Learning vocabulary electronically: Does computer assisted language learning (CALL) instruction have any impacts on Iranian EFL learners?

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Abstract: This study aimed to investigate the effectiveness of Computer Assisted Language Learning (CALL) on Iranian EFL learners' vocabulary learning. Furthermore, this study was an attempt to explore if there is any difference between the impact of CALL instruction on Iranian male and female EFL learners' vocabulary learning. Therefore, 50 homogeneous male and female participants were selected. The instruments were the Quick Placement Test of Oxford University Press and University of Cambridge Local Examinations Syndicate, version 1 (2001) and two vocabulary achievement tests were administered as pre- and post-test. After the homogeneity test was employed, a pre-test was administered to participants of both groups. The experimental group underwent 12 sessions in six weeks of instruction using CALL. Finally, a post-test was given to both groups. Descriptive statistics, independents samples t-test, and paired samples t-test were run to find the effect of CALL instruction on Iranian EFL learners' vocabulary learning. The results of paired samples t-test between pre-test and post-test of both groups of the study showed that the experimental group outperformed the control group. The results also indicated that there was no significant difference between male and female learners' vocabulary learning using CALL instruction.

Subjects: Computer Science; Education; Language & Literature

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PUBLIC INTEREST STATEMENT
Technology has various impacts on human activities and education is not an exception. Computers, corresponding to other forms of technology, are associated to people’s lives and jobs and have many roles in our modern life. In recent years, computer assisted vocabulary learning has drawn the attention of teachers and researchers and has been considered as one of the essential applications of CALL. This can be considered as a new facilitating tool for vocabulary instruction in educational contexts.
Keywords: Computer Assisted Language Learning (CALL); multimedia; vocabulary learning; EFL learners; learning English in computer

1. Introduction
Technology has various impacts on human activities and education is not an exception. Computers, corresponding to other forms of technology, are associated with people’s lives and jobs and have many roles in our modern life. In recent years, computer assisted vocabulary learning has drawn the attention of teachers and researchers and has been considered as one of the essential applications of computer assisted language learning (CALL). This can be considered as a new facilitating tool for vocabulary instruction in educational contexts.

Computer-assisted language learning (CALL), British, or Computer-Aided Instruction (CAI)/Computer-Aided Language Instruction (CALI), American, refers to the search for and study of applications of the computer in language teaching and learning. CALL consists of a wide variety of applications and approaches to teaching and learning foreign languages, from the “traditional” drill-and-practice programs that characterized CALL in the 1960s and 1970s to more recent manifestations of CALL, as used in virtual learning environment and distance mobile-assisted language learning (MALL) learning. It also extends to the use of corpora and concordances, interactive whiteboards, etc. Many researchers believed that computer technology is the ideal tool to enhance the students’ learning in English. Beatty (2003) defined CALL as “any process in which a learner uses a computer and, as a result, improves his or her language” (p.7). Tabar and Khodareza (2012) mentioned that the appearance of CALL provided new insight into vocabulary learning. According to language researchers (Chapelle, 2001; Gunduz, 2005; Hubbard, 2009; Timucin, 2006), the impact of computer assisted language learning (CALL) on vocabulary achievement is salient. Merely using computer-mediated technology in the field of education is not the main issue; instructors need to grasp how CALL can best be applied to the presentation of effective instruction to language learners (Chapelle, 2001). Based on Teo’s study (2006, p.19), “students’ attitudes towards computer have an influential role in their acceptance to apply the computer as a learning instrument and their future behaviors towards the computer, for example using it for further study and vocational purposes.” As Celce-Murcia (2002, cited in Barani, 2013) pointed out “vocabulary learning has been the headache of the second language learners and is central to language acquisition, whether the language is first, second, or foreign” (p.513). Hoven (1999) argues that there are different terms related to CALL. CALL is known as Computer-Aided Language Learning (CALL), Computer-Assisted Language Instruction (CALI) and Computer-Enhanced Language Learning (CELL).

Based on the study conducted by Gunduz (2005), the technology of computer has been used in different fields for foreign language teaching and learning. Afshari, Bakar, Luan, Samah, and Fooi (2009) mentioned that using computers not only increases instructional effectiveness, but also provides positive social interactions and enhances the students’ desire and motivation for learning. Nowadays, the emergence of technology makes a sweeping change in the traditional way of learning and teaching (Kung & Chuo, 2002).

Due to the positive impact of CALL in the process of teaching English, applying it properly in any educational context can optimize the students’ concern and motivation in learning English. This new technology of CALL increasingly has become an important part of the language-learning process and educational settings in the past decade. CALL has given man changeability in many fields, and seems to be the most important representation of technology for today. According to Chapelle (2001), CALL is often utilized to refer to a particular area of technology and also second language learning and teaching. The role of computer in CALL which is an approach to language learning and teaching is as an aid to presentation and also an assessment of the material to be learned.

1.1. CALL and vocabulary learning
Recently, besides reading comprehension and the relationship between vocabulary development and reading comprehension, the effect of extended use of computers on vocabulary acquisition...
has been examined in most of the studies. According to Ellis (1995) and Goodfellow (1995) as to research or reading skill development, substantial attention has been given to vocabulary learning in CALL. Although the role of vocabulary knowledge in second and foreign language acquisition has long been neglected, vocabulary is recently receiving increased emphasis in the language teaching curriculum. Based on the studies of Carter and Nunan (2001), “this is 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”. Tazczu and Coady (2004) proposed that “learning vocabulary is an important aspect of SL/FL acquisition and academic achievement and is vital to reading comprehension and proficiency, to which it is closely linked”.

McCarthy (1988) argues that “the major part of the meaning of any language in learning a second language is the amount of vocabulary one possesses.” Many scientists (Coady & Huckin, 1997; Harley, 1996; Nation, 2001) believe that the crucial element of the second and foreign language proficiency is vocabulary learning. Krashen (1989) argues that “the meaning is conveyed by words and a major obstacle in using the second language effectively is lack of vocabulary.” According to Carter (1998), “vocabulary was neglected in second language researches, as a result of syntax and phonology domination in this field. Moreover, vocabulary presentation seems to be a difficult task for syllabus designers because of its infinite nature” (p. 184). But the last decades have seen a change of attitude towards vocabulary and now vocabulary is in the top of any second language learning and teaching. Laufer (1997) mentions that “vocabulary is no longer a victim of discrimination in second language learning research, or in language teaching” (p. 147). Based on the studies of Jordens and Lalleman (1996) “vocabulary is more important than grammar because people generally use vocabulary and reduce grammar particularly when getting a message quickly and precisely” (p. 359). According to Hatch and Brown (1998), the foreign language learners’ requirements in every stage of the language learning process is most of the time greater than the requirement for grammatical rules. In this regard, he mentions that this is why most travelers take dictionaries not grammar books when going abroad.

Wilkins (1972) proposes that vocabulary is central to English language learning and teaching because without enough vocabulary, learners are not be able to understand or express their own opinions and attitudes. He also mentions that “While without grammar very little can be conveyed, without vocabulary nothing can be conveyed” (p. 111). According to Hulstjin (1993, as cited in Morin & Goebel, 2001), “teaching vocabulary should not only consist of teaching specific words but also should aim at equipping learners with strategies necessary to expand their vocabulary knowledge” (p. 45). Nation (2001) proposes that “vocabulary learning strategies are one part of language learning strategies which in turn are part of general learning strategies”.

Research on computer-assisted vocabulary learning has significant implications for CALL software design such as the presentation methods of on-line lexical resources and the effective use of verbal and visual information in reading instruction. However, Kaya (2006) found that there are no significant differences among electronic method, conventional and blended approaches in respect to the effect of them on the students’ outcome. Son (2001) asserted that “it is difficult to draw conclusions about the effects of electronic glossaries on vocabulary learning and reading comprehension because the computer-based assistance for delivering the meanings of words in each study was accompanied by different presentation methods” (p. 33). On the other hand, there have been some studies on the effectiveness of computer dictionaries on vocabulary acquisition or reading comprehension. For instance, Chun and Plass (1996) presented a study to explore the incidental vocabulary learning, and the examination of the effectiveness of multimedia annotations on vocabulary acquisition. The participants of this study were students in the second year of German who used Cyberbuch, a multimedia application offering various types of annotations (pictures, text, and videos). The results indicated that any type of annotations, according to which visual imageries that act as facilitators of reading comprehension, which stresses the
close relationship between vocabulary and reading comprehension was found to help the learning and retention of new foreign words.

According to Khoshnoud and Karbalaei (2015), the application of CALL while teaching vocabulary will considerably enhance vocabulary acquisition and participants who were elementary EFL learners performed better on the retention test than those who underwent the conventional method of teaching vocabulary as the result of learning language through real-life experience and actively engaged in the learning process. In another study Ghorbani and Jahandar (2015) found that the use of computer assisted vocabulary instruction had significant effects on the Iranian EFL learners’ word retention.

In line with other researchers, Eizadpanah, Abedi, and Ghaedrahmat (2014) believed that Computer Aided Vocabulary Learning (CAVL) had positive impacts on the intermediate EFL learners’ vocabulary achievement and it was concluded that long—term memory enhanced through E-learning. They found that during the instruction period, the learners themselves discovered that they benefited from instruction through e-learning.

To support the previous study, Talarposhti and Pourgharib (2014) conducted a study to explore CALL research on vocabulary acquisition. It discusses the use of computer for lexical skill development in terms of linking CALL with vocabulary acquisitions and searching for effective ways to use CALL in vocabulary instruction. The results showed that the experimental group performed significantly better than the other group in a retention test. This suggests that the presentation of vocabulary with visual, aural, and sentence contexts in computer-assisted learning environments would enhance vocabulary learning and teaching. (Talarposhti & Pourgharib, 2014)

Moreover, the study conducted by Barani (2013) further supported the above-mentioned investigations as in this study, the results indicated the central role of CALL instruction in enhancing vocabulary achievement in the context of EFL learning and teaching.

Naraghizadeh and Barimani (2013) investigated the effectiveness of CALL on Iranian EFL learners’ vocabulary learning in two institutes in Tehran, Iran, as compared to those students receiving traditional instruction using the printed text materials. The results confirmed that CALL instruction improved EFL learners’ knowledge of vocabulary. In terms of vocabulary knowledge, the experimental group was outperformed in this study. In this line, Hirschel and Frits (2013) investigated the short and long-term effectiveness of two popular but little researched vocabulary learning approaches: 1) vocabulary notebooks and, 2) a Computer Assisted Language Learning (CALL) program with spaced repetition. In the light of the findings of the study, similar statistically significant gains were indicated, in terms of increases in vocabulary scores, from the pre- to post-tests for both the CALL and vocabulary notebook groups. In terms of longer term gains, the CALL group performed slightly better.

Since developing vocabulary is an integral element of language learning, some researchers ((Boers, Eyckmans, & Stengers, 2004; Goodfellow, 1994; Groot, 2000) have tried to make computer programs that can facilitate vocabulary learning. Kitajima (2001) mentions that vocabulary can be considered as an element which plays a crucial role in language learning. He also states that words label concepts, objects, and actions, and without knowing words speakers are not able to express their intended meanings. Many researchers (Nation, 1982; Zimmerman, 1997; Laufer & Shmueli, 1997; De Bot, Paribakht & Wesche, 1997) argue that knowledge of L2 vocabulary plays a significant role in language learning.

1.2. Statement of the problem
Since English is an international language and is being used widely in many aspects of life, investigating different ways to improve learning English as a foreign language is essential. It is clear that students in EFL contexts, such as Iran, do not have a good chance of exposure to the English language; therefore, have significant problems in using the language, whether in the
spoken or written form. However, they have received several years of formal English instruction. Vocabulary learning plays a crucial role in terms of learning a new language. Learning vocabulary is done by different methods. Some students memorize word lists without any attention to their pronunciation hints, but learning vocabulary in isolation is a useless job since they have lack of knowledge of the usage. In other words, they are not able to remember the previously learned items and use them in appropriate context; thus, one of the major concerns is the need for developing effective pedagogical methods for the teaching of second language vocabulary.

Despite all the studies being conducted so far, still an urgent need is felt for more research to provide a clear vision of the impacts of E-learning on vocabulary achievement. Most of the previous studies have investigated the efficacy of the application of a single CALL courseware to advance and enhance the learners’ English language skills. Finally, as the literature review indicated, not many studies to date have conducted a comparative study measuring the extent to which gender differences affect e-learning. The ultimate objective of this study was, therefore, to attempt to contribute and fill this gap.

1.3. Definition of key terms

1.3.1. Computer-aided language learning (CALL)
CALL is an extensive term that consists of all aspects of computer implementations in language classes. Hewer (2007) suggests that CALL includes the usage of technology in the form of computers ranging from software to the Internet. According to Beatty (2003), the description of CALL that accommodates its changing nature is “any process in which a learner uses a computer and, as a result, improves his or her language” (p. 7). Based on the studies of Afshari (2009), “computer technologies can enhance interpersonal and communication skills and provide opportunities for cooperative learning” (p. 86).

1.3.2. Vocabulary learning
Vocabulary teaching/learning is a fundamental area that is worth paying particular attention. According to Kitajima (2001), a speaker cannot clearly express intended meanings without words that label objects, actions, and concepts. Based on the studies of Celce-Murcia (2002), vocabulary learning has been an integral part of the second language learning and is crucial and essential to language acquisition, whether the language is first, second, or foreign. Wilkins (1972) points that “… while without grammar very little can be conveyed without vocabulary nothing can be conveyed” (pp. 111–112).

1.3.3. Multimedia
Mayer (2005) defines multimedia as demonstrating words as spoken and/or printed text, and pictures such as illustration, photos, animation, or video. According to Freeman (1996), multimedia technology is “somewhat similar to a traditional textbook in terms of holding information and has the potential and functionality to hold enjoyment for users compared to that of a standard textbook” (p.77). Wang (2006) believes that based on the Krashen’s input hypothesis multimedia gadgets supply deeper comprehension through the combination of audio- and visual input in the process of second and foreign language learning.

1.3.4. Traditional instruction
According to Boumová (2008), “traditional methodology is based largely on a reduction of the integrated process of using a foreign language into sub-sets of discrete skills and areas of knowledge. It is largely a functional procedure which focuses on skills and areas of knowledge in isolation” (p.10). In this regard, traditional pedagogical methods for vocabulary learning include word-lists, dictionary use, workbooks, teacher-made materials, and group discussion. Since “It is … necessary that a large number of words be learned in a short period of time at the intermediate and advanced stages of language acquisition” (Groot, 2000, p.61), making bilingual word lists seems an attractive shortcut because it takes less time than contextual presentation and causes
excellent short term results; therefore, in traditional instruction using these methods for teaching and learning vocabulary is so common.

1.4. Research main questions
This empirical study, therefore, attempts to pose the two research questions:

(1) Is there any significant relationship between CALL instruction and Iranian EFL learners’ vocabulary learning?
(2) Is there any difference between the impact of CALL instruction on Iranian male and female EFL learners’ vocabulary learning?

Therefore, based on the research questions of this study, the following two hypotheses are posed:

(1) There is not any significant relationship between CALL instruction and Iranian EFL learners’ vocabulary learning.
(2) There is no difference between the impact of CALL instruction on Iranian male and female EFL learners’ vocabulary learning.

2. Materials and method

2.1. Design of the study
The present study employed an experimental design; it includes one experimental group as well as a control one. In the present study, a pre-test with 45 items, including 10 cloze items, and 35 multiple choices, was used. The pre-test was conducted at two different private language institutes in Shiraz, Iran. The subjects were assigned to the experimental and control groups. For six weeks, the experimental group was exposed to teaching vocabulary in a computer class. The control group subjects were taught through traditional approach to learning vocabulary and received no instruction using CALL. In fact, the experimental group was exposed to treatment for six weeks. Finally, a post-test was given to both groups.

2.2. Participants
The participants in this study were fifty Iranian intermediate EFL learners (10 male and 40 female) who were learning English at two different private language institutes in Shiraz, Iran. Indeed, sixty students participated in the Oxford Quick Placement Test (2001) which was used in this investigation as a proficiency test. Through this homogenizing test, 50 out of 60 participants were found homogeneous and they were selected as the sample of the study. The participants’ age ranged from 19 to 21 years. All the participants’ mother tongue was Persian and they studied English as a foreign language. Then, they were randomly assigned to the two equal groups (experimental and control groups), each consisting of 25 participants.

2.3. Instruments
In order to collect the data, three instruments including a language proficiency test or placement test divided into two sections (placement test and demographic information), vocabulary levels test and computer laboratory for using electronic dictionary were used to collect the data.

2.3.1. Language proficiency
Quick Placement Test of Oxford University Press and the University of Cambridge Local Examinations Syndicate (2001), version 1, was used in order to homogenize the participants in terms of their English language proficiency. This multiple-choice test is divided into two parts including 8 sections with a total of 60 items and 45 minutes time allotted for the participants to answer. The extent the employed test was standard regarding reliability index was measured through estimating Cronbach’s alpha. The obtained reliability was 0.91.
2.3.2. Vocabulary levels test
The vocabulary test was designed for pre-testing and post-testing. The test was designed by the researcher through selecting different vocabulary items from standardized proficiency tests, such as Nelson English language test and TOEFL. The vocabulary items included content words, such as nouns, verbs, phrasal verbs, adjectives, and so on, consisting of different types of passive and active items essential for speaking and oral communication. The test consisted of 45 items, including 10 cloze items, and 35 multiple choices.

2.3.3. Computer laboratory
The computer laboratory was used to facilitate learning, saving the time and learning new vocabularies in different sentences with correct pronunciation by applying the electronic dictionary.

2.3.4. Procedures
At first, to make the participants homogeneous, a pre-test was used. As a result of the test, the participants with one standard deviation above or below the mean were selected to participate in the present study; therefore, they were divided randomly into control and experimental groups.

Then, a pre-test consisting of a 45-item pre-validated vocabulary test was given to both groups of participants (control and experimental). After that, the experimental group underwent the treatment for six weeks, while the control group received no treatment. The treatment comprised of teaching vocabulary on computers. To this end, while reading, the learner was able to choose words from the text and place them in a word box at the top of the screen. After reading, the learner could return to the items in this word box and create exercises from them using the program available on Tom Cobb’s website. This included gap-filling activities in the form of a concordance quiz, retrieval activities and spelling activities. At the end of the course, in order to see the effect of using technology in learning vocabulary, again the candidates participated in another test as a post-test. Finally, the results of the pre-test and post-test were compared through a t-test and a percentage rate.

2.4. Data analysis
In order to analyze the data, Statistical Package for Social Sciences (SPSS) software was used. To find the effect of explicit teaching of vocabulary by using the computer, descriptive statistics (means and standard deviations) were used to describe data collected throughout the research process; also, independent samples t-test was applied to illuminate the significant differences existing between the control and experiment groups. Finally, in order to reveal the relationship between male and female students and the impact of CALL instruction on their vocabulary learning, a t-test was run.

3. Results
In order to examine if the differences among the groups in the pre-test are statistically significant, independent samples t-test was used. The results for both experimental and control groups are presented in Table 2.

3.1. Descriptive statistics for pre-test
A vocabulary test taken from the IELTS exam was used as a pre-test to see if the control and experimental groups’ vocabulary level was similar. Then, the obtained data were analyzed. Table 2 shows descriptive statistics for the control and experimental groups’ scores in the pre-test.
As shown in this Table, the means and standard deviations for experimental and the control groups are presented, respectively.

According to Table 3, the mean differences for both experimental and control group in the pre-test were 5.1333 and 5.1333, respectively. The P value was also higher than .05; therefore, no statistical significance was found among the groups in terms of the students’ performances in the pre-test. In other words, all the students at the beginning stage were similar in their English language proficiency level.

3.2. Control group
A paired samples test was applied to see if there was a significant difference between the mean scores of the control groups in both pre- and post-tests. The results are presented in Table 4.

The results indicated that there was no significant difference between the participants of the control group in their performance in pre-test and post-test ($t = 1.203$, $p > 0.05$).

3.3. Experimental group
To examine whether the difference between the mean scores of pre-test and post-test of the experimental group is significant or not, paired samples test was used and the results are shown in Table 5.

As Table 5 indicates, a statistically significant difference was found between the performance of the experimental group in the pre-test and post-test, ($t = -1.660$, $P < 0.001$).

3.4. Post-test
To identify the significance of the difference between the post-test mean scores of the experimental and control groups, independent samples t-test was applied. The findings are shown below.

As Table 6 indicates, a statistically significant difference was found between the groups ($P < 0.05$). Thus, it can be concluded that this difference can be the result of explicit teaching of vocabulary, as the experimental group in the post-test performed better than the control group.

3.4.1. Comparison of the male and female learners in the experimental group
In order to investigate the second research question and the null hypothesis of the study, independent samples t-test was used to compare the means of the male and female learners in the experimental group to see whether there was any significant difference between male and female learners vocabulary learning when they applied CALL application or not. The results are shown in Table 7.

According to Table 7, in the post-test there was no significant difference between male and female learners’ means ($t = .308$, df = 48, sig. (2-tailed) = .681). It means that there was not a significant difference between male and female learners’ vocabulary learning, using CALL application. Therefore, the second null-hypothesis of the study was accepted.

| Table 2. Descriptive statistics for the control and experimental groups in the pre-test |
|-----------------------------------------------|----------|----------|-------------------------------|
| N | Mean | Std. Deviation | Std. Error Mean |
|---|------|----------------|------------------|
| Pretest Experimental | 25 | 79.9333 | 2.8652 | .7398 |
| Control | 25 | 74.8000 | 18.7928 | 4.8522 |
| Total | 50 | 77.3666 | 10.8440 | 2.7813 |

As shown in this Table, the means and standard deviations for experimental and the control groups are presented, respectively.
Table 3. Results of independent samples t-test of the experimental and control group in the pre-tests

|                     | 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  |
| Pretest             |         |         |        |      |               |                  |                          |        |        |
| Equal variances assumed | .316   | .576    | -1.103 | 28   | .279           | 5.1333           | 4.1124                      | -4.95131 | 1.48465 |
| Equal variances not assumed |         |         | -1.103 | 21.267 | .282 | 5.1333 | 4.1124 | -4.99784 | 1.53117 |

Table 4. Paired samples test on the mean score of pre-test and post-test for the control group

| Paired Differences | Mean   | Std. Deviation | Std. Error Mean | 95% Confidence Interval of the Difference | T   | df | Sig. (2-tailed) |
|--------------------|--------|----------------|-----------------|------------------------------------------|-----|----|----------------|
| Pair 1 pretest—posttest | 76.8333 | 10.6480        | 2.7492          | -1.41002 to 5.01002                      | 1.203 | 14 | .249          |

a. GROUP = control
Table 5. Paired samples test on the mean score of pre-tests and post-tests for the experimental group

| Paired Differences                 |     |     |                   | t   | Df | Sig. (2-tailed) |
|-----------------------------------|-----|-----|-------------------|-----|----|----------------|
| Mean                              | 85.1666 | 3.5010 | Std. Error Mean | -6.87647 | .87647 | -1.660 | 14 | .000 |

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https://doi.org/10.1080/2331186X.2019.1702827
| 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 |
|---|------|---|----|----------------|----------------|---------------------|-------|-------|
| Posttest | Equal variances assumed | .509 | .481 | -3.908 | 28 | .001 | 90.4000 | .42174 | -9.96109 | -3.10558 |
| | Equal variances not assumed | -3.908 | 27.495 | .001 | 78.8667 | .42174 | -9.95825 | -3.10841 |
Table 7. Independent samples t-test of the male and female learners in experimental group’s post-test

| Levene’s Test for Equality of Variances | t-test for Equality of Means |
|-----------------------------------------|-------------------------------|
| F           | Sig.  | T    | Df | Sig. (2-tailed) | Mean Difference | Std. Error Difference | 95% Confidence Interval of the Difference |
|---|---|---|---|---|---|---|---|
| Posttest | Equal variances assumed | .809 | .681 | .308 | 48 | .751 | 89.2251 | .42174 | −1.14379 | −1.14379 |
|            | Equal variances not assumed | .308 | 46.19 | .749 | 89.1534 | .42174 | −1.14666 | −1.14666 |
4. Discussion

As to the first research question, based on the results shown in Table 2, there was no significant difference between the control and experimental groups \([F = 0.316, P > .05]\). In other words, the experimental groups did not perform better than the control group in answering the comprehension questions on pretest. As shown in Table 4, the difference between the mean scores of the control group in the pre- and post-test was not statistically significant \((P > .05)\). In this regard, Table 5 illustrates the difference between mean scores in pre- and post-test for the experimental group after the seven week treatment. To find the supporting details, the pair sample t-test showed that the gained t was \(−1.660\) and p-value was 0.000. This indicated that there was a significant difference between the performances of the experimental group in pre- and post-test. As to the first research question, “is there any significant relationship between CALL instruction and Iranian EFL learners’ vocabulary learning”, it was found that CALL instruction had a significant effect. So, the null hypothesis presented in this study was “there is not any significant relationship between CALL instruction and Iranian EFL learners’ vocabulary learning”. There was a difference between mean scores of the experimental and control groups in their performance in post-test although they were the same in the pre-test. Also, this difference between the mean scores was statistically significant \((P < 0.0001)\); thus, explicit teaching and using of CALL instruction had a great effect on the experimental group which was not seen in the control group. Hence, the first null hypothesis in the present study was rejected.

In the current study, in order to answer the second research question which asked if there is any significant difference between male and female learners’ vocabulary learning when they used CALL application or not, independent samples t-test was used. As shown in Table 7, there was no significant difference between male and female learners’ mean scores. It means that there was not a significant difference between male and female learners’ vocabulary learning, using CALL application. Therefore, the second null hypothesis was accepted.

In light of the results, the answer to the research questions is now presented. The mean scores of students in vocabulary test performance at the beginning for both control and experimental groups were the same but the results indicated that after some weeks of treatment, the mean scores of the participants in vocabulary test performance for the experimental groups increased, while the control group had somehow the same performance as it had at the beginning.

On the other hand, there was no significant difference between the control and experimental groups in the pre-test \([F = 0.316, P > .05]\). In other words, the experimental groups did not perform better than the control group in answering the comprehension questions in the pre-test. Table 4 displays the difference between the mean scores of the control group in the pre- and post-test; however, it was indicated that this difference was not statistically significant \((P > .05)\). In this regard, Table 5 illustrates a difference between mean scores in pre- and post-test for the experimental group after the seven week treatment. To find the supporting details, the pair sample t-test showed that the gained t was \(−1.660\) and p-value was 0.000. This indicated that there was a significant difference between the performances of the experimental group in pre- and post-test. As to the first research question, “is there any significant relationship between CALL instruction and Iranian EFL learners’ vocabulary learning”, it was found that CALL instruction had a significant effect. Thus, the null hypothesis presented in this study was “there is not any significant relationship between CALL instruction and Iranian EFL learners’ vocabulary learning”.

Based on the results displayed in Table 6, there was a difference between mean scores of the experimental and control groups in their performance in post-test, although, they were the same in the pre-test. Also, this difference between the mean scores was statistically significant \((P < 0.0001)\); thus, explicit teaching and using of CALL instruction had a great effect on the experimental group which was not seen in the control group. Hence, the first null hypothesis in the present study was rejected.
In the current study, in order to answer the second research question which asked if there is any significant difference between male and female learners’ vocabulary learning when they applied CALL application or not, independent samples t-test was used. The related null hypothesis posed was: “there is no difference between the impact of CALL instruction on Iranian male and female EFL learners’ vocabulary learning”.

As shown in Table 7, there was no significant difference between male and female learners’ mean scores. It means that there was not a significant difference between male and female learners’ vocabulary learning, using CALL application. Therefore, the second null hypothesis was accepted.

To sum up, the results of the current study are in line with several previous studies. For example, those of Abbasi and Hashemi (2013), Naraghizadeh and Barimani (2013), Thornton and Houser (2003), Thornton & Houser (2005) also found using technology such as CALL application improves the learners’ vocabulary learning.

Abbasi and Hashemi (2013), for example, investigated the impact of using a mobile phone on English language vocabulary retention and found a positive effect on the students’ vocabulary learning. Thornton and Houser (2003); Thornton & Houser (2005) studied on using mobile phones in English education in Japan. The results indicated that the mean scores of students who used SMS in their learning process improved more than the students who had received their lessons on paper. In this regard, Naraghizadeh and Barimani (2013) examined the effectiveness of CALL on Iranian EFL learners’ vocabulary learning. The results of the study revealed that there was a significant difference between experimental and control group regarding their vocabulary knowledge. That is, CALL instruction improved EFL learners’ knowledge of vocabulary. Besides, the results also showed that the group who received Computer Assisted Language Learning outperformed in that study.

Likewise, Gorjian, Moosavinia, Ebrahim Kavari, Asgari, and Hydarei (2011) conducted a study to measure the impact of asynchronous computer-assisted language learning (CALL) approaches on high and low achievers’ vocabulary retention and recall of English as foreign language learners. The t-tests analyses indicated that high achievers to learn vocabulary in both retention and recall processes benefited from the CALL approach, while the low achievers just benefited in retention period. In a similar manner, Talarposhti and Pourgharib (2014) did a study to reveal the effect of CALL instruction on vocabulary acquisition and the results of data analysis revealed that in retention test (post-test) the experimental group outperformed the control group. This suggests that the presentation of vocabulary with visual, aural and sentence contexts in computer-assisted learning environments would enhance vocabulary learning and teaching.

In a study by Horst, Cobb, and Nicolae (2005), a set of online tools for vocabulary learning was created for an ongoing experimental project. The findings showed that the vocabulary learning on-line set created for the project was able to offer rich input and encourage deeper processing. Similarly, Jones (1999) also created a computer program called “Gertie” which was intended to promote effective vocabulary learning. This program integrated written texts, photographs, and sound. He found that the application was effective for the learners and was able to contextualize and personalize the learners’ learning processes on vocabulary. The findings of this study showed positive reactions from the learners and the possibility of computer use for vocabulary learning. The results of the study were also confirmed by Akbulut (2008). He noted that vocabulary learning was enhanced through using CALL (definitions, pictures, and short video clips) rather than in those students instructed by definition only.

Contrary to our study, a study was done by Maftoon, Hamidi, and Najafi (2012) to investigate the effects of CALL on vocabulary learning of Iranian EFL learners. The results showed that the use of related vocabulary passage writing for computer users with teacher e-feedback did not enhance vocabulary learning. Based on the studies of Basoz and Cubukcu (2014), some pre-service EFL teachers have negative attitudes towards CALL. For example, they do not believe that CALL helps
them develop their writing skills. They do not agree that learning a foreign language assisted by computer is as good as oral practice. Finally, they agree that CALL cannot stand alone. Pusack and Otto (1997) indicated that it is important to consider that students may have personal modes or combinations of modes that work best for them as individuals; thus, it is hard to assume that specific media will be put to the same use or have the same effect on all students.

Computers like other forms of technology are associated with people’s lives and jobs and have many roles in our modern life. CALL means the use of computer in the teaching or learning of a second or foreign language. Hewer (2007) argues that the trend of Computer Assisted Language Learning (CALL) in the area of modern language teaching and learning has got a high growth of popularity. Based on the results, there was a difference between mean scores of the experimental and control groups in their performance in post-test although they were the same in the pre-test. This difference between the mean scores was statistically significant ($P < 0.0001$); thus, explicit teaching and using of CALL instruction had a great effect on the experimental group which was not seen in the control group. Hence, the first null hypothesis in the present study was rejected automatically.

The result indicates that there was no significant difference between male and female learners’ mean scores ($t = .308$, $df = 48$, sig. (2-tailed) = .681). It means that by using CALL application there was no significant difference between male and female learners’ vocabulary learning. In line with our result in this part, the findings of a study conducted in Indonesia showed that both male and female students’ language learning strategies preferences were metacognitive strategies, and there was no significant difference in the language learning strategies preference between male and female students in learning English. (Ansyari & Rhami, 2019)

In line with this study, Chapelle and Jamieson (1986) investigated the use of computer in ESL classes. The findings showed that students who worked harder at learning English spent a lot of time using computers for their learning and had a more positive attitude toward it.

Similarly, the results of Ayres (2002) on ESL indicated positive attitudes towards the application of CALL among language learners since they “appreciate and value the learning that they do using the computers” (p. 247). It also reported that students believe that CALL is relevant to their needs; they agreed that CALL gives useful information, and also thought that more CALL should be used in their learning.

The findings of this investigation were in line with Yun-hong (2009) who evaluated university students’ attitudes towards the application of CALL in China. The finding revealed that ESL students had positive attitudes towards using computers to learn English. The results also indicated that the type of software used for CALL, teachers’ role, access to the internet, and computer literacy were the most important issues among them.

To support the findings of the previous studies, Rahimi and Yadollahi (2011) investigated Iranian female students’ attitudes towards CALL across levels of education. The results reported general positive attitudes towards CALL among their sample.

In line with this study, Barani (2013) conducted a study to reveal the effect of computer assisted language learning (CALL) on vocabulary achievement of Iranian university EFL learners. The results obtained throughout the study indicated that “there was a significant difference between CALL users and non-users in favor of the experimental group” (p.531).

4.1. Conclusion
The results of this study revealed that there was a significant association between CALL instruction and Iranian EFL learners’ vocabulary learning. Moreover, there was no significant relationship between the impact of CALL instruction on Iranian male and female EFL learners.
This study may be helpful in teaching and learning other languages especially for EFL teachers and students. The result of the present research can provide a full guidance for curriculum planners who believe in technology so that an evaluation of the effectiveness of approach to teaching the new technology in the process of learning a new language is somehow necessary. The scope of this study was only limited to vocabulary learning. It is suggested that in future research the scope be expanded in terms of other three important skills: writing, speaking and listening. There were some limitations in this study. One of them was the relatively small number of participants which was due to the problem of availability of learners. The representativeness of the participants, therefore, should be considered cautiously.

The limitations acknowledged for this study may affect the generalizability of the findings. The findings may not be generalizable all areas of the country since the learners may have different attitudes towards the influence of CALL on the students’ vocabulary learning. This study was also limited to the students’ vocabulary learning conducted in one city of Iran. It would be better to do the research in the domain of more than one province in Iran.

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