

*Original Paper*

## Does It Make a Difference? L2 Vocabulary Learning via Mobile and Conventional Mode

Gholam Reza Zarei<sup>1</sup>, AliReza Jalilifar<sup>2</sup> and Saeed Khazaie<sup>2\*</sup>

<sup>1</sup> English Language Center, Isfahan University of Technology, Isfahan 84156-83111, Iran

<sup>2</sup> Shahid Chamran University of Ahvaz, Iran

\* Saeed Khazaie, E-mail: [saeed.khazaie@gmail.com](mailto:saeed.khazaie@gmail.com)

**Abstract**

*The present study investigated the significance of mobile learning (m-learning) of English vocabulary items through a traditional contrasted with a blended method of content representation. To achieve the goals, sixty semi-illiterate adults were evaluated for their knowledge of the English alphabet and then randomly placed in two groups: traditional (G1) and the blended group (G2). Next, they were presented thirty new English vocabulary items through the two methods. Also, the vocabulary items were taught with and without pictorial annotations. Upon the completion of teaching, the participants took the paper-and-pencil-based English Vocabulary Recognition and Recall (EVRR) test. The test results were subjected to the appropriate statistical analyses. The analysis demonstrated the supremacy of blended group's performance over the traditional group in vocabulary learning. Furthermore, the obtained results confirmed that pictorial annotations enhanced the learning of L2 vocabulary compared with non-annotated items. The results can provide some practical and theoretical implications for both teachers and learners.*

**Keywords**

*content representation, traditional and blended method of teaching, m-learning, L2 vocabulary items*

**1. Introduction**

Today more than ever before, non English language countries are beginning to acknowledge that their citizens need to develop their English language proficiency. In this line of perception, promoting people's independence in learning English as a foreign language (EFL) has been parallel with the proliferation of mobile devices and increasing availability of such devices to people around the world. Mobile devices are gaining ground across the world and are increasingly being used for language learning purposes. The statistics show that in 2010 the number of mobile subscribers exceeded 5 billion (United Nations, 2010) and by 2015, 15 trillion Short Message Service (SMS) texts will be sent annually (Informa Telecoms & Media, 2011). Thus, SMS is a powerful source of being widely used for

sending messages and enhancing learning in particular.

Despite the rapid expansion of mobile devices, some have cast doubt over the efficacy of such tools for education. They argue that learners may just get temporarily involved in such learning situations (Gay, Stefanone, Grace-Martin, & Hembrooke, 2001) and soon lose their interest as it may happen through the initial euphoria and excitement. They further question the convenience of using the devices for all (Liu, Wang, Liang, Chan, Ko, & Yang, 2003), and also their suitability for managing different learning contents and activities (Gay et al., 2001). In reaction to these criticisms, others have found that mobile devices serve not as absolute substitutes but auxiliary tools which could facilitate the learning outcomes (Liu, et al. 2003).

As a matter of fact, mobile-learning (m-learning) helps devise a new channel through which formal and informal experiences in learning can meet (Wagner, & Wilson, 2005), thus working best when used as part of the blended method of teaching, and as a supplementary tool that is used in combination with traditional methods, such as paper-based materials (Brown, 2005; Stead, et al., 2006). In this way, it could be claimed that together with formal education, everyday opportunities to access learning resources on mobile devices can get multiplied (Kukulska-Hulme, 2009). However, according to Bull and Kukulska-Hulme (2009), although there is a large body of research on second language learning, often much of the relevant theory and empirical findings are overlooked by developers of language learning technology. In other words, even though some materials may be designed to teach learning contents in a relatively short amount of time, learners' different learning styles and progress rates are not closely attended to while employing mobile devices (Hazerson, & Ranard, 1981). It is thus believed that lots of such mobile mediated learning conditions have so far relied on the stimulus response theory of learning with a special emphasis on the relationship between technology as stimulus and learning outcome as response (Alavi & Leidner, 2001). And, they have ignored the learners' characteristics which might affect the learning outcomes in a mobile language learning environment. In employing mobile technology in the realm of education to enhance the outcomes of learning, educators should prepare the learning contents to be applicable to different learners with different cognitive styles (Wiredu, 2005). As Gardner (1983) in describing multiple-intelligences says, since individuals do not have the fixed and static mental capacities, namely fixed intelligence, they employ different types of intelligent thinking to create products in different settings. With this view in mind, it is necessary that contents of different modes with different annotations are prepared and delivered to learners, where diverse learning styles are very likely to be operating.

To address the important issues reviewed above, Alavi and Leidner (2001) proposed a new approach that combines human mind operations with a rich learning environment where the crucial features of technology such as video, text, and music can be utilized. The diversity of the technological features can accommodate to the multiplicity of human intelligence and heighten up the associated learning. In the same vein, by proposing Dual-Coding Theory (DCT), Mayer and Sims (1994) claim that

combination of the two modalities (pictorial or written) could culminate in the long-term learning of contents. In reality, research on second language vocabulary acquisition has revealed that words associated with actual objects or imagery techniques are learned more easily than those without. Hence, with multimodal applications, it is possible to provide, in addition to the traditional definitions of words, different types of information, such as pictures and videos and enrich the learning context (Chun, & Plass, 1996). The present study thus attempts to put the issues of mobile learning, blended modes of content delivery, learners' processing capacities into a new perspective and see if this integration makes a difference in second language vocabulary learning outcomes in the case of Iranian adult learners who have received four years of formal education and possess minimal literacy skills in Persian, defined as Iranian semi-illiterate adults.

## 2. Research Questions

This study was prompted by the fact that vocabulary learning contents with and without annotations delivered through different modes of teaching (i.e., traditional and blended) can affect the quality of achievement differently; thus the following questions were investigated:

- 1) Does it make any difference if semi-illiterate learners are taught English vocabulary items via different modes (i.e., traditional vs. blended)?
- 2) Do different delivery modes of content (no annotation vs. pictorial annotation) make any difference in learning English language vocabulary items?

## 3. Method

### 3.1 Participants

The subjects consisted of sixty Iranian semi-illiterate adults, all of whom were primary school fourth graders and were able to read and write Persian sentences and enrolled in the courses offered by Iran's Literacy Movement Organization (ILMO). They were considered semi-illiterate based on ILMO'S comprehensive test. The literacy organization was founded in 1978 to eradicate illiteracy in Iran. The participants varied in their age from 30 to 45. Assessed based on their knowledge of English alphabet, the participants were randomly assigned to two homogenous groups. They are as follows:

Group 1 (G1): adult semi-illiterates who received the content in traditional manner of teaching English language;

Group 2 (G2): adult semi-illiterates who received the learning contents in two types (i.e., no annotation & with pictorial annotations), in a blended way of teaching (traditional and mobile mediated). It must be emphasized that semi-illiterates of the second group had cell-phones and used it sending and receiving messages daily in different places.

### 3.2 Materials

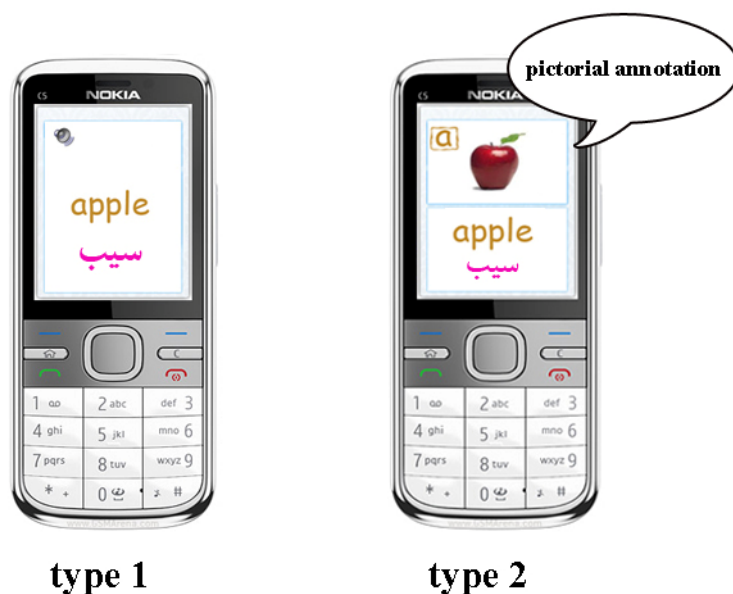
**a) Alphabet test:** In order to ensure that the participants were all at the same level of literacy and also

familiar with English letters, they were asked to participate in English alphabet test. The test comprised 20 alphabet letters, being dictated to the participants to write them down. Those who showed at least the knowledge of 18 letters were selected as the target group. The alphabets were later reviewed for the selected learners.

**b) Background questionnaire:** The questionnaire was an open-ended one, prepared to elicit the semi-illiterates' attitudes towards the manners of teaching English (for this study, traditional & blended manners of teaching), and basically remove those reluctant to learn English via mobile technology from the study. Since the majority of the questions involved in the questionnaire sought the background information on learners' experience in using mobile-phone, their opinions on the frequency and the timing of the learning content (i.e., new English vocabulary items), and their interests in m-learning led to the development of the course syllabus for conducting the study in one semester (the questionnaire is available online, [www.kanoonedu.ir](http://www.kanoonedu.ir)).

**c) New English vocabulary items:** For conducting the main phase of the study in ten sessions of a semester, thirty new word items were selected from 'Let's go' (Starter) (Nakata, 1997). Furthermore, as the probe into the efficacy of using pictorial annotation in English vocabulary learning was another goal of the present study, the following two types of representation were developed for each word item: Type 1- represents the English word, and the Persian meaning of the word; Type 2- represents the English word, the Persian meaning of the word plus the pictorial annotation (i.e., of the related word).

Examples of two different representation types, for the English word 'apple: سیب' are shown in figure 1.



**Figure 1. Different types of learning content**

**d) English vocabulary recognition and recall (EVRR) test:** Upon the completion of the course, in order to compare the two manners of teaching English vocabulary items, and also the effects of pictorial annotation and no annotation, the researchers constructed English Vocabulary Recognition and Recall (EVRR) test and administered to both groups. It must be noted that the test comprised 30 items, 15 multiple-choice-questions and 15 cued-recall questions given to the learners of both groups in the same manner. This decision was made based on the fact that such tests are often used to examine the learner's vocabulary knowledge (Jones, 2004). As KR21 can provide reasonable reliability estimates for tests with dichotomous items (Fulcher, & Davidson, 2007), the test reliability was calculated through KR-21 and it was 0.86.

**e) Software package:** The software package was developed by the researchers through which materials could be presented to the participants as a user-friendly system compatible with cell-phones. This software could handle the presentation of materials as required quite conveniently. The software installation together with its different components and instructions all comes with a CD which has already been patented in Iran (patent no.: 204506, www.amoozeshyar.net).

### *3.3 Instruction*

The selected vocabulary items were taught to the two groups differently, the first group through the so-called traditional mode whereby learners were given the vocabulary items plus their Persian equivalents. Then, they were asked to repeat the same several times orally and give back their equivalents. Some spot-checking was also carried out to enhance and thus reinforce the learning. Finally, they were required to jot down the words along with their Persian translations in their notebooks. The second group, however, enjoyed the same conditions as described above coupled with the mobile mediated exchange of the vocabulary items. This group was required to use the cell-phone information transaction. The vocabulary items for this group were presented in two ways; some with the Persian translation only and some others with Persian equivalent and the pictorial annotations. All this happened in the learners' regular classes, taking the last half hour of the session.

Class meetings were scheduled based on a ten-session syllabus and at the frequency of three new English word items each session. Also, requesting the students' cell-phone number (G2), the teacher sent learners of the second group an average frequency of one word item per day every afternoon (except Fridays) in the form of MMS texts, consisting of Persian definition of new English vocabulary item with or without pictorial annotation as supplementary. The traditional instruction group received the same hours of instruction and learning materials but on paper with no supplementary exercises. The one-way, unsolicited message from teacher to the learners, or push model as defined by Mellow (2005), was selected for using MMS in the m-learning part of the study. The message sending was handled using specially designed software.

### *3.4 Procedure*

To sample out the participants for the study, first of all 85 semi-illiterate adults from different ILMOs

were administered an English alphabet test, a pencil-and-paper alphabet letter writing test.

On the basis of their scores in this phase, they were taught the alphabets, and then described as being able to read and write the English alphabet letters. This procedure led to the selection of 60 elementary semi-illiterate learners. They were assigned to two groups (traditional group (G1) and blended group (G2)) (See section 3.1. participants).

In order to find out about their opinions on the proper way of conducting of the study, at the beginning of the semester, a questionnaire was distributed among the learners at ILMOs to complete. Filling in the background questionnaire, the majority of learners gave their opinions about timing and frequency of the messages; their preferences concerning the issues were taken into consideration in designing the syllabus.

For content delivery to the second group of ILMO (students using MMS) and in order to counterbalance the effect of the order of representations, a 2×2 Latin Square (LS) design was employed. According to Montgomery (1991), one of the frequent uses of LS is to counterbalance the various sequences in which the level of an independent variable might take place. In LS, each of the two digits or letters (i.e., 1, & 2 or A & B) would appear just once in each row and column. Figure 2 displays a 2×2 Latin Square.

A	B
B	A

**Figure 2. The 2×2 Latin square**

In this study, the first 15 word items were delivered to the first participant in type 1 and the last 15 word items in type 2. At the same time, the second participant received the first 15 word items in type 2, and the last 15 word items in type 1. This presentation procedure was achieved through the application program already developed. This procedure takes care of the differences that may arise in the process of annotating one word or another and also delivering the materials to different participants.

At the end of the course, the tests were administered simultaneously to the two groups in their local classes, that is, subjects were provided with 30 multiple-choice and cued recall questions (paper-and-pencil-based tests).

#### **4. Results**

The data involved both groups' scores in the paper-and-pencil EVRR tests. The scores were analyzed using SPSS software, version 16. With regard to the first question, or the difference between the two methods of teaching, the inferential analysis, as shown in Table 1, indicated that the second group of

Iranian semi-illiterates differed significantly from their counterparts in the first group (i.e., traditional group or G1) (T value: 4.09, df: 58, & Sig: 0.000). It is clearly shown that the blended group achieved a mean of 25.27 out of 30 whereas the traditional group obtained only a mean of 18.9. In this way, the blended manner of teaching new English vocabulary proved superior to traditional method.

**Table 1. T-test for the two groups**

t	df	Sig.	Mean difference	95% confidence interval	
				Lower	Upper
4.09	58	0.000	6.37	2.74	7.98

$P < 0.05$

However, the participants in group one (traditional) showed greater consistency in their performances, as indicated by the standard deviation of 4.06 (Table 2). This finding almost points out that the traditional teaching helps learners achieve much more homogeneity, and consequently their differences start dwindling. In contrast, the blended group finds more latitude through multiple methods to act independently and thus variably (SD= 5.44).

**Table 2. Descriptive statistics for the two groups**

t	df	Sig.	Mean difference	95% confidence interval	
				Lower	Upper
4.71	29	0.008	2.13	3.45	2.61

Note: G1, & G2 refer to group 1 and group 2, respectively. Total score: 30

Furthermore, the data analysis for the second question revealed that the delivery of vocabulary items with pictorial annotation enhanced the learners' learning significantly (Table 3). Compared with no annotation vocabulary items, those with pictorial annotations were learned and remembered much more efficiently ( $t= 4.71$ , Sig: 0.008,  $P<0.05$ ).

**Table 3. T-test for the second group**

Group	Mean Score (out of 15)		Mean Differences	t	Sig.	df
	Recall	Recog.				
G1	7.2	11.7	4.5	1.76	0.007	29
G2	12.2	13.07	1.05	3.6	0.75	29

Table 4 shows that the second group involved thirty participants who received 15 vocabulary items with annotations and 15 without any annotations. Those learners having received vocabulary items with picture annotations obtained a mean of 13.7 (out of 15) and those without annotations had a mean of

11.57. The former, as shown in the table, displayed a convergent behavior as a result of receiving pictorial materials (SD=3.07)

**Table 4. Descriptive statistics for the second group**

	Type	Mean	Standard Error Mean	SD
G2	Pic.	13.7	0.88	3.07
	No. Pic.	11.57	0.72	5.56

Note: Pic=Picture; Total Score: 15

To cast more light on the findings, we attempted to discover how the two components of recognition and recall in the test have affected the results. As for the traditional group, it was found that the participants recall the vocabularies better in comparison with the recognition part. However, the blended group remained distinct by showing an almost equal performance on the two parts (recall and recognition).

**Table 5. Inferential statistics: recognition & recall score for two groups**

Type	Mean Score		Mean Differences	t	Sig.	df
	Recog.	Recall				
No Pic	5.1	4.3	0.8	3.76	0.76	29
Pic	4.03	4.5	0.47	4.56	0.87	29

$P < 0.05$

Furthermore, the blended group showed slightly better performance (mean score of 5.1 vs. 4.3 as shown below in Table 6) in the recognition of the no pictorial annotation (compared with recall), and a slightly better performance in the recall of pictorial annotations (mean score of 4.03 versus 4.5 as shown below in table 6). The results were not statistically significant.

**Table 6. Inferential statistics: recognition & recall score for second group**

Groups	Mean	Standard Error Mean	SD
G1	18.90	0.823	4.06
G2	25.27	0.994	5.44

Note:  $P < 0.05$ ; Total score for Recog: 8; Total score for Recall: 7

## 5. Discussion and Conclusions

The conclusions drawn from this study suggest that English language learners exposed to different learning settings acquire vocabulary items variably and more efficiently if multiple manners are integrated together. That is, if methods are integrated, learners with different background and individual differences are more likely to find an opportunity for their own learning. The results also indicate that the easy and ubiquitous accessibility of mobile phones removes the restrictions of learning associated



with the confines of classrooms. Moreover, the mobile technologies provide a chance for the learners to connect their own vocabulary learning to their real world experiences, developing new ways for combining what is learnt in the classroom and what should be learnt outside. These findings are in line with those of Geva and Ryan (1993) and also Chen, et al. (2008). The literature has already shown that language learners usually adopt a multiple and also variable position to approach the challenges of learning contexts. In other words, they exercise various techniques of diversified nature, namely, cognitive, linguistic, and communicative to get over the bottlenecks they encounter and also respond flexibly to a range of possible options as the contexts of learning vary. This finding is exactly in line with the fact that learning is not to be bound by and defined within the one-size fit all approaches and methods of the past (Richards & Rodgers, 2006), but that the new era of learning requires active and agentive role of the learners where they can manipulate the conditions and also construct their own paths and experiences (Afghari, & Zarei, 2003).

This study also shows that learners are more inclined to learn the vocabulary items enhanced with pictures. This finding is in support of the study by Zarei and Khazaei (2011), in which they demonstrated that the language learners with higher visual abilities benefit more from the pictorial materials. In the same line of research, Chen et al. (2008) confirmed that language learners improve better if provided with visually annotated vocabulary items. In this particular case, the mobile mediated vocabulary delivery can be considered as an additional advantage (Alley, 2009). This implies that learners with different cognitive abilities are more likely to succeed if their internal mental characteristics are respected through multimodality of materials (Jones, 2004). The results also tie into the findings obtained by Courtney (1998) and Cohen (1981) that the more diverse the processing involved in the learning process, the more effective and long-term the learning is likely to be.

This study also revealed that while traditional method of teaching leads to better recall of the vocabulary items the blended method brings out no distinction between recall and recognition components of the test. This may imply that traditional method which is actually one dimensional in nature cannot help ease out the double load of both channels of recall and recognition. In other words, the blended method of teaching can decrease the cognitive load of learning as the materials are both visually and conceptually presented electronically, with an increased possibility of repeated retrievals and practices. This is also a reaffirmation of cognitive load theory proposed by Sweller (1994). The cognitive load theory maintains that learners may get irritable and unable to concentrate if they are cognitively overloaded, and that the cognitive overloading can get relaxed if information is given parallel processing channels such as visual plus written. Yet, this finding may be attributed to the individual differences in their inherent verbal or visual orientations, too, which can be pursued in future investigation.

And the last finding is that the blended group did not show a statistically different performance on the two components of the test, namely recognition and recall with and without pictures. This is probably

due to the fact that the possible discrepancy between the two components dissipates for the blended group. In other words, pictorial annotations and verbal ones taken together, and also the pen and paper method coupled with electronic delivery technique used to teach the blended group can only collectively fill up the gaps and deficiencies. This finding receives support from Dual Coding Theory (Mayer, & Sims, 1994) which argues that these different techniques and modes can function as both supplementary and compensatory for the conditions not properly designed to accommodate disparities. While the aforementioned results may cast some light over the issue of technology enhanced language learning, it is not possible to read too much into a research of the present scale. On the whole, the results obtained in this study are to be taken as suggestive rather than definitive since a multitude of issues might work for or against any attempts made for illumination of the mobile technology-language teaching method interrelationship.

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