculum to encourage foreign language learning, which has resulted in game-based learning. In addition to such increased uses of technology, the widespread use of mobile technologies such as smart phones, ipads, ipods, etc. has given rise to a new approach rather than CALL, which is Mobile-Assisted Language Learning (MALL). By providing access to

an array of digital resources and multiple communication tools, mobile devices offer significant advantages in promoting exposure to the target language. It has been argued that personal mobile technologies have a role in promoting lifelong learning more effectively (Demouy, Jones, Kan, Kukulska-Hulme, & Eardley, 2016).

Vocabulary is generally taught in traditional foreign language classrooms. The term "traditionally" refers to teaching through direct instruction mostly rather than through context or incidental learning. As for the students, studying vocabulary only in class is not enough to learn new vocabulary effectively. According to Koren (1999), in-class activities are not enough for effective learning, so practice activities should continue outside the classroom. Therefore, students need to have outside class study habits to practice vocabulary better. With the advent of technology, especially MALL, students have more chances to practice vocabulary since mobile learning has the potential to increase the opportunities to study vocabulary beyond the traditional classroom. Thornton and Houser (2005) claim that mobile phones can provide increased opportunities for learning meaningfully. Mobile learning also helps to facilitate transferring the knowledge and content in a learner-based atmosphere (Nedungadi, 2012).

Mobile learning could be explained by cognitivist theories which claim that linguistic information is processed verbally and visually in learning (Jones, 2004; Mayer, 1979, 2005; Paivio, 1986). To this end, Atkinson and Shiffrin (1968) proposed the multi-store model of cognitive processing theories. According to this model, there are three types of memory, which are Sensory, Short-term (STM) and Long-term memory (LTM). Cognitive theories assert that people process verbal and visual stimuli in dual channels and these channels process only a small amount of information at one time (Fageeh, 2013), which is a part of cognitive theory, called "Dual Coding Theory". Dual coding theory encourages the idea that learning is reinforced when complementary information is processed in two channels instead of one channel (Mayer & Moreno, 2002). This theory suggests that when oral or written instructions are combined with pictures, the learning process and working memory will become more efficient (Kalyuga, Chandler, & Sweller, 1999). The second theory grouped under cognitivist theories is cognitive load theory, which implies that the materials should be designed to minimize the cognitive load of the learners during the learning process (Mayer, 2005). As the capacity of working memory is limited, if the materials are very complex, the cognitive load will increase, which will decrease the performance (Sweller, 1988). According to this theory, when any information is received, it is first stored in short-term memory. If this information is practiced regularly, then it will be sent to long-term memory to be stored, through "rehearsal". The important fact is that this information should be "retrieved" into the short-term memory so as to be used again.

Vocabulary learning has been given little importance although it is one of the significant components of language learning. As Nation (2001) claims, attaining the mastery of all word knowledge is generally impossible. To this end, improved vocabulary learning should be encouraged to be improved through some strategies such as recycling and vocabulary notebooks.

With the integration of technology into language learning processes in recent decades, it can now be seen that there are many studies which attempted to integrate mobile learning into vocabulary learning to examine the effects of mobile learning in English language teaching and learning. The studies in the United Kingdom, Sweden and the United States indicate mobile technology have positive effects as a result of its portability, low cost and practicality (Houser, Thornton, & Kluge, 2002). Levy and Kennedy (2005) conducted a study with Italian learners in Australia, which focused on sending vocabulary words and idioms, definitions,

and example sentences via SMS in a scheduled pattern. The aim of this study was to find out the best times and scheduling of message delivery. The participants were also asked to send their feedback in the form of quizzes and follow up questions. The results showed the best times for message delivery were between 9 a.m. and 10 a.m. and two messages a day was the best number to be sent every day.

Attewell (2005) conducted a study on a mobile learning project, which aimed to motivate students learning a foreign language. At the end of this study, it was found that most of the students developed their reading comprehension and spelling skills with the help of mobile learning, and they claimed that they would like to continue using mobile devices while studying reading. Saran, Çağıltay and Seferoğlu (2008) conducted a study on supporting foreign language vocabulary learning through sending multimedia messages via mobile phones. The participants were chosen at two different levels, which are elementary and pre-intermediate. This study was conducted in two phases. In the first phase, students were provided with target vocabulary in two groups: printed and mobile. In the second phase, students were grouped in three as printed, mobile and web. The printed groups received the target words and quizzes in paper form, the mobile group via SMS on mobile phone and web group in online web-based form. The results of this study revealed that students were positive to use the instructional materials in their mobile phones.

Song (2008) worked on the hybrid use of SMS and the web in the vocabulary learning. The findings showed this mobile technology enhances participants' vocabulary learning. Başoğlu and Akdemir (2010) did a comparative vocabulary learning study with the use of mobile phones and paper flashcards. The results indicate vocabulary learning programs on mobile phones improved students' English vocabulary acquisition. Sarıçoban and Özturan (2012) conducted a study on the effects of mobile assisted language learning over students' success and attitudes towards English language learning through SMS, the results of which show students may have enjoyable and effective learning through mobile phones.

Yousefzadeh (2012) investigated learning collocation (juxtaposition of a particular word with another word) through mobile-based and classical paper-based learning. The results indicated that mobile-based group was superior to the paper-based group. Hayati, Jalilifar and Mashhadi (2013) investigated teaching of idioms to a group of 80 Iranian English learners. The participants composed of three groups which were exposed to 80 idioms. The first group studied with printed material, the second group received 4 SMS messages that covered 4 idioms together with meanings and example sentences, and the last group was taught through short texts. According to the post-test results, SMS group had the highest achievements.

As a recent study that made use of smartphones, Wu (2015) created a mobile application called Word Learning-CET6 to teach vocabulary to a group of 70 Chinese college students. While the experimental group used the application, the control group only studied the vocabulary items via text messages. The post-test results indicated that experimental group outperformed the control group.

As can be seen above, many studies on mobile learning focus on the use of SMS (Short-Message-Service) while studying vocabulary and there is little research showing the role, effects and implications of using mobile applications via smart phones on English vocabulary achievement. Moreover, there is not any research showing the differences of using mobile-based and paper-based vocabulary notebooks yet. To address this issue, this study examines the differences of using mobile-based and paper-based vocabulary notebooks on students' vocabulary achievement level in English language learning. This study might be beneficial by filling a genuine gap in the literature related to vocabulary notebook implementation through mobile applications in ELT (English Language Teaching).

The related research questions for this study are:

1. What is the difference between the vocabulary achievement of students keeping mobile-based and paper-based vocabulary notebooks?
2. What are the perceptions of students on the use of mobile-based vocabulary notebooks?"

2. Methodology

2.1. Research Design

In this study, a mixed method design was used, where a pre-post test control group quasi-experimental study was conducted and also qualitative data was collected. Data were collected through administration of pre-post achievement tests and semi-structured interviews.

2.2. Context and Participants

This study was conducted in the preparatory program at a private university in Turkey. Students are learning English for academic reasons as they will study in their departments on the condition that they pass the proficiency exam, which is equivalent to CEFR (Common European Framework of Reference for Languages) B2 level.

The participants of this study were the students who were at B2 level and their ages range from 18 to 20 (M=18.53). In the experimental group the number of males was 11 (55%) and the number of females was 9 (45%), (N= 20). In the control group, there were 8 male (40%) and 12 (60%) female students (N= 20). As the students in each class were at the same English level and placed at this level with an achievement test, students were matched statistically regarding their English level. The first group which continued keeping paper-based vocabulary notebooks was the control group and the second one which kept vocabulary notebooks through a mobile application named Quizlet was the experimental group. Each class had the same mount of contact hours with the same teachers.

2.3. Procedure

This study took 8 weeks. Before conducting the study, permission from the institution and ethics committee were taken. One week before the implementation started, a pre-test was administered to both groups. At the beginning of the implementation, a presentation on how to keep vocabulary notebooks were given to both groups. The presentation in the control group was a kind of revision for the participants as they were all used to keeping paper-based vocabulary notebooks, according to the institutional policy. The mobile application named "Quizlet" was introduced for the first time to the experimental group. After that, from week 1 to week 8, the same 20 words were assigned each week to each group, and the groups used their assigned method: mobile or paper-based. At the end of week 8, a post test was conducted. Also, semi-structured interviews were conducted with five students in the experimental group to get some in-depth information regarding the use of mobile-based vocabulary notebooks. These students were selected on the basis of whether they kept the mobile-based vocabulary notebooks regularly or not and the vocabulary achievement level in the post-test. Among the five students selected, two of them had high-vocabulary achievement, two had average vocabulary achievement and one had low vocabulary achievement in the post-test.

3. Materials

3.1. Vocabulary Achievement Test

In this study, 160 words from the pre-faculty level (B2) general word list were chosen to be recorded in both paper-based and mobile-based vocabulary notebooks. A vocabulary achievement test consisting of 80 dichotomous items was developed by the researchers. This test was also reviewed by two experts in English Language Teaching and Materials Design Department and two English instructors in terms of the validity and clarity. This vocabulary achievement test included three task types which were matching with the meaning, filling in the gaps and word-formation items. The vocabulary test was conducted by allocating 90 minutes. The test was scored out of 80 points, in which the maximum score was 80 points and the minimum score was 0.The vocabulary achievement test was piloted on 160 pre-faculty students in the early January of 2015. The results of this pilot study were analyzed by using TAP program, the value for reliability was found to be .90 according to KR-21, which proved the reliability of the test.

3.2. Interview Questions

Five interview questions were developed by the researcher to gather qualitative data from the experimental group on the perceptions of mobile-based vocabulary notebooks. The questions were reviewed by two experts in English Language Teaching and Curriculum and Instruction. The interview questions were as follows:

1. Did you keep mobile-based vocabulary notebooks on Quizlet regularly? Why/ Why not?
2. Do you think that using a mobile application while keeping vocabulary notebook is useful and beneficial? Why/ Why not?
3. What do you think are the positive and negative sides of using a mobile application while keeping vocabulary notebooks?
4. Do you think that keeping a mobile-based vocabulary notebook is a good method while studying vocabulary? Why/ Why not?
5. Do you have any other ideas to share about using mobile-based vocabulary notebooks? If yes, what are they?

3.3. Quizlet

Quizlet is an online learning tool which provides students with flashcards and games created by the program itself. All of the materials in this tool are generated by the users. It has both web and mobile versions. In this study, students created their mobile-based vocabulary notebooks by using the mobile application of “Quizlet”. The application is available for both Android and Apple and free of charge. Thus, all the participants could have the application free by simply downloading it from the Apple Store or Google Play. The interface of the application is user-friendly and students can start using the application by only registering into the system by providing a username and e-mail address.

Apart from the mobility of learning, its most important advantage is the application creates fill-in the gaps or matching activities by using the words recorded in the system by the individuals. Thus, the program provides students with further vocabulary activities created by the words entered by themselves. Moreover, learners can view words as a list or flashcard. If the learners study the words as a flashcard, on one side they see the meaning, synonyms or

antonyms, on the other side, when the card is flipped, they see the target words, other word forms and example sentences generated by using the target words.

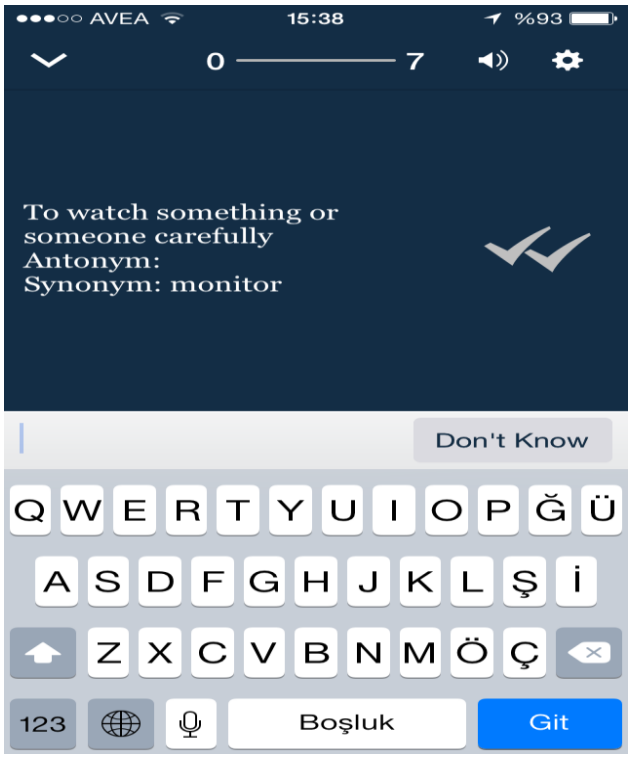

Figure 1. Fill in the gap activity by Quizlet

3.4. Paper-based Vocabulary Notebooks

A vocabulary notebook is a personal dictionary generated by the learners by recording the words that they have learned with different aspects of word knowledge (Schmitt & Schmitt, 1995). The participants in the control group kept their vocabulary notebooks by using a notebook or a pile of papers. While keeping paper-based vocabulary notebooks, the participants entered the assigned vocabulary first. Then, they added other word forms and synonyms or antonyms of the target words. Finally, they wrote an example sentence using the target words.

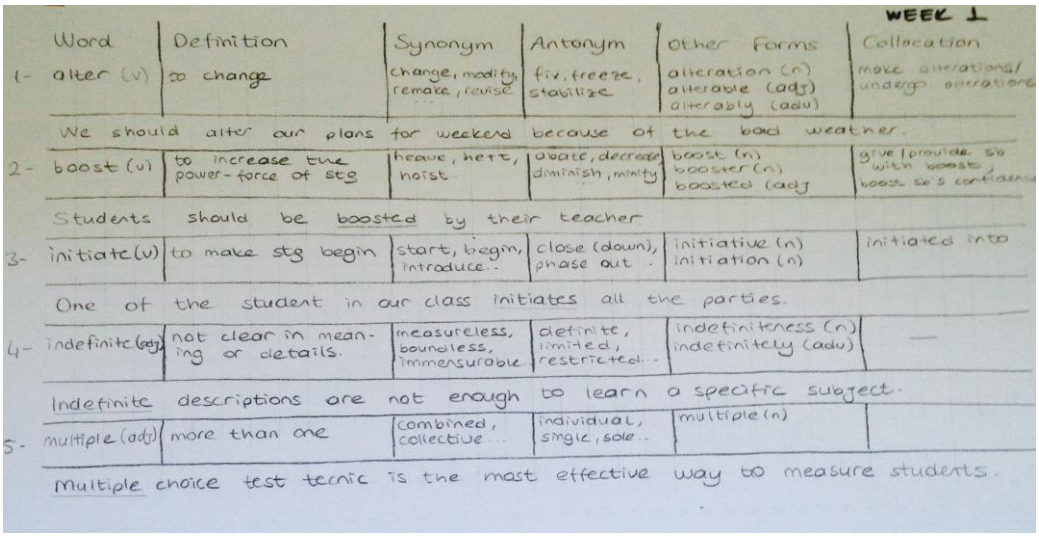

Figure 2. Sample paper-based vocabulary notebook

3.5. Mobile-based Vocabulary Notebooks

The experimental group created a mobile-based vocabulary notebook by using "Quizlet". Students entered 20 pre-determined words given by the teachers into the mobile application every week. The words entered by the learners can be accessed as a list or a flashcard. When students entered the pre-assigned words into the application, they followed the same procedure as those keeping paper-based vocabulary notebooks. While keeping mobile-based vocabulary notebooks, the participants entered the assigned vocabulary first. Then, they added other word forms and synonyms or antonyms of the target words. Finally, they wrote an example sentence using the target words.

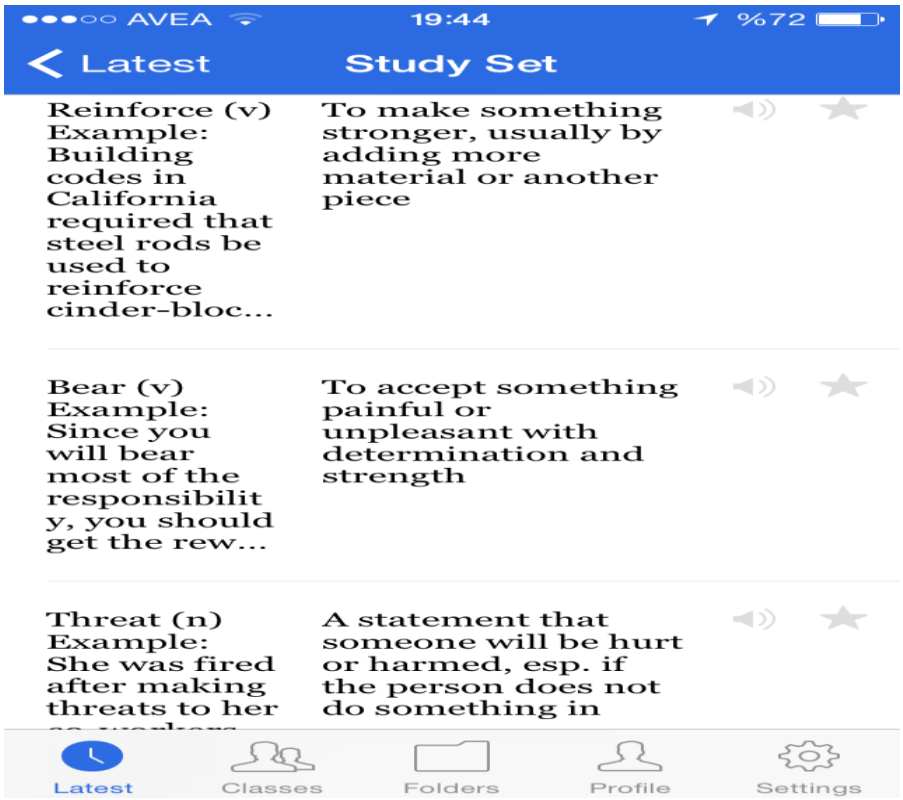

Figure 3. The list view of the words in Quizlet

4. Results

The first problem of this study was to investigate the difference between the vocabulary achievement level of the students using mobile-based and paper based vocabulary notebooks. To test the null hypothesis, two different analyses were conducted. These are Mixed-ANOVA, and independent samples Mann Whitney U Test. Taking the design of the study and time intervals into consideration, Mixed-ANOVA was conducted first as the assumptions were mostly satisfied except for the number of the participants, which was 20 in each group.. However, as there were some minor violations in the assumption check procedure, in order to solidify and reinforce the analysis of the data, independent samples Mann Whitney U test was performed as well.

4.1. Mixed-ANOVA

A Mixed-ANOVA test was conducted to measure the effects of using mobile-based and paper-based vocabulary notebooks on students' vocabulary achievement tests. The results of the test are provided in Table 4.7. The results indicated that there was a significant interaction

between group type and pre-post tests, F (1, 38) = 19.64, p<.05, η^2 = .34 . According to standards suggested by Cohen (1988), there is a large effect of group types. Also, that value indicates that the 34 % variance in pre-post tests is explained by the main effect of group type.

Table 1. *Mixed-ANOVA results for pre-post tests*

Source	SS	Df	MS	F	η^2
Pre-Post Tests*GroupType	655.51	1	655.51	19.64*	.34
Error	1268.38	205	33.38		
Total	1923.89	206			

*p < .05

As we found significant interaction, we did not need to do post-hoc comparisons. We examined the data plot which was given in Figure 4. Plotting the means for mixed-ANOVA showed existence of nonparallel lines indicating an interaction between two factors (pre-post-tests*group type). Figure shows that mean scores of pre-tests of students who kept mobile-based vocabulary notebooks (M = 20.50) and who kept paper-based vocabulary notebooks (M = 21.25) are close to each other.

When we look at the mean scores of post-tests of the students who kept mobile-based vocabulary notebooks (M = 69.40) have higher vocabulary achievement scores than students who kept paper-based vocabulary notebooks (M = 58.70). Overall, students using mobile-based vocabulary notebooks have a higher mean of vocabulary achievement test results in post-test.

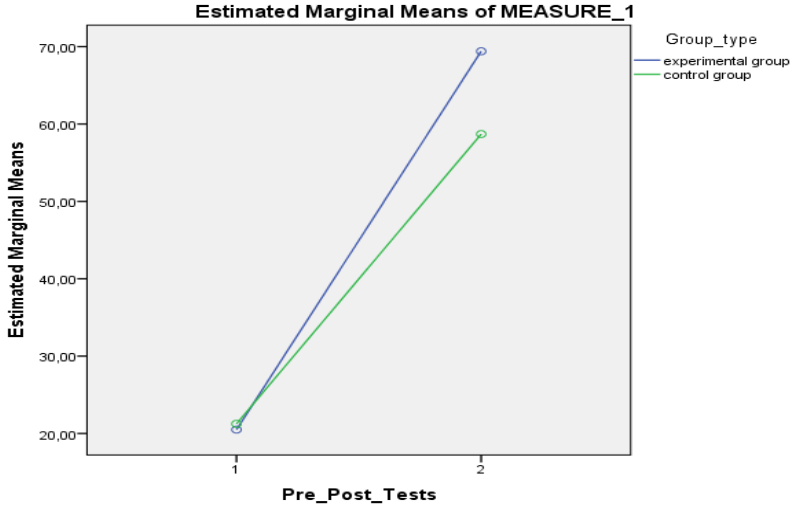

Figure 4. Plot for pre-post tests according to group type

4.2. Mann Whitney-U Test

Independent samples Mann Whitney-U test results showed that (see table 1), there was a significant difference between the post test scores of experimental (M=69.40, SD=6.44) and the control groups' (M=58.70, SD=9.64). In other words, the students' vocabulary achievement in the experimental group was higher than the students' in the control group.

Table 2. *Comparison of post-test scores of experimental and control groups*

Group	N	M	SD	U	Z	p
Experimental	20	69.40	6.44	67	-3.60	.000
Control	20	58.70	9.64			

Moreover, the assumption of Mann-Whitney U test was checked and it showed that the distributions of the post-test scores of both groups were different

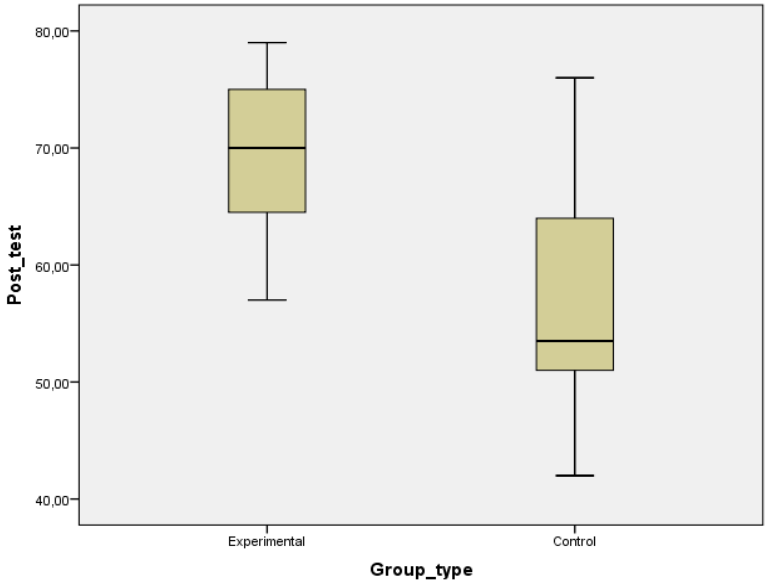

Figure 5. Box plot for Mann-Whitney U test for post-test

4.3. Interview Results

The qualitative data were obtained through conducting semi-structured interviews with the participants in experimental group. The interviews were recorded with a voice recorder and then transcribed. They were analyzed through content analysis to get some ideas about students' perceptions on the use of mobile-based vocabulary notebooks and their suggestions about the implication of using mobile-based vocabulary notebooks in vocabulary learning. Topic coding method is used for content analysis. Before content analysis, the answers collated were grouped in different categories, which are use of quizlet for vocabulary learning, positive and negative sides of the use of application. These categories were assigned codes and the answers were directly grouped using the codes. According to the results of the data obtained from all 5 students, using mobile-based vocabulary notebook was very useful and effective as they thought use of an application on smart phone helped them save time while studying vocabulary and also it was much more convenient compared to paper-based vocabulary notebooks. For example, they stated that they could do extra vocabulary exercises, thanks to the program. Moreover, the participants stated that using a mobile application while keeping vocabulary notebooks motivated them more than paper-based vocabulary notebooks, which increased their vocabulary quiz grades in the course.

5. Discussion and Conclusion

At the beginning of this study, both groups were similar to each other in terms of prior vocabulary knowledge. However, the analysis of the data collated from post vocabulary achievement tests indicated that there is a significant difference between the vocabulary achievement level of students using mobile-based and paper-based vocabulary notebooks. In other words, the students using mobile-based vocabulary notebooks improved their vocabulary knowledge significantly better than the ones using paper-based vocabulary notebooks. Although the students in both groups received vocabulary instruction from the same teacher, the students using mobile-based vocabulary notebooks showed more progress in vocabulary knowledge than the students using paper-based vocabulary notebooks. This shows that use of mobile application, namely, the integration of mobile learning into vocabulary learning has a positive effect on students' vocabulary achievement level. This study shows some promise for mobile learning in the language classroom, but further research is needed to explore all facets and to recommend the best possible approach. There definitely are some potentials for future research that the authors acknowledge, including the novelty effect on motivation. This might be one of the variables in a study like this, and probably shouldn't be ignored.

Since the literature related to the use of mobile applications in the use of vocabulary notebooks while studying vocabulary is limited, it was not possible to make comparisons with similar studies. However, the results could be compared with the use of mobile applications in vocabulary learning or any other skills of English language.

In Song's study (2008), the hybrid use of SMS and the web in vocabulary learning were compared. The results of this study indicated that mobile technology can improve the participants' vocabulary learning. Pei-Lin and Chiu-Jung (2015) conducted a study on the impact of taking photos using mobile phones in the English phrase-learning. The results of this study also showed that the participants doing phrase learning by taking photos on their mobile phones performed significantly better in the delayed post-test than the ones doing online phrase reading activity. In Cavus and Ibrahim's study (2009) MOLT system, similar to an SMS-sending system was used to teach some technical words. The results of this study revealed that students could learn the target words easily. Moroever, in some other studies, the results clearly indicated that mobile group was superior to the traditional group (Attewell, 2005; Hayati et al., 2013; Wu, 2015; Yousefzadeh, 2012).

The second research question tried to explore the students' opinions about the use of mobile-based vocabulary notebooks in vocabulary learning. The responses received from all students were positive as they all claimed using mobile-based vocabulary notebook was useful and effective.

Most of the students (except one) expressed that they kept the vocabulary notebook through Quizlet every week until the end of week 8. One student didn't do that as he thought he collected required points to pass the course. Furthermore, the interviewees stated that using a mobile application while keeping vocabulary notebooks motivated them more than paper-based vocabulary notebooks.

The responses collated from the interviews are aligned with some studies. In Ring's study (2001) in which textual course content, quizzes, reminders were sent to learners' mobile phones as an extra activity to an online business course, all of the participants agreed that mobile learning enriched the course by adding value. Moreover, the students' reactions in this study were similar to what was found in Saran, Çağıltay and Seferoğlu (2008)'s study,

the results of which also revealed that students were positive to use the instructional materials in their mobile phones (Başoglu & Akdemir, 2010; Houser & Thornton, 2001).

Considering the common points that students stated, being accessible anytime and anywhere and matching with their daily lives are the main reasons for them to use mobile-based vocabulary notebooks rather than paper-based ones, which was also mentioned by Diaz and Carrion (2015).

The other points that students mentioned following convenience were the automatically-generated activities that Quizlet created for them by using the words they entered into the program and the pronunciation feature. The participants were quite happy with the activities that the program created as such activities provided them with extra supplementary vocabulary tasks., As the program allowed learners to check the pronunciation of the each word entered, the students claimed that they could improve their pronunciation as well.

These results are also consistent with what the relevant literature says. For example, the cognitive load theory claims things should be kept simple in design process, which may help to transfer information from short-term memory to long-term memory (Sweller, van Merrienboer, & Paas, 1998). Besides, learners should be encouraged to practice the target information in short periods but regularly in order to store the information in long-term memory so that it will not be lost. As students entered 20 new words every week and could do extra activities that Quizlet creates, the students using mobile-based vocabulary notebooks could learn more vocabulary. Despite a lot of positive comments from the students about the use of mobile-based vocabulary notebooks, some students thought that they sometimes had difficulty entering the words or while creating flashcards using Quizlet, due to technical limitations. These students suggested that the way to enter the words could be easier as for the program and also more guidance could have been given to them in terms of how to use Quizlet. Thornton and Houser (2001) stated such technical limitations of mobile phones in terms of the screen size or inputting the text. In this study, screen size was not an issue as most of the smartphones have larger screens nowadays.

6. Implications for Practice

Regarding the needs and backgrounds of the foreign language learners in this century, the learning environments and curricula should be updated and revised considering the principles of mobile learning. The inside and outside class activities should involve more mobile-based materials, which could also increase the student motivation. As stated in this study, when smart phones are integrated into learning, students become more involved into learning process. However, some cognitive theories like dual coding or cognitive load should be given priority while designing mobile-based materials. For example, so as to help learners store vocabulary in their long-term memory, only 20 words per week were assigned. Moreover, when technology is integrated into the instructional design, technical sides should not place too much importance as it might create extra burden on learners. As a result, this might affect learners' cognitive process negatively.

Finally, in the technology integration into language learning process, not only students but also teachers should be the focus. Namely, teachers' technology use competency and their willingness are as important as students'. Thus, teachers should also receive the required trainings on the target mobile devices and applications to be used. Teachers should believe in the usefulness of using mobile devices, should be motivated and receive necessary trainings.

7. Implications for Research

In this study, the difference between the use of mobile-based and paper-based vocabulary notebooks was investigated through pre-post vocabulary achievement tests which focused on

receptive vocabulary knowledge. For future research, productive vocabulary knowledge could also be integrated into the process.

Some students found the number of the words assigned each week not much challenging and thus they thought the number of the words could be increased. To this end, more than 20 words could be assigned each week in further research.

This study was conducted to English language learners who were at B2 level. This study could be done to lower level learners like at A2 level to check whether the similar results will be received. This study was the first one in literature on the use of mobile-based vocabulary notebooks. Therefore, this study should be conducted with different level English language learners in different contexts.

Furthermore, the students were positive about the use of mobile-based vocabulary notebooks. This might result from novelty effect as well. Further studies might be designed in a longer period of time and could be done in institutions where students are used to using mobile devices in learning.

Apart from these, this study took 8 weeks and it didn't include any retention test. A retention test could be implemented. Teachers' opinions about the use of mobile-based vocabulary notebooks could also be integrated as well. Teachers' reactions may help to dig into mobile-based instructional design.

Finally, as mobile learning is a very broad concept, and in this study the application used is limited, other potential mobile applications or strategies should also be integrated into a research where students' vocabulary achievement in foreign language learning is investigated.

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