

A Comparative Study of the Iranian EFL Learners Vocabulary Learning through Two Different Formats: Paper & Pencil vs. Software

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Abstract. This study aimed to investigate the effect of using vocabulary software on the vocabulary learning of Iranian EFL learners. Participants of the study were 54 intermediate-level students (23 males and 31 females) learning English as a foreign language in Mehr Institute in Izeh who were selected after taking the Nelson English Language Test as a proficiency test. They were randomly divided into two groups. Both groups participated in the teacher-made test of vocabulary as pre-test. During class sessions the control group was taught the vocabulary in the conventional way through the printed textbook while the experimental group was instructed by the software version of the same book. One independent samples t-test and two paired sample t-tests were run to investigate the research hypotheses of the study. The results of the statistical analyses revealed that although both methods had positive effects on the vocabulary learning of the participants, using vocabulary learning software was more effective than using printed

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book. The results of the present study could prove useful for EFL course book designers, educational planners, material developers, teachers, and learners to provide a better context for EFL learning.

Keywords: Computer-assisted instruction, computer-assisted language learning, computer-assisted language teaching, vocabulary learning software

1. Introduction

Experienced teachers of English as a foreign/second language know very well how important vocabulary, as the biggest component of any language course, is. According to McCarthy and O'Dell (1995), English vocabulary has a remarkable range, flexibility and adaptability. Teachers know that students must learn thousands of words that native speakers and writers of English use. The vital role of vocabulary knowledge in English as a foreign language (EFL) learning has been increasingly detected and the significance of vocabulary in language learning has been reported by many researchers (e.g., Harris, 1969; Evans, 1978; Pouwels, 1992; Bismonte, Foley, & Petty, 1994; Pellow, 1995; Watts & Bucknam, 1996; Laufer, 1990). Accordingly, practitioners have introduced numerous types of approaches, techniques, exercises and practices to teach vocabulary (Hatch & Brown, as cited in Lotfi, 2007).

Iheanachu (1997) believes that from the time of the appearance of computers in education, the research scope has extended to the use of computer in the form of computer-assisted instruction (CAI). Within CAI, many researchers and educators have been interested in computer-assisted language learning (CALL). The range of the used technologies in language learning is broad including courseware, online activities, and computer-mediated communication (CMC) technologies. The emergence of CALL seems to provide a new outlook for language teaching and learning as well as vocabulary acquisition. Numerous CALL programs and online materials have flooded the field of language teaching and learning with the progress of computer and network, and they are becoming popular. These programs provide various activities for learners. Some examples of CALL systems for vocabulary learning are computer-assisted vocabulary acquisition, and Power Words. Incorporating technology into

the learning process and also wide internet access accompany students on their ways of improving English. New developments in technology provide new tools for language learners. The current study tried to focus on how technological programs can trigger improved vocabulary acquisition.

2. Literature Review

2.1. Theoretical background

Educational technologies were one of the most developed areas in the world in the second half of the 20th century. In developed countries, computers started to enter the educational system in the late 1950s and are still developing throughout the world.

At the end of the 20th century, the computer-mediated communication (CMC) and the internet reshaped the use of computers for language learning (Gndz, 2005). Computers are not considered as a tool for only information processing and display anymore, but as a tool for information processing and communication. However, Dhaif (1989) has claimed that in language teaching where the emphasis is on natural communication between people, the teacher can never be replaced by computers. It can just have the role of an aid to the teacher in teaching a second or foreign language.

Implementation of computer technology into EFL/ESL context offers many advantages both for teachers and students. Motivation has been indicated as one of the most common advantages of CALL. According to Lee (2000), students are motivated with fun and games in a CALL class. Warschauer and Healey (1998) have used the term 'fun factor' as a benefit of computers in language atmosphere. This fun factor is the key element of students' motivation. They claim that the use of computers motivates students and helps students' learning. The effective use of computers as a facilitator in the second language learning context and the well-designed computer assisted activities and lessons are the basic elements of language learners' motivation (Levy, 1997; Warschauer and Healey, 1998).

2.2. Empirical background

A number of research have been conducted to explore the importance of technology and especially computers in vocabulary learning of the students.

Kilickaya and Krajka (2010) attempted to compare the usefulness of online vocabulary teaching and the traditional methods used in upper-intermediate Academic English class. To carry out the study, they selected 38 students from different departments in a private university in Ankara, Turkey, and put them in control and experimental groups. The control group students practiced vocabulary items in ten reading passages through vocabulary notebooks and cards. The learners in the experimental group practiced the same vocabulary items in the passages through WordChamp software. Furthermore, with both groups, the vocabulary items were regularly reviewed. They evaluated the usefulness of the two methods through a post-test. Their study showed that the learners in the experimental group outperformed the learners in the control group and that the experimental group students better remembered the words studied online, evidenced by a follow-up post-test given 3 months later.

3. Methodology

3.1. Statement of the problem

The value and importance of vocabulary learning is obvious for everybody, and helping the learners develop vast vocabulary is essential for their success in school. As Sokmen (1997) states, everyone who wants to learn a foreign language sees vocabulary learning as their first priority. But, unfortunately, according to Bahari (1989), teachers in Iran mainly focus on grammar and neglect vocabulary. Bahari (1989) notes that “one of the problems is an old belief that just knowing about language and its grammatical patterns suffice teaching English, so there is no room left for advancement through insight of linguistics, psycholinguistics, sociolinguistics, methodology, and pedagogy” (p. 14).

Vocabulary as a basic component of language learning has been the subject of several studies. Finding the best way of learning and teaching

words profoundly and extensively has been the purpose of numerous studies.

3.2. Purpose and significance of the study

The present study intended to operationalize post-modern theoretical thinking about vocabulary learning and to create a maximally conducive environment for learning new words. Post-modern theory claims that educators are biased facilitators and co-constructors of knowledge. This study examined the effectiveness of computer-assisted language learning on vocabulary acquisition of Iranian EFL learners. It also investigated whether CALL is as effective as textbook-based vocabulary instruction on males and females.

During the last decade, it was very common to consider teaching vocabulary as an ‘afterthought’ or an ‘appendage’ of some important tasks such as teaching the grammar and pronunciation of the language (Behydt, as cited in Iheanachu, 1997). Vocabulary learning is a basic component of language learning (Chujo, Utimaya, & Nishigaki, 2003). It is quite obvious that vocabulary knowledge and language skills are important for successful communication in a second language. In fact, words are units of meaning; sentences, paragraphs, and whole texts are formed with words. As Kawauchi (2005) has stated, language ability is often considered as the number of words that we know. According to Richards and Renandya (2002), vocabulary is “a core component of language proficiency and provides much of the basis for how well learners speak, listen, read, and write” (p. 255).

The significance of the present study was that it focused on Iranian EFL learners’ vocabulary acquisition through the use of computer software, a case which has not been dealt with so much. So, it was of great importance to know how learners could benefit vocabulary learning software to improve their lexical knowledge.

3.3. Research questions and hypotheses

Based on the purpose of the study the following research questions were proposed:

- Is there any significant difference between post-test scores of Iranian

EFL learners using printed and software versions of a vocabulary book?

- Is there any significant difference between pre-test and post-test scores of the experimental group related to research?
- Is there any significant difference between pre-test and post-test scores of the control group related to research?

According to the above-mentioned research questions the following null hypotheses were formulated:

- There is no significant difference between post-test scores of Iranian EFL learners using printed and software versions of a vocabulary book.
- There is no significant difference between pre-test and post-test scores of the experimental groups related to research.
- There is no significant difference between pre-test and post-test scores of the control groups related to research.

3.4. Participants

This study was conducted with 70 students (31 males and 39 females) learning English as a foreign language at the Mehr Institute in Izeh. For the purpose of homogeneity, prior to research, a Nelson English Language Test as a proficiency test was administered, and the participants of the study were selected based on the results of the proficiency test. From initial participants 54 students (23 males and 31 females) whose scores were between one standard deviation minus and plus the mean took part in the study. Participants of the study were randomly divided into two groups with 27 participants in each group. The age range of the participants was from 15 to 19.

3.5. Instruments

To carry out the present study, the following instruments were used.

- *Nelson English Language Test*: it was used as a tool for homogenizing the participants of the study. The Nelson English Language Test is a battery including 40 separate tests for 10 levels of language proficiency which range from beginner to the advanced level. The levels are numbered from 050, 100, , to 500. Each test consists of 50 items. In the

present study, a test of intermediate level-250A-was used.

- *504 Absolutely Essential Words*: Book (Bromberg, Liebb, & Traiger, 2012): it is a book divided into forty lessons, each containing twelve new words. The words are first presented to the students in three sample sentences. Next, the new words appear in a brief article. The last part of each lesson is a set of exercises that gives the student practice using the new words. This book is the mostly used vocabulary resource book in Iranian foreign language institutes at the intermediate level. According to the blurb of the book, it is designed for the intermediate level and high school students.
- *504 Absolutely Essential Words Software*: it is the software version of the book containing the same words, sentences, and articles.
- *Vocabulary Tests*: two teacher-made tests of vocabulary as pre and post-tests, each including 40 items, were used to measure students' vocabulary knowledge prior and after the research. All items of the tests were drawn from the 504 Absolutely Essential Words Book. The reliabilities of both sets of test scores were calculated by Kudar-Richardson 21 formula. KR-21 reliability index for pre-test and post-test scores were 0.79 and 0.82, respectively. Nunnally (1978) has noted that a reliability index of 0.70 and above is acceptable. Therefore, the reliability of the tests scores was desirable.

3.6. Procedure

At first stage, Nelson English Language Test was administered to the students as a proficiency test. According to the results of this test, those students whose scores fell between one standard deviation minus and plus the mean were selected to participate in the study. The participants involved in this study were randomly divided into two groups. One of the groups was taken as control group and the other as experimental group randomly.

Prior to conducting the main study, the researcher-made tests were piloted among 10 students having the similar conditions to participants of the main study. The reliability of the test scores was explored through Kudar-Richardson 21 formula.

At the first session of the treatment period, a teacher-made test of vocabulary was given to all the participants as the pre-test. This test includes 40 multiple-choice items. Each item bears a sentence drawn from the 504 Absolutely Essential Words book with a blank space for a word selected from among new words of the books. Students were supposed to select the choice which best completes the meaning of the sentence.

From the next session, both groups were going to take the same courses of 504 Absolutely Essential Words. The same activities were conducted in giving the instruction to the control and experimental groups. The only difference was the media of instruction. Students in the control groups were taught the vocabulary, following the conventional way, through the printed textbook. Next, they read three example sentences which contained the introduced new word. Then, they were supposed to read the brief article involving the new words of each session.

Students in the experimental groups read each word presented in the software screen and simultaneously heard the pronunciation of the word. Next, they went to the next page of the software in which each example sentence was presented to them. Afterwards, they moved to the brief article containing the new words presented in the lesson. It was possible for students to move back and forth between pages and also listen to the pronunciation of words more than once by pressing the speaker icon provided in the top of the page.

After the treatment, the post-test, parallel to the pre-test, was given to the students in both groups, and their mean scores were compared with the means of each group on the pre-test to investigate the effects of computer-assisted and paper-based instruction on the vocabulary learning of the participants. In addition, the mean score of the students' post-tests in experimental and control groups were compared to find which one of the two methods of teaching was more effective. The treatment period for both groups was 14 sessions. The first and last sessions were devoted to the administration of the pre- and post-tests, and in each of the remaining 12 sessions a lesson of the book including 12 new words was covered.

3.7. Design

The present study included pre and, post-tests, control, and experimental groups. Therefore, the design of this study was ‘pre-test-post-test control-group design’. This study was also quasi-experimental research as the participants were not randomly selected out of the population. In this study, the type of the teaching instrument was the independent variable (with two levels of textbook and software) whose effect on the vocabulary learning of the students as the dependent variable was investigated and compared.

3.8. Data analysis

Data analysis was done by IBM SPSS Version 22(IBM Corp., Released 2013) software. A number of descriptive and inferential analyses were conducted on the data. The data was analyzed descriptively using mean and standard deviation. The first null hypothesis was investigated through an independent samples t-test and the second and third null hypotheses were investigated by running two paired samples t-tests.

4. Results

4.1. The results of the nelson english language test

The overall homogeneity of the participants of the study was checked through administration of a Nelson English Language Test. For this purpose, all initial 70 students took part in Nelson English Language Test and students who got scores between one standard deviation below and above the mean participated in the main study. Table 1 demonstrates the descriptive statistics regarding the participants’ Nelson English Language Test scores.

Table 1: Descriptive statistics regarding the participants’ Nelson English Language test scores

	N	Minimum	Maximum	Mean	Std. Deviation
Nelson	70	16	50	36.46	7.899
Valid N (listwise)	70				

As Table 1 indicates, the mean of the initial participants' Nelson English Language Test scores was 36.46 with the standard deviation of 7.90. Therefore, from among 70 initial students, 54 who scored between 29 and 44 were selected.

4.2. Descriptive statistics regarding experimental group

Table 2 indicates the descriptive statistics for the participants in the experimental group.

Table 2: Results of the participants' vocabulary pre-test and post-test scores in experimental group

	N	Minimum	Maximum	Mean	Std. Deviation
Vocabulary Pre-Test in Software Group	27	21	30	26.41	3.041
Vocabulary Post-Test in Software Group	27	27	40	33.74	3.623
Valid N (listwise)	27				

As it is shown in Table 2, the participants' mean score in pre-test was 26.41 with the standard deviation of 3.041 and their mean score in the post-test was 33.4 with the standard deviation of 3.623.

4.3. Descriptive statistics regarding control group

Descriptive statistics for the participants in the control group is demonstrated in Table 3.

Table 3: Results of the participants' vocabulary pre-test and post-test scores in control group

	N	Minimum	Maximum	Mean	Std. Deviation
Vocabulary Pre-Test in Print Group	27	22	32	27.19	3.039
Vocabulary Post-Test in Print Group	27	26	35	30.26	3.157
Valid N (listwise)	27				

From the results presented in Table 3, it is obvious that participants' pre-test mean score in the group instructed by printed version of the textbook was 27.19 with the standard deviation of 3.039, while in the

post-test, their mean score was 30.26 with the standard deviation of 3.157.

4.4. Normality check

In order to run parametric tests on the collected data, it was necessary to check the normality of the distribution of the data in both control and experimental groups. Therefore, the researchers ran a One-Sample Kolmogorov-Smirnov Test the results of which are presented in Table 4.

Table 4: One sample kolmogorov-smirnov test for pre-test and post-test scores in control and experimental groups

		Pre-Test of Control Group	Pre-Test of Experimental Group	Post-Test of Control Group	Post-Test of Experimental Group
N		27	27	27	27
Normal Parameters ^{a,b}	Mean	27.19	26.41	30.26	33.74
	Std. Deviation	3.039	3.041	3.157	3.623
Most Extreme Differences	Absolute	.243	.173	.154	.154
	Positive	.149	.119	.145	.129
	Negative	-.243	-.173	-.154	-.154
Kolmogorov-Smirnov Z		.243	.173	.154	.154
Asymp. Sig. (2-tailed)		.072	.066	.101	.097
a. Test distribution is Normal.					
b. Calculated from data.					

As it can be observed in Table 4, p-value for each set of scores is higher than 0.05. Thus, all sets of scores are normally distributed and the parametric tests of independent and paired samples t-tests can be run on the data.

4.5. The results regarding the first research hypothesis

To find answer for the first research question of the study, at the first stage, the researchers ran an independent samples t-test on the pre-test scores of the two groups the results of which are presented in Table 5.

Table 5: Pre-test differences between experimental and control groups

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		95% Confidence Interval of the Difference								
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
Vocabulary Pre-tests	Equal variances assumed	.131	.718	.940	52	.352	.778	.827	-0.883	2.438
	Equal variances not assumed			.940	52.000	.352	.778	.827	-0.883	2.438

As it is indicated in Table 5, there is not any significant difference in the pre-test scores of the participants in two groups ($p = 0.352 > 0.05$).

The would-be difference between the performance of the experimental and control groups in the post-test was checked through the parametric test of independent samples t-test. The results of this analysis are presented in Table 6.

Table 6: Post-test differences between experimental and control groups

	Levene's Test for Equality of Variances	t-test for Equality of Means								
		95% Confidence Interval of the Difference								
	F	Sig.	t	df	Sig. (2- tailed)	Mean Difference	Std. Error Difference	Lower	Upper	
Vocabulary Post-tests	Equal variances assumed	.408	.526	-3.765	52	.000	-3.481	.925	-5.337	-1.626
	Equal variances not assumed			-3.765	51.048	.000	-3.481	.925	-5.338	-1.625

As it is clear from Table 6, the p-value of the Levene's Test for Equal variances was 0.526 which indicates an insignificant difference between the variances of two groups. Therefore, the statistics in the first row should be used. In the first row, the p-value approaches to 0 and is less than 0.05. So, it could be concluded that there was a significant difference in post-test scores between experimental and control groups. According to the mean difference ($=-3.481$), it was inferred that the group instructed through the software version of the textbook outperformed the groups

through the software version of the textbook outperformed the groups taught by the printed version of the textbook. The 95% confidence interval for the difference between two means was (-5.337, -1.626).

4.6. The results regarding the second research hypothesis

As the normal distribution of the data was ensured, in order to explore the difference between pre-test and post-test scores of the experimental group related to the study, the researchers ran a paired samples *t*-test. Table 7 presents the results of this analysis.

Table 7: Paired samples *t*-test of pre-and post-test scores in the experimental group

	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Experimental Pre-test – Experimental Post-test	-7.333	1.209	.233	-7.812	-6.855	-31.519	26	.000	

As indicated in Table 7, there was a significant difference between the pre-test and post-test scores of the participants in the group instructed by the software version of the textbook ($t(26) = -31.519, p < 0.05$). Based on the means of the two tests, shown in Table 4.2, it could be concluded that there was a statistically significant improvement in post-test scores of the participants following the instruction through the software version of the textbook.

4.7. The results regarding the third research hypothesis

In order to investigate the third null hypothesis of the study, the researchers ran another paired samples *t*-test. Table.8 reports the results of this analysis.

Table 8: Paired samples *t*-test of pre-and post-test scores in the control group

	Paired Differences						t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference					
				Lower	Upper				
Control Pre-test – Control Post-test	-3.074	.958	.184	-3.453	-2.695	-16.677	26	.000	

Based on the results shown in Table 8, there was a significant difference between the pre-test and post-test scores of the participants in the group instructed by the printed version of the textbook ($t(26) = -16.677, p < 0.05$). Through comparing the mean score of the participants in the two tests, as shown in Table 3, it was inferred that there was a statistically significant improvement in post-test scores after teaching through the software versions of the textbook.

5. Discussion

This study examined the effectiveness of using software version of a vocabulary book on the vocabulary learning of Iranian EFL learners in Mehr Institute in Izeh. The findings of this study revealed that there was a significant difference between the post-test scores of the experimental and control groups, and vocabulary teaching software was more effective than using the textbook “504 Absolutely Essential Words” when teaching vocabulary to Iranian EFL learners.

Among the factors that could be argued as effective in helping the CALL group participants gain higher vocabulary scores might be the nature of the word activities offered on the computer and their greater accessibility on the computer, which is more inspiring for the learners to practice more on them and obtain higher vocabulary scores. Superiority of the software over the traditional vocabulary teaching might be ascribed to the different exercises which existed in the software to practice and recall the vocabulary items which were instructed.

The findings of the present study are compatible with the results achieved by Barani (2013). The results obtained throughout his study indicated that there was a significant difference between CALL users and nonusers in favor of the experimental group ($p < 0.05$).

The results of this study were also in line with the findings of Naraghi-zadeh and Barimani (2013). The statistical analysis of the pre-test and post-test of both groups of their study revealed that there was a significant difference between experimental and control group regarding their vocabulary knowledge. They found that the experimental group had a higher mean score than the control group.

The results of the present study partly differed from the study which was conducted by Aryadoust and Lashkary (2009). They explored the efficiency of teaching aids on Iranian learners' vocabulary achievement. They did not find any significant difference between the post-test scores of the participants in two groups. The difference in the results emerging from this study and those obtained by Aryadoust and Lashkary could be ascribed to a number of issues involving the efficacy of the teaching aids and the type of tests through which the learning outcome was assessed. Moreover, the selection of vocabulary teaching aids could have also had an effect. It could be that in Aryadoust and Lashkary's study, the effect of teaching aids on Iranian learners' vocabulary acquisition was investigated whereas in the current study, the effects of vocabulary teaching software and the traditional vocabulary teaching were investigated. It might be said that in Aryadoust and Lashkary's study, the teaching aids which they used were not as efficient as the teacher-based vocabulary teaching. As a result, they did not have any superiority over each other. But, in the current study, the vocabulary teaching software was superior to traditional vocabulary teaching.

6. Conclusion

In our current technological world, CALL is a new domain towards learning a language in general, and learning L2 vocabulary in particular. The question which was to be responded is that "Does using software in teaching vocabulary have any impact on the vocabulary achievement of the Iranian EFL learners"? Based on the outcomes of the present study, it was discerned that in our assessment those who had learned the words through CALL had higher mean values in the post-test in comparison with those who had learned the words via traditional vocabulary instruction method; nevertheless, traditional method was also effective. It indicated that in using CALL program, learners had an intensive mental processing which resulted in better acquisition of words.

By considering the fact that users of CALL had better performance in the post-test, we came to the conclusion that CALL produced better results in vocabulary learning than common traditional textbook-based vocabulary teaching method. Although it may imply that CALL is a

better way of promoting lexical knowledge in short period of time, the purpose of learning new vocabulary should also be taken into account.

Another ground for comparing the two methods is that CALL method represents a way of learning new words which is very different from what most learners are used to. It takes more time per word than a bilingual list; learners are not provided with translation but have to work out the meaning for themselves, and all of the context material is in the L2. In short, it is a more difficult method than the familiar paired learning methods which they are used to.

6.1. Pedagogical implications

The present study supports the findings of the previous researchers regarding vocabulary learning software. The most important contribution of this study is that it provides learners and L2 educators with a clear explanation of how using a vocabulary learning software affects the learners' vocabulary acquisition.

The current study has implications for both pedagogy and research. In terms of pedagogical practice, the findings of this study suggest that using a vocabulary learning software can promote an optimal balance of attention compared with traditional vocabulary teaching. There are certain likely implications taken from this study for language teachers and material preparation experts. Teachers can benefit from technological aids such as vocabulary teaching software in their teaching programs. Providing students with the opportunity to combine their language learning with technology is well worthwhile. This combining enables learners to deal with the language learning in a more innovative and novel manner.

Based on the results of this study, vocabulary teaching software was suggested as a superior methodological option in comparison with the traditional textbook-based vocabulary teaching. In terms of research methodology, investigation or the data revealed that categories of analysis could be extended beyond vocabulary acquisition. Listening and reading comprehension, writing ability and pronunciation skills can also be investigated. Varying the types of the software might affect the students' performances.

6.2. Suggestions for further research

This study represents a preliminary effort to empirically examine the efficacy of vocabulary teaching software on L2 vocabulary acquisition by comparing two methods of traditional and CALL teaching. The more answers are obtained; the more questions will naturally be raised. The domain of CALL is too vast to be explored in one single study. Future research is definitely needed to extend knowledge about other aspects and effects of CALL. It is therefore rational to end this paper by proposing some topics related to CALL for future studies. Further research is needed for a thorough understanding of this issue and for confirmation of the findings. It is recommended that this study be replicated with a larger number of participants from the same linguistic background. It would be interesting to compare results across levels of proficiency.

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