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A Comparative Study of Computer-Assisted Language Learning (CALL) and Conventional Methods of Instruction on Intermediate EFL Learners' Vocabulary Learning

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Abstract

The present study aimed at investigating the effect of CALL on intermediate EFL learners' vocabulary learning and comparing it with traditional teaching method. To this end, a quasi-experimental design was used in which 80 students were chosen based on their performance in an Oxford Placement Test (OPT), and were randomly assigned to the experimental and control groups. Six reading comprehension passages consisting of 72 new words were selected from the book "504 essential words" and used as the pretest of the study. Then, the experimental group received twelve sessions of treatment which was teaching vocabulary through different tools in the computer such as related pictures, video, textual highlights, PowerPoint slides, or Narsis software while the control group received the traditional way of teaching such as providing oral pronunciation of words, explaining their parts of speech, and offering a direct translation of words in Persian. Afterward, both groups attended the post-test of vocabulary at the end of the study. The scores of learners in pretest and posttest were analyzed statistically via running independent T-test. The findings revealed that CALL instruction was more effective in enhancing learners' vocabulary learning in comparison to the traditional vocabulary instruction. The findings indicated that the experimental group had a better performance than that of the control group, and the learners in the CALL group learned more vocabulary than the learners in the traditional group. The findings of this research have implications for teachers and learners as teachers can use CALL in EFL classes to help them be independent learners, and make vocabulary learning more attractive and enjoyable to learners. The findings can help material developers and syllabus designers to consider the importance of CALL while planning textbooks and materials.

Keywords: Vocabulary, vocabulary learning, EFL, CALL, traditional teaching method

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1. Introduction

Non-native speakers need sufficient vocabulary knowledge to become successful users of English in any academic environment. Therefore, without enough vocabulary knowledge, they are not able to communicate effectively (Min, 2013). According to Moir and Nation (2002), Brown, Waring, and Donkaewbua (2008), and Schmitt, Wun-Ching, and Garras (2011), grammatical mistakes lead to ungrammatical sentences while the incorrect use of vocabulary affects the communicative process. That is, vocabulary is one of the linguistic parts influencing the communicative competence and learners' language abilities. The key role of vocabulary knowledge in English as a foreign language (EFL) learning has been growingly identified and its importance in language learning has been demonstrated by a lot of researchers (Alizadeh, 2016; Chalak, 2015; Itmeizeh, 2018; Karbalaei & Kord Afshari, 2019; Lervåg & Aukrust, 2010; McKeown, Beck, & Sandora, 2012; Namaziandost, Pourhosein Gilakjani, & Hidayatullah, 2020; Namaziandost, Pourhosein Gilakjani, & Shakibaei, 2021; Namaziandost, Razmi, Tilwani, & Pourhosein Gilakjani, 2022; Pakdaman & Pourhosein Gilakjani, 2019; Riazi Ahmadsaraei & Pourhosein Gilakjani, 2022; Shamsi & Rahimy, 2017; Taati Jeliseh & Pourhosein Gilakjani, 2022). Therefore, researchers have proposed many kinds of approaches, techniques, and methods to teach vocabulary.

One important part of learning a second language is the amount of vocabulary one owns, as it shapes the component part of the meaning of any language. Words are regarded the basic units of language since not knowing the right way may create major problems for learners in learning other parts of language. In the last years, some research on vocabulary has been carried out to explain the rate of vocabulary learners should attain in order to read different materials and to process various types of oral and written texts, and the sorts of procedures learners apply in comprehending, utilizing, and recalling words (Zhang, 2009). Moreover, incorporating computer technology into the learning process helps learners to improve their language (Bgheri, Roohan, & Ansari, 2012; Pourhossein Gilakjani & Sabouri, 2017).

In an English as a second language (ESL) environment, Computer Assisted Language Learning (CALL) completes and increases the class activities through providing games for practice or word processing for composition. The computer either completely replaces or completes classroom instruction by providing instruction in language skills not taught by classroom teacher (Davies, 2002). CALL has challenged traditional teaching and learning methods. Jones (2001) states that language teachers understand the value of CALL and learners need computers for effective learning. When computers are properly employed, they can efficiently improve learners' learning. While Iranian learners perceive the importance of vocabulary in learning language, most of them learn it passively because they often learn just the new vocabulary through new words in their textbooks. This traditional method of teaching vocabularies makes the class tedious for learners and causes them not to pay attention to their teaching-learning activity, so they prefer to do other tasks such as talking, playing, and socializing with their friends. According to Wallace (1982), the most disappointing experience in speaking is the lack of ability to apply the words needed to express oneself. It is very difficult owing to two main reasons: there are too many words to be acquired and teachers do not seriously consider learners' problems in this regard.

Vocabulary learning is one of the most monotonous activities for learners. Nejati, Jahangiri, and Salehi (2018) clarify that vocabulary learning is gaining more consideration in language teaching. Nevertheless, the question of how learners learn vocabulary successfully or how it is appropriately taught is still a controversial issue. Traditional method which is applied at Iranian universities persuades learners to memorize the word lists or provides them with translation equivalents of the words. The difficulty is that this method lacks theoretical support and learners consider vocabulary learning as a boring activity involving the memorization of long lists of words.

The sheer memorization of the translation of words is not regarded as a useful method. These traditional methods eventually have led to frozen vocabulary learning courses which are remembered with distaste by Iranian school and university students. Traditional method is not assumed the only way of teaching; nor is it welcomed by learners as a useful method (Nejati et al., 2018). Unfortunately, textbook writers and syllabus designers have not paid enough attention to the key role of CALL in Iranian EFL classes. Teachers do not usually use CALL to teach language courses. The classes are teacher-centered and teachers do not like to give learners autonomy to lose their authority. Consequently, they prefer to use traditional teaching methods (Abdollahi-Guilani, Subakir Mohdyasin, & Hua, 2011; Khoshnoud & Karbalaei, 2015).

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1.1 Research Questions

To fulfill the objectives of this research, the following research questions were proposed:

1. Does CALL have any significant effect on intermediate EFL learners' vocabulary learning?

2. Is CALL more effective than traditional teaching methods in intermediate EFL learners' vocabulary learning?

1.2 Research Hypotheses

Based on the above research questions, the hypotheses of this study were as follows:

1. CALL does not have any significant effect on intermediate EFL learners' vocabulary learning.

2. CALL is not more effective than traditional teaching methods in intermediate EFL learners' vocabulary learning.

2. Review of the Literature

CALL is an approach to language teaching and learning in which the computer is used as an assistance to the presentation, reinforcement, and assessment of materials to be learned, often involving a fundamental interactive part (Davies, 2002; Rahnavard & Mashhadi Heidar, 2017). CALL is more effective than traditional teaching methods with opportunities to practice the language within various kinds of exercises. CALL research has been continuing for decades examining CALL usage in various contexts and with different language. Its potential for language teaching has been discussed by some researchers (Aghajanzadeh Kiasi & Pourhosein Gilakjani, 2022; Ahmadi, 2018; Akhter Farhat & Dzakiria, 2017; Enayati & Pourhosein Gilakjani, 2020; Gilakjani, Sheikhy, Montashery, & Alizadeh, 2019; Jafarian, Soori, & Kafipour, 2012; Kilickaya & Krajk, 2010; Naraghizadeh & Barimani, 2013; Pourhossein Gilakjani, 2018; Pourhosein Gilakjani & Rahimy, 2020; Saleh & Gilakjani, 2021; Sheylani Bakshs & Pourhosein Gilakjani, 2021). Kilickaya and Krajk (2010) examined 38 university learners with an online vocabulary program called "WordChamp" in Turkey. The findings indicated that online vocabulary learners outperformed the participants who were exposed to traditional teaching methods.

A study carried out by Khazae, Dastjerdi, and Talebi Nejhad (2011) investigated the effect of traditional and CALL approaches on Iranian EFL lear1ners' vocabulary acquisition and retention. One group studied a list of vocabulary through web-based activities, the other group worked on the same list via paper material. The findings demonstrated that students learned vocabulary more effectively via online activities than with paper material. The results also revealed that students who received learning content through web-based approach were better than those who received learning content traditionally. The other study conducted by Tamjid and Moghadam (2012) examined the impact of Narsis software on Iranian intermediate learners' vocabulary learning. 46 homogeneous intermediate EFL learners participated in this research. They were randomly assigned to experimental and control group. The experimental group received the treatment by Narsis software which was based on "504 Absolutely Essential Words" book. The control group was taught the same vocabulary using the "504 Absolutely Essential Words" course-book. The results revealed that the experimental group outperformed the control group and the participants in the experimental group had positive attitudes towards Narsis software.

Bagheri et al. (2012) conducted a research to examine the effect of CALL-based and non-CALL-based approaches on teaching and learning vocabulary. 61 Iranian EFL learners were selected as the participants of this study from a Language Institute in Isfahan. They were randomly assigned into two groups: CALL and non-CALL. CALL group was taught by Phonics software in a language laboratory. The non-CALL group used the same vocabulary but they performed it in the class. The result showed that CALL users and non-CALL users had the same function on the vocabulary test in immediate and delayed posttests. Another finding was that both CALL-based and non-CALL based approaches significantly increased learners' lexical knowledge in the short and long term. Abbasi and Hashemi (2013) examined the effect of using a mobile phone on learners' vocabulary retention. The findings showed a positive impact of mobile phone on the learners' vocabulary learning. Naraghizadeh and Barimani (2013) investigated the impact of CALL on Iranian EFL learners' vocabulary learning. The findings showed that there was a significant difference between the experimental and control group concerning their vocabulary knowledge. The findings also demonstrated that the group who received CALL outperformed the other group in the research.

The impact of using computers on vocabulary learning was investigated by Pahlavanpoorfard and Soori (2014). 40 Iranian EFL learners from the Larestan University participated in this study. They were randomly divided into the experimental and control group. The experimental group was taught by software-assisted and game-assisted

techniques respectively. The learners in the control group received classroom teaching. Treatment period lasted 10 weeks for each group. Then, they received a posttest to assess the impact of the treatment. The findings demonstrated that computer group had a better performance than that of the traditional group, and the learners in the computer group learned more vocabulary than the learners in traditional group. Khoshnoud and Karbalaei (2015) performed a research to examine the application of CALL in learners' vocabulary knowledge. The results indicated that EFL learners who used CALL performed better on the retention test than those who learned vocabulary conventionally.

Moreover, Wang, Teng, and Chen (2015) carried out an investigation to examine the impact of iPad App on learners' vocabulary learning. 74 Taiwanese university learners were selected for this research. They were divided into experimental and control group. The teacher applied iPad Application to teach vocabulary in the experimental group, and used the traditional semantic-map method to teach it in the control group. In the treatment period which lasted about 18 weeks, learners studied the words by watching words, word pictures, and example sentences by the classroom projector. Then the researchers administered the same post-test at the end of the course to examine learners' progress. The findings showed that the iPad App created a significant improvement in the students' vocabulary acquisition and the experimental group performed better in the post-test than the control group.

In addition, Taki and Jafari (2017) carried out a study to evaluate the extent to which Mnemosyne software helps Iranian EFL learners to improve their vocabulary learning. 60 learners were selected for doing the objectives of this research. They were assigned into two equal-sized experimental and control groups, each involving 30 participants. The experimental group used Mnemosyne on their own computers. The control group received instructions by traditional method. The findings obtained from the research indicated a significant difference between the scores of the experimental group and those of the control group. The findings also showed that Mnemosyne significantly improved learners' vocabulary learning.

A research conducted by Mirhosseini Chahardeh and Khorasani (2018) on the impact of pre-teaching new vocabulary items through audio images on Iranian EFL students' comprehension skill. Thirty intermediate students took part in this study and were divided into two groups. The experimental group was instructed in new vocabulary items using audio-visual materials. The findings showed that pre-teaching new vocabulary using audio-visual materials has a great impact on students' comprehension ability.

Hashemifardnia, Namaziandost, and Rahimi Esfahani (2018) performed a study to examine the impact of WhatsApp on Iranian intermediate EFL learners' vocabulary learning. 50 Iranian female participants were chosen among 80 learners based on the results of Oxford Quick Placement Test (OQPT). They were randomly assigned into two groups; one experimental group and one control group. English words were taught to the experimental group by WhatsApp. The control group received word instruction through traditional method. In the control group, words were taught to participants by the researchers and the whole instruction continued 8 sessions. The researchers administered the OQPT and pretest in the first two sessions and then in the last session they administered post-test to experimental and control groups to identify the effect of WhatsApp on the learners' vocabulary learning. The findings represented that there was a significant difference between the posttests of experimental and control groups. The results also proved that the experimental group significantly outperformed the control group ($p < .05$) on the post-test.

Furthermore, Shokrpour, Mirshekari, and Moslehi (2019) examined the impact of CALL on Iranian EFL learners' vocabulary learning. 50 participants were chosen for this research. They were assigned into experimental and control groups. After employing the homogeneity test, a pretest was administered to both groups. The experimental group received 12 sessions of instruction utilizing CALL. Then, a posttest was given to both groups. The collected data were analyzed via descriptive statistics, independents samples t-test, and paired samples t-test. The obtained outcomes specified that the experimental group outperformed the control group.

As mentioned above, many studies have been carried out concerning the effect of CALL on improving learners' vocabulary. Yet, to the best of our knowledge, no research has been performed in Iran regarding the effect of CALL on intermediate EFL learners' vocabulary learning and comparing it with traditional teaching method. Hoping to fill this gap, the current study set out to examine the impact of CALL on the learning vocabulary of Iranian intermediate EFL learners.

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3. Methodology

3.1 Design of the Study

The current study followed a quasi-experimental design because there was no random assignment of participants. In fact, this research followed a pre-test, intervention (treatment), post-test research design to examine the effect of CALL on Iranian intermediate EFL learners' vocabulary learning.

3.2 Participants

The participants of the present study were 80 Iranian male/female EFL learners who were studying English at intermediate level in Parsian Institute in Nowshahr, Mazandaran, Iran during the spring semester of 2019. These learners were between 14-20 years old. An Oxford Placement Test (OPT) was administered to make sure that the participants were all at the same level of proficiency. The results indicated that there were no significant differences between them. Among 95 intermediate learners, 80 students with one standard deviation above and one standard deviation below the mean score were selected for this study. They were non-randomly assigned to experimental and control groups. The experimental group consisted of 25 females/15 males and the control group involved 27 females/13 males. Table 1 shows the number of males and females in each group.

Table 1. The number of males and females in the experimental group (EG) and control group (CG)

Participants	Males	Females
EG (N=40)	15	25
CG (N=40)	13	27

3.3 Instruments

The researchers used the following instruments in order to collect the data.

3.3.1 Oxford Placement Test (OPT)

The first instrument which was utilized in the present study to homogenize the participants was a proficiency test. This test was the OPT which was answered by all the participants of this research. It helped the researchers to select the intermediate learners. The results of OPT test indicated that there were no significant differences between them. Among 95 intermediate learners, 80 students with one standard deviation above and one standard deviation below the mean score were selected for this study. They were non-randomly assigned to experimental and control groups. The experimental group consisted of 25 females/15 males and the control group involved 27 females/13 males.

3.3.2 Reading Comprehension Passages

The second instrument which was used in the current study was six reading comprehension passages which were selected from 504 essential words book containing seventy two new words. The instructional materials included six units of 504 absolutely essential words book. The book is used for intermediate learners at language institutes. A total of 72 words were chosen from this book as the target training words. The two groups of the study were taught two sessions a week for 6 weeks. Six words were chosen to be taught in each session.

3.3.3 Pre-test and Post-test

The third instrument used in the present study was composed of two vocabulary tests; pretest and posttest, which were prepared to evaluate participants' vocabulary knowledge. The reliability of the pre-test and post-test were calculated through a pilot study and it was met according to Cronbach Alpha formula as (r=.79) and (r=.83) respectively. In addition, two Associate Professors of Teaching English as a Foreign Language (TEFL) confirmed the validity of the pre-test and post-test. Both of these tests shared the same test form comprising two parts. The first part contained fill-in the blank items and the second part contained multiple-choice items. On the whole, the tests were composed of seventy two questions and each question was given one point. Students who answered all questions accurately got 72 points. All these tests were prepared to evaluate the learners' amount of acquisition of the targeted vocabulary.

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3.4 Data Collection Procedures

This research was conducted within approximately two months. First, the goals of current study were clarified to Iranian intermediate learners. The researchers informed the participants that their personal information will be kept confidential. They clarified CALL and the way of using it in teaching new words. An OPT was accomplished among 95 male/female students in Parsian Institute to make sure about their homogeneity. 80 students with one standard deviation above and one standard deviation below the mean score were chosen for the present research. They were randomly divided into the experimental and control groups. The experimental group consisted of 40 participants (25 females/ 15 males) and the control group had 40 participants (27 females/ 13 males).

In pretest stage, the participants were asked to answer 72 vocabulary tests during 1 hour. After pretest, scores of the experimental and control groups were measured. During six weeks, six reading texts (each including 12 targeted words) were given to two groups; several techniques of vocabulary instruction were utilized in both groups. In order to teach in the control group, the teacher provided the students with an oral pronunciation of words, described their parts of speech, and presented the Persian translation of words. This process was followed every session for the whole semester during which the learners were not offered any new vocabulary learning program. Prior to teaching and learning session, participants were familiarized with the notion of CALL, a type of strategy awareness; afterwards they were provided with practical examples to learn employing the considered strategy.

After reading a passage in the book which contained new words, the teacher in experimental group showed these new and unfamiliar vocabularies in the screen presented in front of the class. The intended word was shown by different tools in the computer, it could be shown by related picture, video, textual highlights, PowerPoint slides, textual glosses or Narsis software. This intelligent software includes the pronunciation, spelling, and definition of the intended words. They included some particular games for learning vocabulary. This trend was kept every session for experimental group to learn new vocabularies. One session after last treatment session, a posttest was administered. This test which contained 72 vocabulary questions assessed the learners' knowledge regarding words taught in past sessions.

During the period of six weeks, this strategy of teaching vocabularies was performed for the experimental group as treatment. No new strategy was given to the control group and this group received traditional way of instruction. In the first week of treatment, a reading text with the title "My Brother, the Gentleman" which included 12 new targeted vocabularies was taught to the learners through CALL and then after watching these new worlds on screen with different techniques of CALL in the classroom, learners were supposed to answer the forthcoming questions and tasks provided in their books. In the second week, another reading test with the title "Terror in the Cemetery" which contained 12 new vocabularies was chosen to be taught to learners through CALL and again students answered the questions and tasks provided in their books after watching and learning targeted words through CALL technique. Another reading test with the title "An Unusual Strike" was chosen to be taught in the third week of treatment session. This text contained 12 new vocabularies which were taught to the learners through using different techniques of CALL, and then they answered the upcoming questions and tasks provided in their books.

For the fourth week of treatment session, another reading passage from the "504 essential words" was chosen to be taught to the learners. The title of the text was "A Fan in the Air" and included 12 new vocabularies. After learning these new vocabularies through various CALL techniques, the learners were supposed to answer the upcoming questions and tasks provided in their books. In the fifth week of treatment session, another reading passage with the title "Shape Up at Shaker" which included 12 new targeted vocabularies was taught to learners trough CALL then they were supposed to answer the forthcoming questions and tasks provided in their books. In the sixth week of treatment session, another passage with the title "The Health of Your Car" which involved 12 new targeted words was selected to be taught through CALL method in the classroom. After introducing these 12 new words through different CALL techniques in the classroom, learners were supposed to respond upcoming questions and tasks provided in the book. One day after the last treatment session, an immediate posttest was administered to both groups. The participants were asked to answer 72 vocabulary questions during one hour. The scores again were measured.

3.5 Data Analysis

In order to investigate the effect of CALL on Iranian intermediate EFL learners' vocabulary learning, the data were submitted to a series of analysis of t-test with alpha decision to reject the null hypotheses set at the 0.05 level. Then, the quantified data were given to SPSS software. The researchers analyzed the data through calculating independent sample t-test between the scores of experimental and control groups.

4. Results

This section reports the analysis of the data which were collected from learners' vocabulary knowledge tests and the effect of CALL on the participants. To compare the two groups, descriptive statistics of both groups and independent sample T-test were computed. First of all, it was important to make sure that the data had normal distribution. Table 2 reports the results of the Shapiro-Wilk tests of normality.

Table 2. Test of normality for control group

	Shapiro-Wilk		
	Statistic	df	Sig.
Pretest	.971	40	.784
Posttest	.952	40	.401

As it can be seen in Table 2, the obtained results for the control group scores were .784, and .401 for the pre-test and posttest of the learners, respectively. Thus, the level of significance for the control group was over 0.05 and the data distribution was normal.

Table 3. Test of normality for experimental group

	Shapiro-Wilk		
	Statistic	df	Sig.
Pretest	.940	40	.239
Posttest	.951	40	.381

According to the data demonstrated in Table 3, the level of significant of the experimental group in pretest and posttest is over 0.05, and the data distribution was normal. The results of the learners' performance during the pretest and posttest stages in the control group were tabulated in Table 4.

Table 4. Mean scores of control group

	N	Mean
	Statistic	Statistic
Pretest	40	29.25
Posttest	40	56.20
Valid N (listwise)	40	

The results of the learners' performance during the pretest and posttest stages in the experimental group are tabulated in Table 5.

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Table 5. Mean scores of experimental group

	N	Mean
Pretest	40	29.75
Posttest	40	67.15
Valid N (listwise)	40	

The first research question was as follows:

Does CALL have any significant effect on intermediate EFL learners' vocabulary learning?

Table 6 indicates the mean scores of the experimental group in the pretest and posttest.

Table 6. Statistics of experimental group in pretest and posttest

		Pretest	Posttest
N	Valid	40	40
	Missing	40	40
Mean		29.75	67.15
Std. Deviation		2.712	2.601

Comparing the mean scores of the experimental group learners in the pretest (29.75) and immediate posttest (67.15) stage represents a noticeable difference. It displays that there is a significant difference between the experimental group members' scores in the pre- and post-test and shows the significance effect of CALL on learners' vocabulary development; but in order to analyze the first research question accurately we need to calculate independent sample t-test.

The second research question of the current study was as follows:

Is CALL more effective than traditional teaching methods in intermediate EFL learners' vocabulary learning?

Table 7 reveals the experimental group participants' performance on the pretest and posttest regarding vocabulary learning.

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Table 7. Independent samples test of experimental group in pretest and posttest

	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
Equal variances assumed	.049	.826	-44.510	78	.000	-37.400	.840	-39.101	-35.699
Equal variances not assumed			-44.510	37.934	.000	-37.400	.840	-39.101	-35.699

In Table 7, the significance level in Leven's Test for Equality of variance is .826 which is greater than .05 and should be referred to the first line of the table that assumes Equal variances. In the above table, the sig. (2- tailed) value is shown by the amount of .000 and this value is less than .05, which means that a significant difference was provided among the experimental group students before and after using CALL method considering their vocabulary knowledge. Through comparing the means of the experimental group members and level of significance in Tables 6 and 7, it was revealed that CALL had a substantial effect on learners' vocabulary development, so the first research hypothesis was rejected here. Tables 8 and 9 show the basic descriptive statistics of participants' vocabulary knowledge in the pretest immediate posttest phases.

Table 8. Descriptive statistics of control group

	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Pretest	40	29.25	.557	2.489
Posttest	40	56.20	.986	4.408
Valid N (listwise)	40			

Table 9. Descriptive statistics of experimental group

	N	Mean		Std. Deviation
	Statistic	Statistic	Std. Error	Statistic
Pretest	40	29.75	.606	2.712
Posttest	40	67.15	.582	2.601
Valid N (listwise)	40			

Tables 8 and 9 indicate the mean scores, standard deviation, and standard error of mean of the experimental and control groups. Mean scores of the experimental and control groups in the pre-test stage equal 29.75 and 29.25 respectively, which show that these groups have the same vocabulary knowledge in the pretest stage. Table 10 shows the independent sample t-test of both groups in the pretest stage.

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Table 10. Independent samples t-test: Pretest

	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
Equal variances assumed	.224	.639	-.607	78	.547	-.500	.823	-2.166	1.166
Equal variances not assumed			-.607	37.725	.547	-.500	.823	-2.167	1.167

In Table 10, the level of significance for both groups equals .639, which is more than .05, so it does not express a significant difference in pretest stage; which means that both group members had equal knowledge of vocabularies before they receive treatment. Mean scores of the experimental group in the immediate posttest equals 67.15 (SD= 2.601), while it is 56.20 for the control group (SD= 4.408). Comparing the mean scores of the experimental and control groups in the immediate posttest stage indicates a considerable difference. It signifies that there is a significant difference between the experimental and control groups' mean scores on the posttest of vocabulary knowledge test. Learners in the experimental group gained higher scores in the posttest than learners in the control group. In order to test this hypothesis correctly, the independent sample t-test was used. Table 11 shows the independent sample t-test of both groups in the posttest stage.

Table 11. Independent samples t-test: Posttest

	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
Equal variances assumed	6.811	.013	-9.568	78	.000	-10.950	1.144	-13.267	-8.633
Equal variances not assumed			-9.568	30.800	.000	-10.950	1.144	-13.285	-8.615

Table 11 reveals the participants' performance on the posttest with respect to vocabulary development. The significance level in Leven's Test for Equality of variance shows .013 which is less than .05 and should be referred to the second line of the table that not assumes Equal variances. In the table of t-test for Equality of means, the sig. (2-tailed) value is shown by the amount of .000 and this value is less than .05, which means that there was a significant

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difference between the experimental and control groups in the posttest. By comparing the means of the experimental and control groups and level of significance in Tables 8, 9, 10, and 11, it was revealed that CALL had a significant effect on learners' vocabulary development, so the second research hypothesis was also rejected.

5. Discussion

The present study investigated the effect of using CALL on intermediate EFL learners' vocabulary learning. This section discusses the findings of the research. The results of this research are consistent with the previous studies such as the one by like Kilickaya and Krajk (2010), Jafarian et al. (2012), Wang et al. (2015), Taki and Jafari (2017), and Hashemifardnia, Namaziandost et al. (2018) on the significance of vocabulary instruction using CALL in improving EFL learners' vocabulary learning. The first hypothesis of this study stated said that CALL does not have any significant impact on Iranian learners' vocabulary development. It was predicted that learners who learned new words through CALL would have the same performance in comparison with their past knowledge. The results of this study rejected this null hypothesis. The obtained results demonstrated that there was a statistically significant improvement in the vocabulary development observed in the experimental participants after a six-week instruction through CALL.

After collecting the data, the researchers used independent samples t-test to find the impact of CALL on learners' vocabulary learning. The results revealed that learners who received instruction by means of CALL had better performance compared to those who were trained traditionally. In other words, the findings statistically indicated that experimental group significantly outperformed control group ($p < .05$). Therefore, the second hypothesis of this study "CALL is not more effective than traditional methods in EFL learners' vocabulary learning" is rejected. This finding is supported by the findings of the study of Kilickaya and Krajk (2010), showing that online vocabulary learners outperformed the learners who were exposed to traditional teaching methods.

The above finding is in accordance with the findings of the study of Khazaei et al. (2011) who investigated the impact of traditional and CALL methods on Iranian learners' vocabulary learning. The findings indicated that learners who received learning content by web-based approach were much better than learners who received it traditionally. The above finding has also been supported by the findings of Pahlavanpoorfard and Soori (2014), Wang et al. (2015), and Hashemifardnia et al. (2018), indicating that the experimental group had a better performance than that of the control group, and learners in computer group learned more vocabulary than learners in traditional group.

The positive effect of using CALL was indicated in the experimental group's performance. Through CALL, the researchers exposed learners to more comprehensible and authentic input and, as a result, learners learned more vocabulary items. Using CALL increases learners' motivation, self-confidence, and involvement in learning that results in mastery of language skills. It is more oriented towards learner-centered learning and interactivity (Hashemifardnia et al., 2018). Through using CALL, learners could have more interaction with each other and this interaction led to learning vocabulary effectively. The above finding is in tune with the findings of Tamjid and Moghadam (2012), investigating the impact of Narsis software on Iranian learners' vocabulary learning. The findings of this research revealed that the experimental group outperformed the control group in vocabulary learning.

Teaching with CALL helped the participants to perform better and develop their vocabulary knowledge significantly. The results of this research indicated that there existed a positive relationship between CALL and vocabulary development. Another finding of the study was that CALL is more effective on vocabulary learning rather than the traditional method. Obtained scores of both groups' posttest revealed that learners in the experimental group learned more words than learners in the control group. This finding is in line with the study of Shokrpour et al. (2019) who examined the impact of using computer-assisted vocabulary learning on vocabulary knowledge. The results demonstrated that learners who used computer-assisted vocabulary learning outperformed their peers in the control group.

The results of this study are compatible with the findings attained by Barani (2013). His study showed that there was a significant difference between CALL users and nonusers in favor of experimental group ($p < 0.05$). The findings of this study were also in line with the results of Naraghizadeh and Barimani (2013). The results of this research revealed that there was a significant difference between the experimental and control groups concerning their vocabulary knowledge. They perceived that the experimental group had a higher mean score than the control group. The above finding has also been supported by Wang, Teng, and Chen's (2015) study who studied the effect of iPad App on learners' vocabulary learning. The findings revealed that the experimental group who learned vocabulary through the iPad instruction performed better in the post-test than the control group.

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The findings of this study are not compatible with the results of Bagheri et al. (2012) who stated that there is no significant difference between CALL-based and non-CALL based methods of vocabulary instruction. The findings of the current research are partially different from the research which was carried out by Aryadoust and Lashkary (2009). They investigated the effect of teaching aids on Iranian learners' vocabulary knowledge. The results did not show any significant difference between the posttest scores of participants in two groups.

The findings of the current research are in contrast with the study of Ostovar-Namaghi and Malekpur (2015) who demonstrated the ineffectiveness of digital games in vocabulary learning. The above researchers mentioned above confirmed that the use of CALL is regarded as a distractive factor. The findings are also in contrast with the study of Nielson (2011) who used Rosetta Stone and Tell Me More to improve learners' language proficiency. The results showed that the learners didn't like to use the mentioned software because of the technological problems they caused for their autonomous learning. Contrary to our research, a study was conducted by Maftoon, Hamidi, and Najafi (2012) examined the impact of CALL on Iranian EFL learners' vocabulary learning. The findings revealed that the usage of vocabulary passage writing for computer users with teacher e-feedback did not increase their vocabulary.

6. Conclusions

The present study was designed to investigate the impact of CALL on vocabulary development of Iranian EFL learners. The research was conducted with 80 students in Parsian Institute at intermediate level. The participants' vocabulary learning performance in both experimental and control groups were collected and measured. The effect of using computer tools on vocabulary learning was determined via comparing the participants' performance in the pretest and posttest. The results of this research indicated that there was an interrelationship between CALL instruction and learners' vocabulary learning. Due to the fact that users of CALL had better performance in the posttest, we can conclude that CALL produced better results in vocabulary learning than common traditional vocabulary teaching method. The findings of the present study may have implications for both teachers and learners. CALL helps teachers and learners to realize the importance of computers in language teaching and learning. It makes vocabulary learning more attractive and enjoyable to learners.

The knowledge of how CALL theory affects various language skills enables teachers to find new methods of teaching by using different computer software and increase students' motivation and attitude to attend English language classes. This method can increase learners' motivation to learn and make learning process more meaningful. Computers can be used to improve other features of vocabulary knowledge. EFL teachers can use computers for some aims like promoting students' lexical competence, improving learners' reading and writing ability containing paraphrasing, spelling competence, and reading fluency. The successful performance of the experiment group of this study supports the much use of CALL in EFL classes. Computers present appropriate teaching individually to each learner; universities and schools can use CALL to assist their low-achievement learners and increase their learning. CALL instruction can help teachers make informed decisions as how to provide input for learners. The findings help materials developers and syllabus designers to consider the significance of CALL while planning textbooks and materials. Since CALL offers all materials for language items, teachers need not waste their time in preparing materials for vocabulary teaching.

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