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Vocabulary Learning through Digitized & Non-digitized Flashcards Delivery

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Abstract

The current study aimed at evaluating the vocabulary gain of advanced learners of English when digitized and non-digitized flashcards served as learning tools. To do so, after a vocabulary pre-test, 109 university students were subdivided into three groups, using mobile, online, and paper flashcards. Each week, 70 flashcards containing frequent words of TOEFL and IELTS were available to them during a ten-week program. Besides taking biweekly progress tests, the participants finally took a post-test to assess their overall vocabulary gain. This study drew attention to some advantages of mobile phones, indicating that they represent a language learning resource worthy of further investigation.

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1. Introduction

In this era of rapid technological innovation, despite the growing belief that learning is increasingly taking place on the move and located beyond educational settings, in the gaps of daily life, language learners have mostly been viewed as being fixed in particular contexts, whether in the educational environment, abroad, or in their homes and communities. Moreover, many adults who want to learn a second language are challenged by lack of time, location flexibility, and convenient access. Current mobile technologies can take these concerns into account through

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supporting anytime-anyplace learning. Therefore, to bridge this gap, several researchers suggested the use of mobile devices which allow learners to benefit from the multiple sites that they travel through, whether public or private spaces, formal or informal ones (Kennedy & Levy, 2008; Kukulska-Hulme & Shield, 2008).

Compared to other language skills and components, vocabulary is one of the fields that can easily be practiced outside the classroom. Vocabulary knowledge constitutes an important aspect of language development and a fundamental part of learners’ general proficiency in a second/foreign language (L2). As the acquisition of lexical knowledge has traditionally been viewed as one aspect of L2 syllabus backbone, there is an extensive body of literature that has investigated the impact of instructional technology such as CALL and Mobile Assisted Vocabulary Learning (e.g. Brown, 2008; Shih, 2007; Stockwell, 2008). A relatively rare example of learner-led mobile language learning activity is reported by Song and Fox (2008), who tracked advanced learners of English to see how they were using mobile devices to build their knowledge of vocabulary.

However, only a few studies have empirically investigated the relative effectiveness of wordlists, flashcards (whether online or paper-based) and mobile assisted vocabulary acquisition. Although researchers have repeatedly claimed the superiority of flashcards over wordlists or the advantage of computers over the paper-and-pencil approach, such arguments lack empirical support and remain exploratory (Nakata, 2008). It is not yet clearly known whether, or to what extent, vocabulary learning in advanced learners differs when mobile phones serve as a ubiquitous tool for vocabulary instruction. However, compared to traditional settings of learning, mobile learning had seldom been studied as a phenomenon in education until 2010. Rather, it is introduced as a new technology-led practice that can potentially initiate a new learning paradigm (Kukulska-Hulme & Shield, 2008).

According to the Mobile Data Association of Iran, the number of mobile phone subscriptions in the country was approximately 55 million by the end of 2011 when the overall population had been around 75 million. These figures are clear indicators of the extent to which mobile technology has integrated into our daily lives. Therefore, it is time to begin rethinking of our cell phones as a kind of instructional media or educational tool even more powerful in some ways than the traditional tools (Kennedy & Levy, 2008; Motiwalla, 2007). Moreover, this newly developed technology offers numerous practical uses in language learning, such as ubiquity, availability, and affordability (compared to PCs) (Prensky, 2005; Warschauer, 2006). These beneficial facets have encouraged both teachers and researchers to provide learners with language learning resources that are no longer dependent upon educational environments or that put time and place constrictions on learners. In addition, not only MALL serves as a primary source of language education for students, but also supports the retention and utilization of newly-acquired skills whenever they are required (Tabatabaei & Heidari Goojani, 2012). In the light of these arguments, the intent of the current study was to investigate whether there was any significant difference in vocabulary acquisition for advanced learners when mobile phones and online learning serve as tools for delivery versus traditional non-digitized delivery.

2. Method

Thereunder, the methodology used to achieve the objectives of the study is explained.

2.1. Participants

About 300 Iranian advanced EFL learners aging 20-35 years, who were male and female university students in Tehran, Iran with Persian as their native language, volunteered to participate in this study. Since they were eager to develop their English language proficiency to be able to write academic English articles and to pass proficiency tests, they were motivated enough to learn vocabulary through the procedure proposed in this study. In addition, the educational staff of the faculty motivated the students to participate in the study due to its benefits. However, after the enrolment, only 109 participants took part in the pre-test. Therefore, the researcher had to continue the treatment with this number of participants since the design of the study was based on the comparison of the pre and post-test scores.
2.2. Instruments

The following instruments were utilized in this study:

A language proficiency test: A reduced Paper Based TOEFL was used to account for the homogeneity of the participants attending the study. The test consisted of two subsections: structure and written expression, and reading comprehension. While the first subtest included 15 multiple choice and 25 error identification items, the reading comprehension section consisted of five reading passages followed by 50 multiple-choice reading comprehension items. To check for the reliability of this test, Kuder-Richardson formula (KR-21) was used and the reliability estimate was proved to be 0.90.

A vocabulary pre-test: A teacher-made vocabulary test was designed, piloted and administered to the participants, firstly to assess and compare their vocabulary knowledge level in the three groups and secondly to make sure that they had not already learned the words included in the test. The pre-test consisted of 70 multiple-choice items covering a representative sample of the words that the participants were expected to learn during the study. The rationale behind using these words in the pre-test was the frequency of their occurrence in TOEFL and IELTS. To check for the reliability of this test, Cronbach’s Alpha was used and the reliability estimate was proved to be 0.85 which proved to be reasonable for the study.

A vocabulary post-test: The same vocabulary pre-test was used after the treatment as a post-test to enable the researcher to compare the mean scores of the two administrations in the three groups. It is worth mentioning that the researcher made use of four 40-item multiple-choice vocabulary progress tests between the pre and post-test, not only to keep track of the participants’ achievement during the study, but also to motivate them to study and help them use the learned vocabulary autonomously.

A questionnaire of attitude: Along with the tests, as the forth instrument, the researchers designed a questionnaire of attitude, consisting of 30 closed-ended items in Likert scale to assess the attitudes of participants towards the digitized and non-digitized vocabulary delivery. The questionnaire was specifically aimed to assess the participants’ attitude towards language learning, vocabulary learning, CALL, and mobile learning in particular.

Interview: The final instrument was a structured interview with four questions asking for the participants’ viewpoint on the project. From among the 109 participants, ten were randomly interviewed and the data elicited were analyzed qualitatively.

2.3. Materials

Having assessed the participants’ goals, the researcher found that they were willing to get prepared for the TOEFL or IELTS. Therefore, 700 most frequently used words in these two proficiency tests, which were also cross checked with the University Word List (UWL), were used as the vocabulary inventory to be covered during the treatment. The UWL is a list of vocabulary items common in academic texts. It is composed of 808 words, divided into 11 levels. This vocabulary list is specialized for students who know about 2,000 generally common words and plan to study in an English-language college or university or to achieve their academic goals. The 700 words were divided into ten packs of 70, to be covered within ten weeks respectively. The content was organized in this way so that the participants could study ten words per day, or 70 words per week, and finally a total of 700 at the end of the ten-week program.

Each of the words to be taught was provided with definition(s), example(s), synonym(s), and antonym(s). The definitions were extracted from Longman Dictionary of Contemporary English and Oxford Advanced Learner’s Dictionary. For the examples, Collins Cobuild and Cambridge Advanced Learner’s Dictionaries were used in addition to the first two. Where possible, synonyms and/or antonyms were also added to the pack of each word.

The sources utilized to fulfill this aim are listed below:

- Cambridge Vocabulary for IELTS with answers, self-study vocabulary practice
- Check your vocabulary for English for the IELTS examination, A Workbook for students
The desired technique for vocabulary learning in this study was the use of flashcards. To fulfill this purpose, the researcher employed three types, namely, paper-based, online, and mobile-based flashcards. Each flashcard was designed in a way that every single entry was presented on one side of the card, while the definition(s) together with example(s), synonym(s) and/or antonym(s) were presented on the other side.

2.4. Procedure

Having decided where to conduct the present study, the researcher made arrangements to meet the authorities of the faculty to prepare the setting for the start of the study. At first, the researcher made use of posters and flyers announcing the advantages of the project, namely, its ubiquity, practicality, high usefulness, and cost effectiveness to call for voluntary participants. Therefore, the volunteers were encouraged to enroll in the study and fill out the enrolment forms including their demographic information, cellphone numbers, preferences, cellphone screen width and accessibility to high-speed Internet.

In the next stage, to select homogeneous participants, a proficiency test (reduced Paper Based TOEFL, version May 2004) was administered to them. After analyzing the data, the participants whose obtained scores were 1SD above and below the mean were chosen to be randomly assigned to the three instructional conditions. Based on the results, 115 participants were selected from among the total number of 150 who took part in the test. The selected participants were assigned into three groups of Mobile, Online, and Paper-based flashcard, according to the width of their cellphone screens, Internet accessibility, and also personal preferences.

The third phase of the study was constructing and piloting a teacher-made vocabulary test. This test consisted of 70 multiple-choice items, in which various forms of stems were used. The rationale behind selecting this number of items was to cover 1/10th of the total number of words (i.e. 700) which were expected to be covered during the study. Not only the words being tested in each item, but also the distractors were meticulously selected from the vocabulary inventory of the study. After piloting, a few of the items revealed weak item characteristics, which were modified and reconstructed for the main pre-test. The reliability index of the piloted pre-test was 0.85.

The treatment of the study was based on the digitized and non-digitized tools of vocabulary delivery. As for the digitized delivery, the researcher hired a web designer to design a website where flashcards could be uploaded weekly and the progress tests could be administered online every other week. Also, since finding a mobile software compatible with all types of cellphone operating systems was somehow impossible, the researchers had to design a software package for this purpose.

Having selected the weekly pack of words, the researcher had to provide the content for the three groups. The first type was traditional paper-based flashcards, the format of which was adopted from Cambridge Flashcard Maker website (i.e. www.cambridgeenglishonline.com). Regarding the online flashcards, the researchers hired a designer to design a website was designed and was available to the participants to learn the words while they had access to the Internet. The third type to be presented was the mobile-based flashcard package, in which the content was available on the participants’ cellphones in the form of video clips. Ease of installation on all varieties of mobile devices was the most positive feature of this package.

During the ten-week project of vocabulary delivery, four progress tests were administered to the participants to motivate them to study, assess their achievement, and get them interested in pursuing the later stages of the study. Each progress test consisted of 40 multiple-choice vocabulary items, based on the words having been presented
from the onset of the study until the date of the progress test cumulatively: the first including 1-140, the second 1-
280, the third 1-420, and the last 1-560 words of the sample. The stems of the items were all taken from dictionary
examples to eliminate any possible source of error.

After the treatment, the same vocabulary pre-test was administered to the three groups as the post-test to make
the comparison possible. The correlation between the pre and post-test (as a test retest measure of reliability) was
0.85 which proved that the test was reliable to be used as a research instrument.

Along with the post-test, a questionnaire of attitude consisting of 30 closed-ended five Likert scaled item types
was administered to the participants to account for their attitude towards digitized and non-digitized delivery of the
contents. The last step was interviewing the participants to look for some qualitative aspects of the study.

3. Results

Having checked the homogeneity of the participants before the treatment, the researchers used ANOVA to
analyze the data elicited from the three groups. The results of the posttest pointed out that there was statistically a
significant difference between the groups (Table 1).

Table 1. ANOVA results for the posttest

|              | Sum of Squares | DF | Mean Square | F     |
|--------------|---------------|----|-------------|-------|
| Between Groups | 2140.32       | 2  | 1070.16     | 7.787 |
| Within Groups  | 14568.41      | 106| 137.43      |       |
| Total         | 16708.73      | 108|             |       |

However, to detect where the difference was significant and where insignificant, a post hoc comparison was
inevitable. For this purpose, Tukey HSD test was used to cross-compare the groups since they already showed
homogeneity of variances through using Levene test (Table 2).

As Table 2 illustrates, there is a significant difference between Mobile and Online Group in the results of post-
test. However, the difference between Mobile and Paper Group was not statistically significant. As the third way of
comparison, the one between Online and Paper Group also showed a significant difference in the post-test.

Table 2. Multiple comparisons for the posttest

| (I) Groups | (J) Groups    | Mean Difference (I-J) | Std. Error | Sig.  | 95% Confidence Interval |
|------------|---------------|-----------------------|------------|-------|-------------------------|
| Mobile Group | Online Group | 10.845                | 2.768      | .000* | 4.27 – 17.42            |
|            | Paper Group  | 4.018                 | 2.708      | .303  | -2.42 – 10.45           |
|            | Mobile Group | -10.845               | 2.768      | .000* | -17.42 – -4.27          |
|            | Paper Group  | -6.827                | 2.785      | .042* | -13.45 – -0.21          |
| Paper Group | Online Group | -4.018                | 2.708      | .303  | -10.45 – 2.42           |
|            | Mobile Group | 6.827                 | 2.785      | .042* | .21 – 13.45             |

*The mean difference is significant at the 0.05 level.

After the ten-week study, the participants were given a questionnaire to assess their attitude towards technology
in general, and mobile, online, and paper flashcards vocabulary learning in particular. The results of the
questionnaire data are presented in Table 3.

Table 3. ANOVA results for attitude questionnaire

| Sum of Squares | Df | Mean Square | F    | Sig. |
|----------------|----|-------------|------|------|
| Between Groups | 1238.858 | 2 | 619.429 | 5.645 | .005 |
| Within Groups  | 11630.830 | 106 | 109.725 |
| Total          | 12869.688 | 108 |      |

Based on the table, the results of ANOVA indicated that there was a significant difference between the participants’ attitude in the three groups. However, a post hoc comparison was needed to detect where the difference lied (Table 4).

Table 4. Multiple comparisons for participants’ attitude

| (I) Groups | (J) Groups | Mean Difference (I-J) | Std. Error | Sig. | 95% Confidence Interval Lower Bound | Upper Bound |
|------------|------------|-----------------------|------------|------|-------------------------------------|-------------|
| Mobile Group | Online Group | 6.646 | 2.473 | .030* | .51 | 12.78 |
| Paper Group | Online Group | 7.412 | 2.419 | .011* | 1.41 | 13.42 |
| Mobile Group | Paper Group | -6.646 | 2.473 | .030* | -12.78 | -5.41 |
| Online Group | Paper Group | .766 | 2.489 | .954 | -5.41 | 6.94 |
| Mobile Group | Paper Group | -7.412 | 2.419 | .011* | -13.42 | -1.41 |
| Online Group | Paper Group | -7.66 | 2.489 | .954 | -6.94 | 5.41 |

* The mean difference is significant at the 0.05 level.

The results of this test revealed that there was a significant difference in participants’ attitude in Mobile and Online Groups, and also between Mobile and Paper Groups, but the difference between Online and Paper Groups was not significant.

4. Discussion

The present study focused on various ways of vocabulary delivery. After ten sessions, the researchers came to the end of the treatment, and got feedback from the participants through the posttest, attitude questionnaire, and interview. Having collected the data, the researcher went through the process of data analysis and came up with the results.

It was found that there is a significant difference in vocabulary learning when two digitized tools of delivery (mobile and online flashcards) were used. Since the flashcards content was the same for all three groups, the outperformance of the vocabulary learning of Mobile Group over the Online Group seemed to be due to the portability and high accessibility of cell phones.

In addition, there was no significant difference in vocabulary learning when digitized tools (mobile and online flashcards) and non-digitized ones (traditional paper-based flashcards) were used. The justification for this result can be the fact that one of the digitized tools was Online flashcards. Therefore, limited Internet access and consequently limited time of study in this group resulted in the lowest mean of scores on the post-test which dragged the high mean of the Mobile Group down. Moreover, compared to the Online Group, members of non-digitized delivery tool (i.e. paper-based flashcards) showed better results on the post-test. Therefore, the type of delivery tool, whether
Furthermore, there was a significant difference in vocabulary learning when portable tools (mobile phones and paper-based flashcards) and non-portable ones (online flashcards) were used. The difference was not due to the nature of the delivery tools, whether electronic, digitized or paper, but it was because of the portability of the devices. While the Online Group members were not able to take their flashcard package with them everywhere all the time, the Mobile Group and Paper Group members did benefit from the ubiquity and portability of the delivery devices.

Since the present study was based on a mixed-method design, the survey part was done by an attitude questionnaire and a structured interview. The data analysis showed a significant difference in students’ attitude towards vocabulary learning through different tools of delivery between the members of Mobile Group and the other two groups. In fact, the participants specifically showed a significant difference in their attitude towards using cell phones to learn vocabulary in comparison with the other tools of vocabulary delivery.

The descriptive qualitative analysis of the interview confirmed the results of the questionnaire. Interviewed participants indicated that their use of the program on the mobile phone increased after the study, mostly in their leisure time.

When the findings of the present research were compared with the results found in literature, it was revealed that those of the current one fit in the previous related studies (e.g. Abdollapour & Asadzadeh Maleki, 2012; Alemi & Lari, 2012; Alemi, Anani Sarab, & Lari, 2012; Başoğlu & Akdemir, 2010; Edge, Fitchett, Whitney, & Landay, 2012; Jalalifarahan & Ghevehnodoshan, 2011; Tabatabaei & Heidari Goojani 2012; Zhang, Song, & Burston, 2011). These studies proved that language learners prefer to use mobile phones for learning purposes. Besides having access to vocabulary learning programs in mobile phones whenever and wherever they preferred, students could have developed a positive attitude in using mobile phones for language learning. The availability, ubiquity, and accessibility of these devices seem to have been determinant factors in this regard.

In a study conducted by Tan and Nicholson (1997), results showed that flashcard training groups were significantly better than the control group in their reading speed and comprehension. Results of Stutz’s (1992) study also support that flashcards are fast and fun to use and that they are effective since they have multi-sensory appeal and occupy only a short time within the lesson. Fun and ease of use of flashcards could be the reason for their effectiveness in improving students’ vocabulary learning.

To sum up, it can be said that increased use of mobile phones has made them a popular device not only for communication, but also for entertainment and learning purposes. Accessibility, portability, and ubiquity of mobile phones prompted students to use them as an English vocabulary learning tool in their leisure time. Therefore, vocabulary learning gain of students using mobile flashcards was found higher than paper flashcard users.

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