The Effects of CALL on Vocabulary Learning: A Case of Iranian Intermediate EFL Learners

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Abstract

In the past, vocabulary teaching and learning were often given little priority in second language programs but recently there has been a renewed interest in the nature of vocabulary and its role in learning and teaching. Although most teachers might be aware of the importance of technology, say, computer, rarely teachers use it for teaching vocabulary. Thus, the current study aims at exploring the effects of CALL on vocabulary learning of Iranian EFL Learners. In this study, 40 intermediate EFL learners, both male and female aged from 16 to 18 studying New Interchange, book III, were chosen randomly from a language institute in Tehran. They were divided into two twenty-member groups. The experimental group was given the VTS.S (a computer program for teaching vocabularies), a computerized dictionary and provided with teacher e-feedback. The control group received no special software and vocabularies were taught using the conventional ways with the help of a paper dictionary. A vocabulary pre-test based on the tests available in their teacher's guide was given to both groups. The aim of this test was to make sure that the students were not familiar with the words in advance. By *pre-test/post-test* comparison researchers found learners exposed to VTS.S teacher e-feedback plus the computerized dictionary scored higher than the control group. Both high-stake and low-stake holders can avail from the findings of the study.

Keywords: CALL, computerized dictionary, VTS.S, educational software, e-feedback

1. Introduction

Effective learning of new lexical items in any language seems to be one of the main goals to be achieved by very language learners. It might not be possible to conduct a message or communicate in a language by those who may know some grammar, but their vocabulary knowledge is not still rich enough. Most ESL/EFL learners must have experienced that the majority of their time spent over the foreign language has been devoted to practicing and remembering vocabulary. Not long ago, vocabulary teaching and learning were often given little priority in second language programs but recently there has been a renewed interest in the nature of vocabulary and its role in learning and teaching (Richards & Renandya, 2002).

The role that knowledge of vocabulary plays in second and foreign language acquisition/learning has long been neglected. However, vocabulary is seemingly receiving much attention in the language teaching curriculum. This is partly due to several reasons, such as the influence of comprehension-based approaches to language development, the research efforts of applied linguists, and the exciting possibilities opened up by the development of computer-based language corpora (Nunan, 1999, p. 103).In recent years, with the development of computer-assisted

language learning (CALL), the need and opportunity to investigate the effects of multimedia or computer technology on vocabulary acquisition has been felt and created. In line with that, numerous studies such as (Aust, Kelley, & Roby, 1993; Brett, 1998; Davis & Lyman-Hager, 1997; Plass, Chun, Mayer, & Leutner, 1998) have shown that computerized technologies and multimedia environments can be helpful for learning foreign language vocabulary.

2. Review of the Related Literature

2.1. A Brief History of CALL

The world of ELT is amazing. It undergoes many changes and experiences with new methods and approaches coming into existence every day. Technology has had its share and effect on language teaching/learning too. Within the world of technology, computer and its software opened a new horizon to language teaching/learning. According to Warschauer (1996), Warschauer and Healey (1998), computers have been used for language teaching since the 1960s. This 50 years history can be roughly divided into three main stages: behaviorist CALL, communicative CALL, and integrative CALL. Each of these stages corresponds to a certain level of technology as well as a certain pedagogical approach.

2.2. Definitions and Some Goals of CALL

Under the umbrella term of Technology-enhanced Language Learning (TELL), Computer-assisted language learning (CALL) can be regarded as an approach which aims at using computer technology in learning or teaching foreign languages. "such a technology, which has become a fixture in many homes nowadays, has significant impact on education and has been more and more integrated into classrooms (Davis, 2006). According to Warschauer and Healey (1998), it is the rise of computer-mediated communication and the Internet, more than anything else, which has reshaped the uses of computers for language learning at the end of the 20th century. It seems that computers both in society and in the classrooms have been transformed from a tool for information processing and display to a tool for communication with the help of the Internet.

Computer-assisted language learning laboratories and multimedia lessons can provide drills on oral and visual aspects of language communication in general and vocabulary learning in particular (Salaberry, 2001). CAI (Computer Assisted Instructions) as Salaberry claims can provide monitoring, recording, assessment, and analysis of student language performance. Electronic or computerized dictionaries could also provide a full range of synonyms, antonyms, grammatical and stylistic information productively. The capabilities of speech generating of computer makes electronic language teaching and tutoring possible(Salaberry, 2001).

CALL can help language learners be more autonomous in terms of language learning. Some stakeholders (Salaberry, 1999; Rost, 2002) indicate that the current computer technology can have many advantages for foreign/second language learning. Computer technologies, software and its language learning programs could provide second language learners more
independence from classrooms thereby allowing learners have the option to work on their learning material at any time and any place.

However, CALL is not without its criticisms. According to Davis (2006), one of the important issues with using technology in language teaching environments is that language education is in danger of being taken over by computer programmers, software developers, hardware vendors or technicians. High cost of software, computer programs, lack of technical support by practitioners and also negative attitudes by both teachers and learners may add fuel to the fire too.

2.3. Previous Studies

A number of studies have been done to see if there is any relationship between computer assisted language learning or any type of computer technology and vocabulary acquisition of EFL/ESL learners. We turn to some of the studies conducted using computer, multimedia and email

(or any kind of e-feedback) to determine vocabulary learning. Gholinia (2010), having thirty first-year university students majoring in English as her participants, conducted a research to see if computer assisted language learning has any effect on the vocabulary learning of these university students. She also investigated the language learners' attitude toward the use of computers in language learning. The results of her study showed the usefulness of the applied software in facilitating vocabulary learning, in remembering and also in enhancing the students' motivations to learn the English language. Her study also confirmed that the use of multimedia CALL software led to a higher-level ability of the learners in the long-term recall of the English vocabularies.

In another study conducted by Xin and Reith (2001), it was found that video technology can be used as a tool for facilitating vocabulary acquisition. In this comparative study of 4th, 5th and 6th grade students with learning disabilities, students were randomly assigned to a video instruction group and to a non-video instruction group for reading vocabulary and comprehension lessons. Analysis of pre, post and follow-up tests two weeks after the completion of the lessons indicated that students in the video instruction had statistically higher vocabulary acquisition scores than those in the non-video group.

Investigating the effect of multimedia annotation modes on L2 vocabulary acquisition, Al-Seghayer (2001), conducted a comparative study to find out which of the image modalities -- dynamic video or still picture -- is more effective in aiding vocabulary acquisition. He administered two types of tests to 30 ESL students: recognition and production. In addition, a face-to-face interview was conducted, and questionnaires were distributed. Results of the both tests were analyzed using analysis of variance procedures. His investigations yielded the conclusion that a video clip was more effective in teaching unknown vocabulary words than a still picture. He further found that video better builds a mental image, better creates curiosity leading to increased concentration, and embodies an advantageous combination of modalities (vivid or dynamic image, sound, and printed text). Some other studies such as Tozcu and Coady (2004),Somogyi (1996), Duquette, Renie, & Laurier (1998). Kang and Dennis (1995), Iheanacho (1997) all support that computer technologies increase the probability of vocabulary acquisition.

In most institutional classes in Iran, learners feel bored and are tired of the traditional language teaching methods they are exposed to and this has created discomfort for them while using traditional strategies in learning the four skills. On the one hand different teachers use different strategies for teaching the skills, on the other hand different students use various strategies to learn them. Vocabulary teaching/learning has always been one of the mind-boggling issues among language teaching experts/students. The role that knowledge of vocabulary plays in second and foreign language acquisition/learning has long been neglected. However, with the aid of technology enhanced language learning programs it is hoped that vocabulary learning enters a new era.

Effective learning of new English vocabularies seems to be one of the important aims to be obtained by beginners of EFL learners. This research study is thus significant in several respects. First, although most teachers might be aware of the importance of technology and in this particular aspect computer, a few try to use it within their classrooms. Second, most studies of CALL-based language teaching/learning have taken place in foreign countries in an ESL situation. This study is targeted at Iranian EFL learners. Third, this study would be of special importance for those students who want to self-study the materials and be autonomous as much as possible. Therefore, it is hoped that the findings of this study help both EFL teachers and learners move toward a better understanding of using technology and gain new language learning techniques. The results of this study could also potentially provide a solution for materials developers how to best provide the receivers with optimal technology enhanced materials.

2.4. Research Questions

There are few, if any, empirical studies to date to show that using online vocabulary teaching software enhances students' vocabulary learning at Iranian language institutes. Therefore,

the present study is an attempt to investigate the role of CALL on the vocabulary learning of Iranian intermediate EFL learners and tries to answer the following research questions:

1. Is there any significant difference between CALL-based vocabulary learning and the traditional one?
2. Does the use of related-vocabulary passage writing for computer users with teacher e-feedback enhance vocabulary learning?

2.5. Research Null Hypotheses

In order to be on the safe side, and also reach to logical answers to the aforementioned research questions, the following null hypotheses are formulated:

1. There is no significant difference between CALL-based vocabulary learning and the traditional one.
2. The use of related-vocabulary passage writing for computer users with teacher e-feedback does not enhance vocabulary learning.

3. Methodology

3.1. Participants

In order to conduct the research the researcher invited 68 students to participate in this experiment. The students are at intermediate level (studying New Interchange, IL.1, IL.2, and IL3) from Simin Language Institute, in which the researcher has been teaching for two years. The students have learnt English for about five years, and reached the intermediate level. The participants are aged from sixteen to eighteen. Regardless of the number of the participants that the researcher tried to get them involved in his general proficiency test, there was one problem here that evidently influenced the reliability of the test and ultimately the whole research project, and that was most of the participants in the researcher's project were female.

A general proficiency test was administered to the students on two different days, since it was not possible for the whole students to come on one day and the institute could not accommodate around 70 students at once. To obtain the population required for the experiment, 58 students from three different classes studying New Interchange book.3 were chosen and a Nelson test was administered. From among those who took the test, two groups (experimental and control) were selected. As it is conventional the scores of the students were ranked and measured. After that, the mean of the students was obtained and then the standard deviations of the scores were calculated. Those students located one standard deviation below and one standard deviation above the mean were selected and others were discarded. The researcher was the teacher of the classes, so there was no limitation on conducting the research in his own classes held two times a week for ninety minutes.

3.2. Instrumentation

The materails used in this research and the tasks that learners engaged in included:

- **Computerized dictionary**: The Longman Exam's Coach English Dictionary (2010) was provided for the students of the experimental group. This dictionary had both British and American pronunciation. Pronunciation of the words could be played for the students by typing or simply clicking on the words.
- **Nelson test:** in order to measure and determine the participants' level of general English language proficiency and ensure their homogeneity, they were required to do the standard Nelson's intermediate level test. Thus, Nelson test battery was used as the language proficiency test in this study. This test battery is consisted of 50 items in the form of multiple choice questions and students are supposed to choose the correct answer from among the alternatives.
- **Paper dictionary**: All the students of the control group had permanent access to different paper dictionaries such as Oxford Advanced and Cambridge both at home and in the institute.

- **Pre-test**: a standardized pretest consisted of 25 items; all taken from the teacher's book was given to the students at the beginning of the course in order to make sure that they are not familiar with the words.
- **Post-test**: a posttest consisted of 25 items; all taken from the teacher's book was given to the students at the end of the course in order to investigate and analyze possible differences between the control and the experimental group.
- **VTS.S**: which is a simple computer program designed for language teaching enhancement. It contains the new words, their synonym, antonym, definition and one example. It contains two main parts: one for keeping the new words and another section for related-vocabulary passage writing. This software can be used both online and with computer. Time recording can be added to the software if needed.

3.3. Procedure

As it has already been mentioned, in order to make an experimental and a control group, sixty-eight students were chosen from the intermediate level. The first thing to consider is that these participants should be homogenized and then those whose marks are closer to the mean should be chosen for the two experimental and control groups. This is done by calculating the descriptive statistics of the data. It means that the mean, mode, median, and standard deviation of the Nelson test scores were computed and then the subtraction of the mean from standard deviation and once again the addition of these two were calculated (mean+/-standard deviation). Scores which are below and also above it are discarded and those scores which are between them are chosen. The chosen scores which belong to somehow homogeneous students are randomly divided into two groups, one as a control group and one as an experimental group. In this research the whole number of students chosen were forty-four, so two groups of twenty-two participants were ready.

In both groups new vocabularies were taught. In the control group the conventional method that teachers use in their classes was used. In the experimental group, the introduced technique in the research was used. The procedure is as follows: first of all, the twenty-two students of the experimental group were given a CD containing Longman computerized dictionary (Longman Exam's Coach Version 2010) and Babylon English to Persian and Persian to English dictionary. All the participants were instructed how to work with these two dictionaries in one session. Next step was to teach participants how to work with the vocabulary teaching software (VTS.S). To this end, the application was brought in to the class and was explained to the participants via laptop. They were then given instruction how to use it online. But there existed a problem here and that was the researcher was not sure whether all the students could in fact use internet, e.g. they were internet literate or not. Having or not having access to the internet at home was not a major problem, since participants could go to the coffee net and work with the application. However, to make sure that all the students could use the internet or not the researcher first asked them to send him emails from their own email addresses. He then asked students to make a passage with the words which were sent to their email addresses by their teacher. After making sure that all the participants were internet literate, the experiment started.

Right after the training was over, a standardized vocabulary test taken out of their teacher's guide book by Jack C. Richards was given to them as a pre-test and a post-test (both experimental and control groups). The experimental group students had to work on the list of new words prepared by the researcher taken from each unit of their book. They had to go through the two computerized dictionary and find definition, example, opposite, synonym, and make one sample sentence from their own. They also had to take the prepared exercises and work on them available in the VTS.s application. The next step, these computer users had to prepare a word file in docx format to email their finished work to the researcher after each unit. Among the experimental group participants, 11 were randomly chosen to work on related-vocabulary passage writing in order to test the second research questions. These participants had to choose ten words from each unit, make a passage out of them, and email them to the researcher separately. The researcher would then correct, modify and

email them back to the participants as a feedback. After covering the twenty sessions, a standardized vocabulary post-test was administered to investigate the possible effect.

4. Results and Discussions

4.1. Descriptive Statistics

As it is shown in Table 1, the number of the participants (68) is illustrated. Based on the numerical values that you can see on the frequency table these 68 students' mean, median as well as standard deviation are measured. As it was stated in previous chapter each students' score has been considered and then (SD+/- Mean=x) for each of the score was measured. As you can see the mean = 28.3971 and the SD = 6.5429. So, it can be concluded that scores which are placed between these marks can be selected and those higher or lower than them should be discarded. So, from among 68 participants, 44 students were assigned to be located in two (experimental and control) groups.

Table 1. Descriptive analysis of Nelson test for 68 students

	N	Minimum	Maximum	Mean	Std. Deviation
Nelson	68	16.00	43.00	28.3971	6.54295
Valid N (listwise)	68				

The table above and appendix A show the distribution of data. You can also see the percentage of the Nelson test distinctively in different columns. As an example you can take the fifth row. You can see that 3 students received score 20, or 6 students got score 34 on the nineteenth row (see appendix A) .

Once the participants were assigned, they were divided in to two groups, 22 for control group and 22 for experimental. Also in the graph below you can easily observe those students whose marks located closer to the mean and those, whose marks located further to the mean on the axis. That indicates that the groups are somehow normally divided.

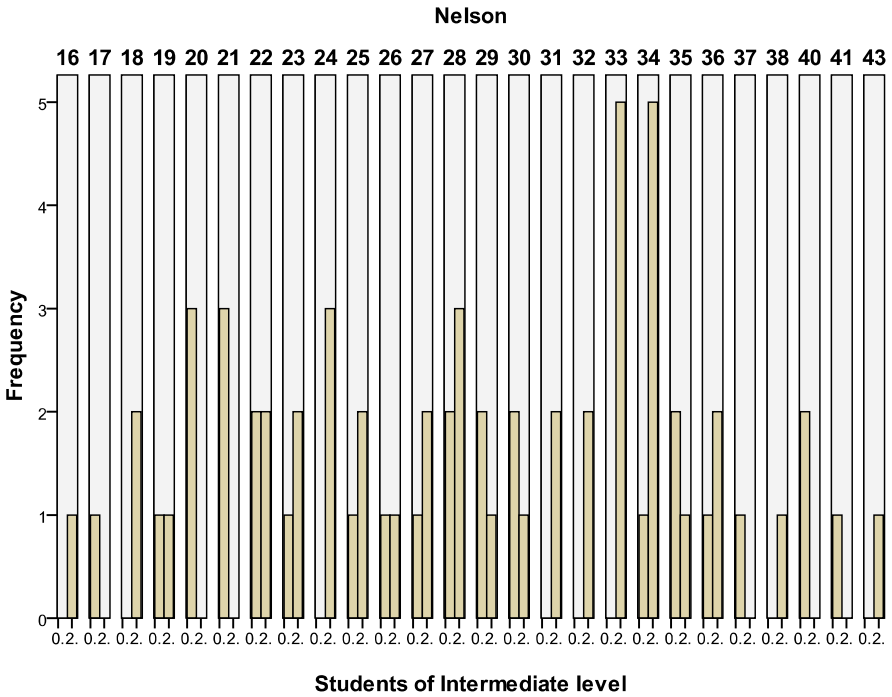

Figure 4.1. Distribution of scores for the Nelson test

The graph below also shows the ratio of male to female participants.

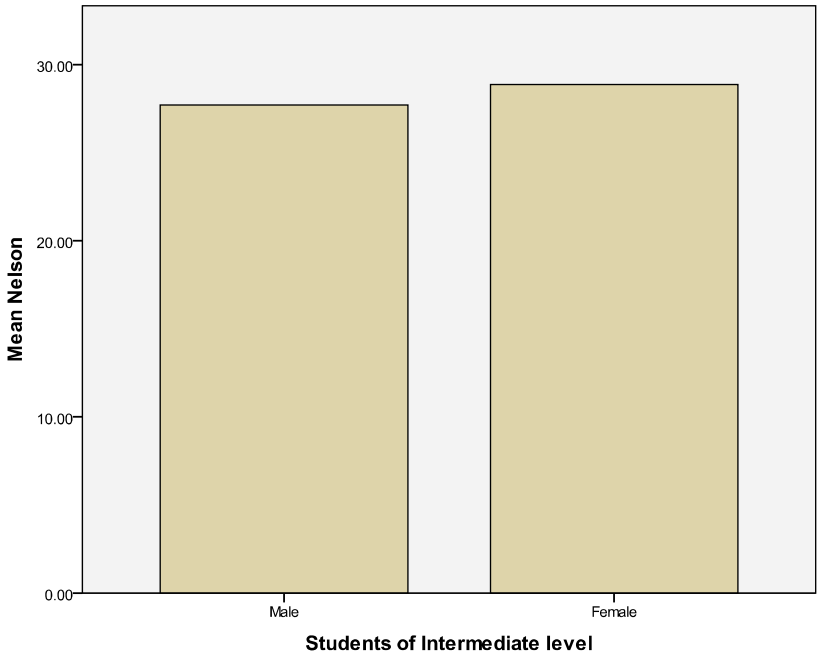

Figure 4.2. Ratio of male to female participants

After the two groups (C & E) are assigned, now it is time to go to another phase of our research. As you know our research was on the effect of CALL on vocabulary learning of the students, so we needed a vocabulary test as a pre-test and post-test. For this reason a standardized vocabulary test was necessary to be prepared. A vocabulary test from New Interchange' teacher's guide, book.3 by Jack C. Richards was chosen and was piloted in a class of 18 students and after administering the test standardization process was applied and finally out of 50 vocabulary questions 25 tests were chosen as standard questions to be used in both control and experimental groups as a pre and post tests.

Then as it was mentioned earlier a pre-test was administered to both control and experimental groups. Then the control group used the conventional the conventional method of learning vocabularies with the help of a paper dictionary which is quite common in language institutes. On the other hand, the experimental group was given two computerized dictionaries and had access to the VTS.S online application. After the treatment a post- test was administered and the obtained results were statistically computed. The following charts show the results gained after the data were statistically computed. The computation is analyzed as follows:

A paired sample *t*-Test was used to compute and analyze the data. For this method a brief illustration along with its related charts will be presented here.

Below you can see a chart in which both C and E groups' descriptive statistics have been presented. In this chart the mean scores and the standard deviations of both groups (C & E) in pre-test and post-test are given. As you see the mean of pre-test in control and experimental group is 5.18 and 5.36 and the standard deviation in control group and experimental group is 1.25 and 1.67 respectively which doesn't show any significant difference between the two groups at first.

Table 4.2. Descriptive statistics for the vocabulary test (single)

	N	Minimum	Maximum	Mean	Std. Deviation
vocabularypretestCON	22	3.00	7.00	5.1818	1.25874
vocabularypretestEXP	22	3.00	8.00	5.3636	1.67745
vocabularypostestCON	22	13.00	23.00	17.8636	2.69560
vocabularypostestEXP	22	17.00	25.00	21.9091	2.30753
Valid N (listwise)	22				

Table 4.3. Descriptive statistics for the vocabulary test (paired)

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	vocabularypretestCON	5.1818	22	1.25874	.26836
	vocabularypretestEXP	5.3636	22	1.67745	.35763
Pair 2	vocabularypostestCON	17.8636	22	2.69560	.57470
	vocabularypostestEXP	21.9091	22	2.30753	.49197
Pair 3	vocabularypostestEXPG1	21.2727	11	2.45320	.73967
	vocabularypostestEXPG2	22.5455	11	2.06706	.62324
Pair 4	vocabularypretestCON	5.1818	22	1.25874	.26836
	vocabularypostestCON	17.8636	22	2.69560	.57470
Pair 5	vocabularypretestEXP	5.3636	22	1.67745	.35763
	vocabularypostestEXP	21.9091	22	2.30753	.49197

But on the other hand when the mean scores of the post-tests of the control and experimental groups are compared, it can be easily understood that the experimental group scored higher than the control one. The mean of the control and experimental group was 17. 86 and 21.90 and the standard deviation was 2.69 and 2.30 respectively. Therefore, it shows that the treatment has worked.

Table 4.4. Paired sample correlation for the vocabulary test

		N	Correlation	Sig.
Pair 1	vocabularypretestCON & vocabularypretestEXP	22	.960	.000
Pair 2	vocabularypostestCON & vocabularypostestEXP	22	.335	.128
Pair 3	vocabularypostestEXPG1 & vocabularypostestEXPG2	11	.421	.197
Pair 4	vocabularypretestCON & vocabularypostestCON	22	.611	.003
Pair 5	vocabularypretestEXP & vocabularypostestEXP	22	.673	.001

As it was stated earlier, the 22 experimental participants were divided in to two eleven-member groups in order to investigate further whether related-vocabulary passage writing of the students with teacher e-feedback had any effect on their vocabulary learning or not. As you can see in the descriptive chart below the mean of the group one and group two is 21.27 and 22.54 and standard deviation of 2.54 and 2.06 respectively which shows a slight difference.

For the first research question a null hypothesis is made**:** There is no significant difference between CALL-based vocabulary learning and the conventional one. In order to test this hypothesis, a paired sample *t*-test was conducted. As you can see in the chart below the *t* value of the control and experimental group post-test is 6.53 with standard deviation of 2.90. The mean of the post-test for the control group and the experimental group is 17.86 and 21.90 which shows that the treatment has worked. As shown in table 4.5., the *P value = .000 < .05.* Based on the results, it could be concluded that there was a significant difference between the mean scores of the two groups on the posttest. The experimental group scored higher marks than the control group. According to the statistics the mean difference was significant, therefore, it can be concluded that our null hypothesis is rejected.

Table 4.5. The conducted *t*-Test for the two groups

Paired Samples Test								
					95% Confidence Interval of the Difference			
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	Sig. (2-tailed)
Pair 1	vocabularypretestCON - vocabularypretestEXP	-.18182	.58849	.12547	-.44274	.07910	-1.449	21	.162
Pair 2	vocabularypostestCON - vocabularypostestEXP	-4.04545	2.90283	.61888	-5.33250	-2.75841	-6.537	21	.000
Pair 3	vocabularypostestEXPG1 - vocabularypostestEXPG2	-1.27273	2.45320	.73967	-2.92081	.37535	-1.721	10	.116
Pair 4	vocabularypretestCON - vocabularypostestCON	-12.68182	2.16875	.46238	-13.64339	-11.72025	-27.427	21	.000
Pair 5	vocabularypretestEXP - vocabularypostestEXP	-16.54545	1.71067	.36472	-17.30393	-15.78698	-45.365	21	.000

For the second research question a null hypothesis is made: The use of related-vocabulary passage writing for computer users with teacher e-feedback does not enhance vocabulary learning. In order to test this hypothesis, another sample *t*-test was conducted. As you can see in the table above, the *t* value for the experimental group 1 and 2 is 1.72, the mean score as shown in table 4.6. below is 21.27 and 22.54 with standard deviation of 2.45 and 2.06 respectively. As shown in table 4.5., the *P value = .116> .05* which does not show any significant difference between two groups. Therefore, we fail to reject the second null hypothesis which means that the use of related-vocabulary passage writing for computer users with teacher e-feedback does not enhance vocabulary learning although there seems to be a slight difference.

Table 4.6. Descriptive statistics for the two experimental groups

	N	Minimum	Maximum	Mean	Std. Deviation
vocabularypostestEXPG1	11	17.00	24.00	21.2727	2.45320
vocabularypostestEXPG2	11	18.00	25.00	22.5455	2.06706
Valid N (listwise)	11				

5. Conclusions and Implications

Although there are many computer software designed so far whose purpose are to manage and organize foreign language learning and teaching, the author of the research aimed at confirming whether using his vocabulary teaching software in remembering and studying new vocabularies may bring necessary efficiency, whereby putting the application (VTS.S) among other website programs as an optional useful tool for foreign language learning or teaching. Therefore, by presenting the gained results (discussed in data analysis part), the possible effects on language studying and in this particular case vocabulary learning have been discussed and focused on.

The research results proved the stated first research hypothesis that there actually is a significant difference between CALL-based vocabulary learning and the conventional one and unprecedentedly exceeded the researcher' expectations. But surprisingly the author found that that the use of related-vocabulary passage writing for computer users with teacher e-feedback does not enhance vocabulary learning.

After having answered all the questions in the post-tests, the experimental group obtained better results than the control group did. However, in selected in person interviews, some students from both groups were found to be psychologically sensitive to computer and to using its related educational software. Although not each foreign language learner may prefer learning English with the help of technology or computer, the difference between pre- and post-tests within the two groups may suggest that using applications similar to VTS.S enhances the learning process and improves the quality of studying the language. Furthermore, by having a detailed look on the research results regarding learning the vocabulary, it seems to the author that having access to the

VTS.S application brought much motivation within the experimental group students. The researcher was also wondering whether students would be interested in getting to know other website tools or not. In contrast to feelings present at the beginning of the research that the participants would not use the application too often, or that they easily might get bored with the application and tools, within only two-week access given to them, students showed quite eagerness to use the application and they even introduced it to other students of lower classes too. Another issue which also proved the interest and motivation to learning English in this way was that the author was asked also by the control group members to give them the access to the program after the research was over. Thus they were given the application in order to use with computer at home.

Another researcher's purpose for conducting this research was to motivate himself to use other versions of the application for further researches. On the one hand, being aware of many hours spent on designing the tools and the need to improve, add or modify some missing options for the tools may demotivate the author from further work in this area. On the other hand, the surprising results of the research within the experimental group, as well as many positive remarks given by them (participants), do encourage the author to further develop and modify the application.

First of all, the researchers want to stress on the fact that the research conducted was devoted only to the vocabularies taken from students' study book over a ten-week period. Although no questionnaire was used and it was not the focus of the researchers, the authors realized that students in the experimental group were getting more autonomous in terms of looking up the words, finding their definitions, opposites, synonyms, and examples. They could be differentiated from the other students who did not use the computerized dictionary regarding their speaking fluency and specially pronunciation accuracy using the computerized dictionary. After the research was over, the author felt that within the set of vocabularies taught to the students, some of the them were indeed interesting, more practical and useful to the learners (for example such items moody, egotistical, selfish), while others did not seem to pay much role at the current level of the students' English and might have been substituted for different ones (for instance such words as coincidence, lucky break, and predicament). Of course it is quite obvious that students use the new words in their daily conversation which are of higher frequency. Similar remarks were also expressed by the students themselves after they finished the ten-week period.

Furthermore, those students who had to work on related-vocabulary passage writing recalled the words much better that those who did not. This implies that even if students are not supposed to use computer application to do this exercise, they can do it on a piece of paper and hand them in to the teacher for correction and feedback. It was possible for the author to correct the passages and score them, but since the concentration was on the multiple choice tests and there was no exact method of correction, this suggestion was rejected.

The authors also consider adding pictures and cartoons to the words listed in the glossary of each section. Because pictures and visualization play an important role in any learning process, it seems that such an option added in further versions of the program would improve the effectiveness of absorbing new words and thus affect the research results. Apart from that, the researchers wonder about the results of conducting the same research both in rural and urban environments and in different institutes. Children from villages may not have such easy access to the internet as children from cities have. Of course, this does not mean that village students have no motivation or desire to use technology in studying English. Some children from cities may be less ambitious and less diligent . The difference between possible research results in rural and urban environments could be indeed interesting, especially when we distinguish male participants' results from that of females'. Finally, it is worth mentioning that this application has been designed especially for EFL teachers and learners and those who study English at language institutes. That is why such a research should be conducted among EFL students at English language institutes.

This study aimed at empirically examining the efficacy of computer assisted language learning on L2 vocabulary acquisition by providing the students with a vocabulary teaching software and a computerized dictionary. More research is needed related to this study for a thorough

understanding of this issue and for confirmation of the findings stated in this research. This is particularly true when considering that there might be additional variables that would add different intrapersonal effects based on learning style preferences which were not included in this study. Interpretations of the findings of this research also led to several suggestions for further research.

1. It is recommended that this study be replicated with a larger sample or number of participants from the same background.
2. The present study may be replicated having native speakers as the participants.
3. It is recommended that a mobile assisted language learning (MALL) study be conducted on the effect of vocabulary learning of Iranian EFL learners.
4. It would be interesting to compare the results across levels of language proficiency.
5. It is recommended that the time-show item be included in the software to see whether spending more time working with computer would improve students' vocabulary acquisition.

These suggested chains of research might shed more light on L2 vocabulary acquisition involving the computer or any kind of technology. They should be able inform us as to which combinations of computer software will enhance second/foreign language vocabulary learning the most. Lastly, it is hoped that the outcome of this study be of some help to future research studies.

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Appendix A

Detailed descriptive analysis of Nelson test for 68 students

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	16.00	1	1.5	1.5	1.5
	17.00	1	1.5	1.5	2.9
	18.00	2	2.9	2.9	5.9
	19.00	2	2.9	2.9	8.8
	20.00	3	4.4	4.4	13.2
	21.00	3	4.4	4.4	17.6
	22.00	4	5.9	5.9	23.5
	23.00	3	4.4	4.4	27.9
	24.00	3	4.4	4.4	32.4
	25.00	3	4.4	4.4	36.8
	26.00	2	2.9	2.9	39.7
	27.00	3	4.4	4.4	44.1
	28.00	5	7.4	7.4	51.5
	29.00	3	4.4	4.4	55.9
	30.00	3	4.4	4.4	60.3
	31.00	2	2.9	2.9	63.2
	32.00	2	2.9	2.9	66.2
	33.00	5	7.4	7.4	73.5
	34.00	6	8.8	8.8	82.4
	35.00	3	4.4	4.4	86.8
	36.00	3	4.4	4.4	91.2
	37.00	1	1.5	1.5	92.6
	38.00	1	1.5	1.5	94.1
	40.00	2	2.9	2.9	97.1
	41.00	1	1.5	1.5	98.5
	43.00	1	1.5	1.5	100.0
	Total	68	100.0	100.0	