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The effect of using computer-assisted language learning (CALL) on Iranian EFL learners' vocabulary learning: An experimental study

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Abstract

This study examines the effect of computer-assisted language learning on the vocabulary learning of Iranian EFL learners, in which 40 pre-intermediate and intermediate students enrolled at Iran Language Institute, Urmia, Iran were selected as participants. The participants were randomly assigned to two experimental groups and two control ones. The two experimental groups underwent the same procedures in receiving treatment, while the control groups did not receive any treatment. Initially, all groups participated in pre-tests. The students in the experimental groups were exposed to the treatments for eight sessions, which included the teaching of word lists selected from the students' books using computers. These words were taught to the experimental groups using 'Vocaboly', while the control groups were taught using the traditional method of vocabulary teaching. Finally, all groups participated in post-tests. The comparison of the mean scores using a *t*-test indicated that the experimental groups outperformed the control groups on post-tests.

Keywords: CALL, multimedia, CAVI, vocabulary learning, learner autonomy.

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1. Introduction

One indispensable factor in learning a second language is the amount of vocabulary one possesses, as vocabulary forms the biggest part of the meaning of any language (McCarthy, 1988). Words are considered the building blocks of language since the lack of them will certainly place difficulties in the way of learners in learning other aspects of language. A large number of researchers have acknowledged that vocabulary learning is an essential component of second and foreign language proficiency (Coady & Huckin, 1997; Harley, 1996; Nation, 2001). For instance, Krashen (1989) states that most of the meaning in language is transpired by words and lack of vocabulary is the greatest obstacle in using the target language effectively. Considering the importance of lexis, vocabulary learning is presently gaining enormous attention in second language pedagogy and research. However, the question of how learners learn vocabulary effectively and efficiently or how it can best be taught is still a controversial issue. In this regard, a traditional teaching method which is still applied at schools and universities of Iran is having the students to memorise the word lists or explicitly providing them with paired translation equivalents of the words. The problem is that not only does this traditional method lack theoretical support since vocabulary learning is more than sheer memorisation of the target language word lists but the whole learning experience could also leave a sour taste in language learners' mouth as learners would view vocabulary learning as a tedious experience of memorising endless lists of words. Nation (1990) states that knowing a word is defined as knowing its spelling, pronunciation, collocations (i.e., words it co-occurs with) and appropriateness. Thus, the sheer memorisation of the paired translation of the target words is not considered an effective method. These ineffective methods eventually have led to frozen vocabulary learning courses which are remembered with distaste by Iranian school and university students. Thus, boosting vocabulary knowledge in a productive way has become a major concern for students as well as language teachers, researchers and practitioners (Liu, 2009). Very often, learners tend to forget the meaning of the words owing to the fact that they have not used an effective technique to learn them, or they were not effectively taught by instructors. Traditional chalk and board method, although fruitful in some cases, is no longer considered the sole means of teaching; nor is it any longer welcomed by language learners as a productive method. In other words, dependence on a single vocabulary instruction method will not result in optimal learning.

In the field of English as a Foreign Language (EFL), numerous efforts have been made to facilitate and enhance the complex process of L2 vocabulary learning (Goodfellow, 1994; Groot, 2000). In recent years, computer technology has made inroads on foreign language learning and educational programmes have become available to both accelerate and facilitate the vocabulary learning process. Many researchers strongly believe that educational softwares can make a significant contribution towards learning languages (Lam & Pennington, 1995; McEnery, Baker & Wilson, 1995; Neu & Scarcella, 1991; Warden, 1995). Woodard (1998) suggested some strategies for teaching vocabulary including teaching word origins and structural analysis, using semantic mapping/webbing, showing students how to attack analogies, reading aloud, dramatising, showing students how to use the dictionary, using cloze sentences and using computer programs. In addition, different forms of technology are being integrated into the teaching and learning of L2 vocabulary. A review of the vocabulary literature has shown that specially designed softwares, a tutorial computer-assisted language learning (CALL) program, concordancing, online lessons, animated texts, use of multimedia contexts, interactive multi-modal materials, online dictionaries, eBooks and a hypertext/hypermedia environment were used to teach L2 vocabulary. The past few decades have seen a huge rise in the number of teachers using computers and the Internet in their classrooms to teach vocabulary. In fact, the emergence of CALL seems to provide a fresh outlook for language teaching and learning as well as vocabulary learning. Furthermore, it provides learners with easy access to learning environments regardless of place and time and increases motivation and effectiveness of learning with multimedia content. Moreover, it can help learners study language individually at their own pace in a motivated atmosphere with a high level of interactivity (Cellat, 2008). In this way, CALL is expected to foster

learner autonomy as well. When a computer is used in conjunction with traditional second language classroom study, students can study more independently, leaving the teacher more time to concentrate on those parts of second language teaching that are still hard or impossible by computer. Owing to such pedagogical benefits, computer technology has become more accessible to both individuals and schools and the growing understanding of its potentials has encouraged a shift of emphasis away from the computer technology itself to various applications of such technology in more practical aspects of teaching and learning.

Furthermore, language classroom environments have rapidly integrated information and communication technology. During the late 1990s, the question of technology use gradually changed from 'Should the computer be used in language teaching'? to 'How can the computer best be used in language teaching'? (Chapelle, 1998, p. 1). This shift implied that technology was not optional in language classrooms any more. In this connection, computer-assisted vocabulary learning (CAVL) is considered to be one of the most common applications of CALL. As this learning medium has been viewed to be a new tool of vocabulary instruction, it has recently given rise to the interest of language teachers and researchers. As a result, a great deal of the recent empirical research has been applied to determine CAVI's effectiveness on vocabulary achievement (Basoz & Can, 2016; Levine, Frenz & Reves, 2000; Takoc, 2005). However, some research results have been inconclusive when it comes to its effectiveness, especially when compared to teacher-led instruction (TLI). Therefore, in the present study, the researchers decided to investigate the effectiveness of CAVI on the vocabulary learning of pre-intermediate and intermediate Iranian EFL learners using 'Vocaboly'- a learning program for English vocabulary. The researchers decided to engage students in learning the vocabulary items within a lively context via a multimedia program so as to empirically study the effectiveness of the proposed educational software in developing vocabulary knowledge among pre-intermediate and intermediate Iranian EFL learners.

As stated above, most teachers in Iran still use traditional methods such as the chalk and board method when teaching vocabulary to their students while they may be unaware of the effect of educational softwares in this regard. This study gives teachers a wider outlook on vocabulary teaching. In short, it aims to: 1) indicate the effect of multimedia in language teaching in general and in teaching vocabulary in particular, 2) emphasise the significance of multimedia, particularly educational software specially designed for vocabulary learning and 3) investigate the effect of CAVI in contrast to teacher-led method (i.e., traditional methods).

Research Questions

The study specifically aims to answer the following research questions:

1. Is CAVI more effective on pre-intermediate Iranian EFL learners' vocabulary learning in comparison to teacher-led method?
2. Is CAVI more effective on intermediate Iranian EFL learners' vocabulary learning in comparison to teacher-led method?

2. Methodology

2.1. Participants

A total number of 40 students participated in this study. The participants were chosen from among pre-intermediate and intermediate EFL students enrolled at Iran Language Institute (ILI), Urmia, Iran. Offering language courses at a variety of proficiency levels ranging from basic to advanced levels to children, young adults, and adults, ILI is one of the most renowned language institutes in Iran. The research was conducted on 20 pre-intermediate learners and 20 intermediate learners. In order to validate the language proficiency of the students and to make up a homogeneous group, the students were given the solutions placement test (SPT). Having administered the placement test, the researchers placed 20 participants in pre-intermediate level and 20 participants in intermediate level

to be finally selected as the participants of the study. The 20 pre-intermediate students were then randomly assigned to the control and experimental groups, that is, Group A or pre-intermediate experimental group and Group B or pre-intermediate control group. Likewise, the 20 intermediate students were randomly assigned to the control and experimental group, that is, Group C or intermediate experimental group and Group D or intermediate control group. The participants included 20 female and 20 male students. All students were native speakers of Persian and they were within 14–18 years of age. In short, this study was conducted on four groups: Group A (i.e., pre-intermediate experimental group), Group B (i.e., pre-intermediate control group), Group C (i.e., intermediate experimental group) and Group D (i.e., intermediate control group). Table 1 displays the experimental and control groups on whom the study was conducted.

Table 1. Experimental and control groups

Proficiency level	Experimental groups (or CAVI groups)	Control groups (or teacher-led groups)
Pre-intermediate	Group A	Group B
Intermediate	Group C	Group D

2.2. Instruments

Five instruments were used to gather the required data: the SPT, two vocabulary tests, the CAVI software and the questionnaire. Furthermore, details are provided below.

2.2.1. Solutions placement test

The researchers administered the SPT in order to evaluate the participants' proficiency level and to form a homogeneous group. This placement test is intended to help teachers decide which level of *Solutions*, elementary, pre-intermediate or intermediate is more suitable for their students. The SPT has been developed by the University of Oxford following the consultation with teachers and is designed to assess students' knowledge of the key language as well as their receptive and productive skills.

2.2.2. Vocabulary tests

The tests in this study were designed by the researchers. Two vocabulary tests were developed. One test was developed for pre-intermediate learners, and another test was developed for intermediate learners. These vocabulary tests have similar formats. Each test is composed of two parts, and each part includes 20 items. Therefore, each test has 40 items. All items were given one point each, and there was no penalty for guessing. The first part, which had 20 items, was *multiple-choice completion.* In this part, a sentence with a missing word was presented; the students were required to choose one of the four vocabulary items given to complete the sentence. The second part, which also had 20 items, was *multiple-choice paraphrase*. In this part, a sentence with one word underlined was given; students chose which of the four words was the closest in meaning to the underlined item. This section would test the students' knowledge of vocabulary items and use of English. These two vocabulary tests were given twice, first as a pre-test and then as a post-test. Students were pre-tested using these tests in order for the researcher to capture the initial differences between the groups; then, they were exposed to the procedure, i.e., the experimental groups received the special treatments and the control groups received no treatments. Finally, these vocabulary tests were administered to the participants once again in order for the researchers to investigate the effect of the treatments on gain in vocabulary.

2.2.3. CAVI software

A multimedia software called *Vocaboly* was used to teach new vocabulary to the experimental groups. This kind of software has several parts such as 'Study', 'Test' and 'Game'. Each part has several items by which you can learn many new vocabulary items.

3. Data collection procedures

3.1. Procedure for the CAVI group

This study adopted an experimental pre-test–post-test design. Before the instruction, the students sat for a pre-test in order for the researchers to capture the initial differences between the groups. The experimental group students had already been told to bring their laptops. An introductory session was held during which the researcher provided the students with a brief introduction to the study. Next, the researchers helped the students with installing the software. Once the software was installed on the students' laptops, the researchers explained all the features of the program and answered the participants' questions regarding the software. Then, CAVI groups practiced the software in order to diminish the effect of students' unfamiliarity with the software. In this introductory session, nothing was taught, and the goal was simply to familiarise the participants with the software. Moreover, dates on which the eight sessions were to be held for instruction were set and fixed. Pre-intermediate students were asked to attend the class twice a week. Intermediate students were also asked to attend the class twice a week on different days. Each session lasted for 15 minutes. One week later, the first formal session was held, and the students participated in a CAVI session in the classroom. By then, the researchers had already prepared the words' source files. Eight source files were prepared for pre-intermediate students, and eight source files for intermediate students. Throughout all the eight sessions, the students were provided with each source file at the beginning of each session. Once the students were given the session's source file, they were asked to load the file. The researchers guided the students whenever they encountered a problem. In the first section, the students were asked to click on the main window. In the middle, the word lists were displayed. The page contained 10 words; each word consisted of meaning, difficulty level and phonetic symbol. The students could press 'F2' to hear the word pronounced; they could also press 'Page Up' or 'Page Down' to scroll the word list. In the second part, the words were displayed and pronounced automatically. Students could adjust the speed and other settings. In the third part, students practiced words' spelling. The definition of the word was displayed automatically, and students wrote the spelling of the words. If students misspelt the words, the software produced a sound meaning that the word's spelling was incorrect. Then, the correct spelling and the student's spelling were displayed together on the right. The fourth part was multichoice. In this part, the students could take a vocabulary test. This test included that session's words only. The test consisted of two modes which enabled the students to either select the meaning by word or select the word by meaning. Depending on the students' selection, the students were to select the correct definition or word. The fifth and the sixth parts composed of games. In the 'memory' part, there were a few cards that were matched with each other; one card contained the word while another card contained the meaning. If the student clicked one card, the card would display the content it held; when the student clicked another card. If these two cards were matched, they would disappear; otherwise, the first one would hide the content. When all cards disappeared, the student would win the game. The last part was 'the star war'. Once the game began, the words started dropping down in the window and the students should hit the words before they get crashed. This procedure was followed throughout all sessions. Once the eight sessions were held and students received the treatment via multimedia software, they sat for the post-tests in order for the researchers to investigate the effect of the treatments.

3.2. Procedure for teacher-led group

The students in teacher-led groups received ordinary classroom instruction in each session. Before the instruction, the students sat for a pre-test in order for the researchers to capture the initial differences between the groups. In order to teach new words, the students were asked to close their books, and then the following steps were taken:

1. The first step included reading out each word two or three times allowing a short pause so that the students could pick up the correct pronunciation and recognise the syllable that received the primary stress.
2. The second step included reading out each word two or three times again, and having the students to repeat the words. This was done in chorus with individual spot checks. After each spot check, the class was asked to repeat the word one more time.
3. In the third step, the students were asked to open their books to the right page and only listen as the words were read out to them two or three times.
4. The last step included going through the vocabulary list and explaining each word by giving examples and writing the synonyms and antonyms on the board.

The above-written steps were followed when teaching the words to both pre-intermediate and intermediate control groups. After the eight sessions were held and students received the treatment via the teacher-led method, they sat for the post-tests in order for the researcher to investigate the effect of the treatments.

4. Data analysis

Since the present study compared CAVI with teacher-led (i.e., traditional) instruction with regard to students' vocabulary achievement, the data were collected through vocabulary tests. In addition, two mediums of instruction were compared in terms of vocabulary achievement. Therefore, the independent variable of the study was two different mediums of instruction. Vocabulary test scores were the dependent variables. As the experimental and control groups were independent from each other, an independent-sample *t*-test was conducted for the analyses in order to compare CAVI groups with TLI groups. Before the administration of the treatments, all groups sat for a pre-test. An independent-sample *t*-test was conducted to compare the means of Group A (pre-intermediate experimental group) with that of Group B (pre-intermediate control group). Likewise, an independent-sample *t*-test was conducted to compare the means of Group C (intermediate experimental group) with that of Group D (intermediate control group). Then, after the administration of the treatments, all groups sat for a post-test. The very same statistical procedure was applied here as well. An independent-sample *t*-test was conducted to compare the means of Group A (pre-intermediate experimental group) with that of Group B (pre-intermediate control group). Likewise, an independent-sample *t*-test was conducted to compare the means of Group C (intermediate experimental group) with that of Group D (intermediate control group). The Statistical Package for Social Sciences (SPSS, version 20.0) software program was used to analyse the data.

5. Results and discussion

In order to analyse the participants' responses, all the collected data were analysed by SPSS. The results are reported below in Table 2. The tables are preceded by interpretations and explanations. As mentioned, initially 40 pre-intermediate and intermediate EFL learners took the SPT in order for the researchers to determine the qualified participants for this study. These participants were selected under the following conditions. The following Table 2 shows the way of interpreting scores.

Table 2. Interpretation of scores

	Total	Pre-intermediate	Intermediate
Grammar & vocabulary	50	21–30	31+
Reading	10	5–7	8+
Writing	10	5–7	8+

Research Question 1:

The first research question stated: Is CAVI in comparison to teacher-led method more effective on pre-intermediate Iranian EFL learners' vocabulary learning?

In order to find out whether CAVI was more effective than teacher-led method, all groups were compared according to their pre- and post-test scores separately. First, students' scores in pre-test were analysed in order to find out whether the two groups were homogeneous in terms of their vocabulary knowledge. Second, the participants' scores in post-test were analysed in order to study the effect of the treatment. An independent-sample *t*-test was conducted to compare the means of Group A (pre-intermediate experimental group) with that of Group B (pre-intermediate control group) both before and after the administration of the treatment. Table 3 displays the descriptive statistics of the pre-test before the administration of the treatment given to pre-intermediate students, and Table 4 presents the descriptive statistics of the independent-sample *t*-test prior to the administration of the treatment.

Table 3. Descriptive statistics of the pre-test administered to pre-intermediate students

	Groups	*N*	Mean	Standard deviation	Standard error mean
Data	A (CAVI Group)	10	2.2667	1.62422	0.41937
	B (teacher-led group)	10	2.5333	1.50555	0.38873

Table 3 describes the statistics of the pre-test given to pre-intermediate level students before the administration of the treatment. A in the first row stands for pre-intermediate experimental group, and B in the second row stands for pre-intermediate control group.

Table 4. Independent-sample *t*-test comparing CAVI and teacher-led group

	***t*-test for equality of means**						
	F	**Sig.**	***t***	***df***	**Sig. (two tailed)**	**Mean difference**	**Standard error difference**
Data	0.001	0.976	−0.466	28	0.645	−0.26667	0.57183

As is seen in Table 3, the mean score of the CAVI group (*M* = 2.2667) is almost the same as that of the teacher-led group (*M* = 2.5333). Then, a *t*-test was conducted to see whether or not the difference was significant. As seen in Table 5, the *t*-test result (0.645) shows that there is no meaningful distinction between the means of the two groups in the pre-test before the administration of the treatment. Therefore, it can be claimed that the two groups had almost the same amount of vocabulary knowledge before the administration of the treatment.

In order to answer the first research question and investigate the effect of the treatment, participants' scores in post-test were analysed. An independent-sample *t*-test was conducted to compare the means of Group A (pre-intermediate experimental group) with that of Group B (pre-intermediate control group) after the administration of the treatment. Table 5 displays the descriptive statistics of the post-test after the administration of the treatment given to pre-intermediate students and Table 6 also presents the results of the independent-sample *t*-test after the administration of the treatment.

Table 5. Descriptive statistics of the post-test administered to pre-intermediate students

	Groups	*N*	Mean	Standard deviation	Standard error mean
Data	A (CAVI group)	10	35.4667	3.13657	0.80986
	B (teacher-led group)	10	30.0667	3.69298	0.95352

Table 6 displays the statistics of the post-test given to pre-intermediate level students after the administration of the treatment. A in the first row stands for pre-intermediate experimental group, and B in the second row stands for pre-intermediate control group.

Table 6. Independent-sample *t*-test comparing CAVI and teacher-led group

	t-test for equality of means						
	F	**Sig.**	***t***	***df***	**Sig. (two tailed)**	**Mean difference**	**Standard error difference**
Data	1.001	.326	4.316	28	0.000	5.40000	1.25103

As seen in Table 6, the mean score of the CAVI group (*M* = 35.4667) is considerably higher than the teacher-led group (*M* = 30.0667). Then, a *t*-test was conducted to see whether or not the difference was significant. According to Table 6, the *t*-test result (0.000) shows that there is meaningful distinction between the means of the two groups in the post-test after the administration of the treatment. This analysis indicates that CAVI is more effective on pre-intermediate Iranian EFL learners' vocabulary learning in comparison to teacher-led method.

Research Question 2:

The second research question stated, 'Is CAVI in comparison to teacher-led method more effective on intermediate Iranian EFL learners' vocabulary learning'?

In order to answer this research question, the participants underwent the same procedure which was applied to pre-intermediate students. To find out whether CAVI was more effective than teacher-led method on intermediate Iranian EFL learners' vocabulary learning, both groups were compared according to their pre- and post-test scores separately. First, students' scores in pre-test were analysed in order to find out whether the two groups were homogeneous in terms of their vocabulary knowledge. Secondly, the participants' scores in post-test were analysed in order to study the effect of the treatment. An independent-sample *t*-test was conducted to compare the means of Group C (intermediate experimental group) with that of Group D (intermediate control group) both before and after the administration of the treatment. Table 7 displays the descriptive statistics of the pre-test before the administration of the treatment given to intermediate students, and Table 8 presents the descriptive statistics of the independent-sample *t*-test before the administration of the treatment.

Table 7. Descriptive statistics of the pre-test administered to intermediate students

	Groups	***N***	**Mean**	**Standard deviation**	**Standard error mean**
Data	C (CAVI group)	10	2.6000	1.35225	0.34915
	D (teacher-led group)	10	2.3333	1.44749	0.37374

Table 7 describes the statistics of the pre-test given to intermediate level students before the administration of the treatment. C in the first row stands for intermediate experimental group, and D in the second row stands for intermediate control group.

Table 8. Independent-sample *t*-test comparing CAVI and teacher-led group

	t-test for equality of means						
	F	**Sig.**	***t***	***df***	**Sig. (two tailed)**	**Mean difference**	**Standard error difference**
Data	0.048	0.828	0.521	28	0.606	0.26667	0.51146

As seen in Table 7, the mean score of the CAVI group (*M* = 2.6000) is almost the same as teacher-led group (*M* = 2.3333). Next, a *t*-test was conducted to see whether or not the difference was significant. According to Table 8, the *t*-test result (0.606) shows that there is no statistically significant difference between the means of the two groups in the pre-test before the administration of the treatment. Therefore, it can be claimed that the two groups had almost the same amount of vocabulary knowledge before the administration of the treatment.

In order to answer the second research question and investigate the effect of the treatment empirically, the participants' scores in post-test were analysed. An independent-sample *t*-test was conducted to compare the means of Group C (intermediate experimental group) with that of Group D

(intermediate control group) after the administration of the treatment. Table 9 displays the descriptive statistics of the post-test after the administration of the treatment given to intermediate students.

Table 9. Descriptive statistics of the post-test administered to intermediate students

	Groups	*N*	Mean	Standard deviation	Standard error mean
Data	C (CAVI group)	10	29.4000	4.35562	1.12462
	D (teacher-led group)	10	23.7333	4.26726	1.10180

Table 10 presents the descriptive statistics of the independent-sample *t*-test after the administration of the treatment.

Table 10. Independent-sample *t*-test comparing CAVI and teacher-led group

	t-test for equality of means						
	F	Sig.	*t*	*df*	Sig. (two-tailed)	Mean difference	Standard error difference
Data	0.058	0.812	3.599	28	0.001	5.66667	1.57440

According to Table 10, the mean score of the CAVI group (*M* = 29.4000) is considerably higher than that of the teacher-led group (*M* = 23.7333). Next, a *t*-test was conducted to see whether or not the difference was significant. As seen in Table 10, the result of the *t*-test (i.e., 0.001) shows that there is meaningful distinction between the means of the two groups in the post-test after the administration of the treatment. Once again, this analysis reveals that in comparison to teacher-led method, CAVI is more effective on intermediate Iranian EFL learners' vocabulary learning.

6. Discussion

The present study compared the effect of CAVI and TLI on pre-intermediate and intermediate Iranian EFL learners' vocabulary learning. The results of the study revealed that CAVI groups did far better than teacher-led groups. This indicates that CAVI groups learned and remembered more vocabulary than teacher-led groups. The success of the CAVI groups in terms of vocabulary achievement might be due to various factors. First, learners had control over their learning process and learned at their own pace during the implementations. This individualised learning might have promoted learners' motivation (Lee, 2000). Thus, students' motivation might have facilitated students' vocabulary learning. Second, one-to-one interaction between a student and the computer might have facilitated students' vocabulary achievement. CAVI software (i.e., *Vocaboly*) made the students to actively involve in the learning process. For each student, the computer program provided an instant feedback and opportunity to correct a mistake. Students' activities and answers were only seen by them. Hence, students might have had lots of activities without the fear of making mistakes. This situation may have contributed to having low-affective-filter environment that facilitates language learning (Krashen, 1982). The other possible reasons may be the lively environment and the animation that the program provided the students with. Especially in the spelling, listening and star war section of the program, there were a lot of lively features that helped the students to build better mental images and create curiosity. The result of the study also indicated that students were eager to use software program and found it enjoyable and educational because they could both play game and learn words during the CAVI sessions.

Last but not least, the findings of the study point to the facilitating effect of CAVI on vocabulary learning. This result is in line with the findings of previous studies that indicate the facilitating effect of CAVI on vocabulary (Fu, 2002; Levine et al., 2000). The finding of the study indicated that the use of computer had a significant role on the enhancement of the participants` vocabulary. The findings emerging from the present study are in line with the suggestion of Person (1988, cited in Leery, 1997)

who claimed that CALL can encourage the development of language learning skills and results in more learning. The findings of this research are in line with Kocak (1997) who investigated the effects of CALL on vocabulary instruction for Turkish EFL students. In his research, students who were educated by CALL had higher achievement levels on English vocabulary than those who learned using traditional language teaching methods.

7. Conclusion

The present study investigated the effect of CAVI on pre-intermediate and intermediate Iranian EFL learners' vocabulary learning and compared CAVI with TLI in term of vocabulary achievement. The comparison of both group scores revealed that the students in CAVI groups could learn and retain more vocabulary than teacher-led groups. This shows that multimedia can serve as an excellent teaching tool, especially in the teaching of vocabulary. Moreover, it offers language learners major advantages. CALL enhances the motivation level of students. It is useful in enhancing in-group activities as well as in imparting individualised instruction, which is rarely possible in a traditional classroom. In addition, there are no limitations with regard to practice sessions or time in which students can have as many practice sessions as they wish, repeat the tasks any number of times to acquire mastery and select the material according to their individual requirements. Thus, CALL is efficiently learner-centred. In addition, CALL software has tutorial modes, which help students explore the correct answers and learn from the errors they make. CALL programs provide the information requested in a very short time, almost instantaneously. By using CALL method, the students will not only learn more number of words but also the usage of those words as well. The advantage of using CALL is that students can do the entire study skill activity at their own pace and time using their own learning styles and strategies.

8. Implications

This study provided evidence for facilitating effect of CAVI on pre-intermediate and intermediate learners' vocabulary learning. Therefore, language teachers may use such commercially available CAVI programs to enhance learners' vocabulary. Since computer programs present all materials for language items, teachers need not waste time in finding and preparing materials for vocabulary instruction. This study and its results might suggest better ways of training and equipping instructors with strategies, techniques and approaches. Such training might be achieved through the implementation of an effective programme on how to better exploit corpus tools and dictionaries software, as well as computer technology resources. In addtion, since many universities and schools in Iran are not fully yet aware of this technology and its applicability to language teaching, the study might provide some forms of guidance to language programmes throughout the country that want to pursue a similar path in the future. In the present study, individualised learning, instant feedbacks and animations of the program might be considered fundamental grounds for CAVI effectiveness on students' vocabulary learning. Students can also evaluate their own pace and make provision for their language learning pace. Hence, learners have a responsibility of their own language learning in CAVI. For this reason, CAVI can be an integral part of foreign language learning. CAVI programs can also be used to improve students' pronunciation. In EFL environment, students are rarely exposed to foreign language input out of classroom and their only exposure to the target language's oral form is their teachers' speech in the class. CAVI programs expose students to native pronunciation and this will help to eliminate teacher-induced pronunciation errors. From this point of view, CAVI provides a valuable opportunity to EFL learners.

9. Limitations of the study

This study is limited from four aspects. The first limitation is that there are a lot of barriers to the use of CALL in language learning in many different aspects related to CALL. The second limitation is

that Language teachers often have some financial barriers to afford the necessary hardware and software for CALL because the university administration does not spare an appropriation for CALL. The third limitation is that computers cannot handle unexpected situations due to technological barriers. The fourth limitation is that both teachers and students need training to learn to use computers. The present study possesses two delimitations. First, the research was conducted on pre-intermediate and intermediate students, which means the findings of the research can only be generalised to this population. However, a wider population could have provided more reliable insights on the effectiveness of CAVI applications. The other delimitation is that students in CAVI groups studied the target words through computer, but they were tested with traditional testing procedure. Tests were given on pen and paper rather than on-screen. In this respect, TLI groups may have an advantage over CAVI groups.

10. Suggestions for further studies

This research was conducted on a cohort of pre-intermediate and intermediate students. A study on a different age group and proficiency levels such as upper/high intermediate or advanced levels can be conducted to see whether CAVI has different effects on them. Furthermore, in this study, the target words consisted of abstract words. As a result, future research may examine the effect of CAVI on concrete words which is likely to result in different outcomes in different word classes. Next, the present research did not take into account gender, and thus future research may examine CAVI effectiveness in relation to this factor. Besides, in the current research, learners' vocabulary was examined by means of multiple-choice completion and multiple-choice paraphrase tests. Furthermore, research can also administer listening and speaking tests to examine vocabulary learning. In addition, while this study investigated students' vocabulary achievement after they had received eight sessions of instruction, future studies are to examine students' vocabulary learning in a longer period of time may provide more reasonable results. Finally, the present study investigated computerised instruction on vocabulary learning. Future research may examine computerised instruction on different language skills such as reading and writing. Thus, more generalised result may be obtained about computerised instruction on foreign language learning.

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