Impact of Using CALL on Iranian EFL Learners' Vocabulary Knowledge

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Abstract

Computer Assisted Language Learning (CALL) integration in EFL contexts has intensified noticeably in recent years. This integration might be in different ways and for different purposes such as vocabulary acquisition, grammar learning, phonology, writing skills etc. More explicitly, this study is an attempt to explore the effect of using CALL on vocabulary acquisition of EFL learners. It also discusses CALL applications for vocabulary instruction and searches for efficient methods to integrate CALL in vocabulary acquisition. For the discussion, it reviews the results of previous international and Iranian studies on CALL integration in vocabulary instruction to illustrate the state of research in this field. Based on the literature review, it is proposed that further research is required to find out the influences of CALL on different facets of vocabulary knowledge. At the end, some pedagogical implications have been offered for EFL teachers and learners.

Keywords: CALL, CALL application, vocabulary acquisition

1. Introduction

Computer technologies can be used in learning languages in different ways. Many computer facilities contribute to enhancing vocabulary development. Multimedia is one of the computer facilities which refer to computer-based systems that use various types of content, such as text, audio, video, graphics, animation, and interactivity. The key concepts of multimedia are thus computer-based and interactive.

Some research evaluated the overall value of ESL or EFL software programs for developing vocabulary and other sub-skills (AlKahtani, 1999; Busch, 2003; McGlinn & Parrish, 2002, as cited in Constantinescu, 2007; Yunus, Salehi & Nordin, 2012; Yunus et al, 2013; Yunus, Tuan & Salehi, 2013). More recent studies investigated the impact of extended use of computers or multimedia software on vocabulary and ESL writing improvement (Singhal, 1998, as cited in Constantinescu, 2007; Yunus & Salehi, 2012; Yunus et al, 2013; Yunus, Salehi & John, 2013). First, this article gives an overview of previous research on CALL-based vocabulary instruction. Then, it discusses the use of different tools and software which have already been applied in vocabulary learning process. Priority of CALL application in vocabulary acquisition is the main topic that this article, based on previous studies, intends to emphasize. These studies can be classified into two groups of international and Iranian.

2. International Studies

In their study, Reinking and Rickman (1990) examined the impact of exhibiting texts on a computer screen which presented the meanings of complex words on intermediate readers' vocabulary learning and comprehension. After they had been randomly allocated to four treatment conditions, the participants read two informational passages including several difficult words distinguished by teachers. In two conditions, they read the texts on printed pages with either a glossary or a dictionary including the difficult words. In the other two conditions, they read the texts on a computer screen that presented either elective or compulsory assistance with the meanings of the complex words. The findings revealed that participants who read texts with computer assistance scored meaningfully higher on a vocabulary test, and participants who read texts on the computer screen with compulsory assistance also outstripped other participants on a comprehension test. The researchers came to conclusion that reading comprehension can be enhanced when computer-mediated passages are

employed to develop or to control options for obtaining information.

Leffa (1992), in another CALL-based research in an EFL context, explored the influences of an electronic glossary on reading comprehension of authentic texts. The results of the study indicated that a computer-mediated electronic glossary was significantly more effective than a traditional bilingual dictionary, making beginning level students understand 38 percent more of the texts, with 50 percent less time.

Knight (1994) examined the impact of a computerized dictionary on incidental vocabulary learning and reading comprehension. To do this, university intermediate-level Spanish students were chosen as participants of the study. They were randomly allocated to two groups: dictionary access and no dictionary access. A computer was available for dictionary access group which was programmed to keep information of the number of words each student searched and the time each student devoted to reading a paper. The participants of no access group used ordinary method of learning for a specific period of time. Based on the results of the vocabulary tests and recall tests, Knight concluded that learners who benefited a computerized dictionary acquired more vocabularies than their peers in control group.

Kang (1995) conducted a research to study the influence of a context-embedded method on second language vocabulary acquisition. The participants of the study were elementary school students with basic knowledge of the English alphabet and sentence structure. The instructional methods used for vocabulary learning were: Paper and Pencil (P&P), Computer-based Word-for-word (CW), Computer-based word-for-word plus Picture (CP), and Computer-based Context (CC). The P&P condition signified a common way of vocabulary learning directed by a human instructor. The CW condition included the same definition used in the P&P but utilized a computer instead of a human instructor. In the CP condition, pictures were, furthermore, used with the characteristics counted in the CW. The CC condition put participants in a situation in which, first, the target English words occurred and then, the meaning of the word and an example sentence. The findings indicated that the experimental group had a better performance than the control group in a retention test.

Chun and Plass (1996) conducted three studies examining the impact of multimedia annotations on vocabulary acquisition. In these studies, participants were second-year students of German at three universities. The participants viewed a video that provided an overview of a German short story and then read the story and searched the meaning of each word by freely choosing any of the different kinds of annotations available in the form of text, video, and pictures. In all three studies, the participants could look up the words having been annotated in a multimedia program called CyberBush. To see the effect of multimedia annotations, after the treatment, the students took a vocabulary test. The results indicated a higher degree of incidental learning of vocabulary and meaningfully higher scores for words being annotated with pictures and text than for those with video and text or text only.

In a comparative study, Gan, Low and Yaakub (1996) investigated the impacts of computers in vocabulary acquisition. In this study, 48 participants were randomly selected and divided into the experimental and control groups. Both of the groups were exposed to the treatment, each under a special one. In the experimental group, the treatment was performed in two phases, each lasting five weeks. In each phase, the participants were engaged in five two-hour sessions of computer-mediated practices. In the control group, participants were taught the vocabulary in a usual way while the experimental group students were taught by both usual and computer-mediated methods. In addition to posttest, at the end of the treatment, a survey was managed to observe the students' attitudes towards the two methods of instruction. The results of the posttest revealed that vocabulary skills were more efficiently taught by the computer-mediated method than with the usual classroom instructional style. The information obtained from the questionnaire showed that the participants preferred computer-mediated method to be employed as an accompaniment to usual classroom instruction in vocabulary skills. The researchers deduced that computer-mediated method could develop the multi-context vocabulary learning experience.

Iheanacho (1997) explored the impacts of two multimedia CALL programs on vocabulary learning. Eighty six intermediate ESL learners took part in this study. They were randomly allotted to one of the two treatment groups. Participants of group one watched a program with motion graphics and text while participants in group two watched a program that had motionless graphics and text. They were supposed to study the names of tools and objects. After taking the pretest, both groups watched the video of the tools and sat for an immediate posttest and a two-week delayed posttest. The results showed no treatment effects. Additional analysis showed meaningful time effects but no meaningful interaction between the treatment and time. Participants who learned through motion graphics outperformed those who learned through motionless graphics regarding the recall tests.

In a study, Aist (2002) applied computer-assisted oral reading teach children vocabulary. He pursued a project

called "Listen's Reading Tutor", a piece of software that would modify automatic speech identification to listen to children reading aloud, and help them learn to read. In order to learn a word from reading with the Reading Tutor, learners needed to meet the words and realize the equivalence of the words in context. He compared the Reading Tutor with classroom training and with human-assisted oral reading as part of a yearlong study with 144 second and third graders. The researcher observed that second graders did about the same on word learning in all three conditions. Yet, third graders working with the Reading Tutor had a meaningfully greater performance than other third graders in a classroom control and even than the other third graders who read one-by-one with human-assistance.

In another study, Getkham (2004) examined the vocabulary development of two groups of students; one using computer program and the other using traditional printed texts. The findings showed that both groups enhanced their vocabulary knowledge after applying vocabulary practices but the students in both groups forgot some words after one month. Nevertheless, the amount of forgetting of vocabulary in the group using printed texts was more than that of the group using multimedia. This was proved by comparing the results of an immediate posttest and a delayed posttest. The researcher deduced that a computer program could make vocabularies long-lasted in students' minds.

Tozcu and Coady (2004) conducted a study to investigate the effect of using computer-assisted language learning (in directly vocabulary teaching) on word recognition speed, reading comprehension, and vocabulary knowledge. In this study, the research questions were: Do students who use computer-assisted vocabulary learning acquire the most frequently used words better than those in the control group? Does the students' reaction time decrease in detecting the words when they use computer-assisted vocabulary learning in acquiring high frequency words? Do students who use computer-assisted vocabulary learning in acquiring the most frequently used words indicate considerably developed reading comprehension than those in the control group? The researchers theorized that both native and non-native speakers have the same universal model in detecting the word. The participants in this study consisted of 56 students, all of them being in the intermediate level studying English for the academic preparation of the university. They were randomly allocated equally to the experimental and control groups. They were from Asia, Latin America, Europe, Russia, and the Middle East. One of the instruments employed in this study was a piece of software named "New Lexis". This software was based on three modes: Study, Practice, and Review. It comprised the 6400 most frequently used words in English. First, in the "Study" mode, words were displayed in the form of a list as the student could see the meaning of a word with sample sentences. Second, in the "Practice" mode, students could undertake five activities such as: selecting words, finding definitions, choosing missing words, spelling the defined words, and finally spelling the missing words. Third, in the "Review" mode, students had the choice to pick either a lesson of 20 words, or a list of words to revise for further study. In this treatment which lasted two months, students in both the experimental and control groups took pretests and posttests. In addition, at the end of the study, an analysis was managed to find out students' reactions towards the software. In order to measure their reaction time, participants completed both the pretest and posttest in the computer lab. The participants in the experimental group were requested to study 2000 words three hours per week for eight weeks, while the participants in the control group were inquired to read two articles (every week) and answer comprehension questions associated with these articles. The participants in the control group were using only reading comprehension in class. The results proved that students who used computer-assisted vocabulary learning in acquiring vocabulary outperformed their peers in the control group. Furthermore, their reaction time towards detecting the word and reading comprehension was better than the control group.

The main purpose of a study conducted by Akkoyunlu and Soylu, (2006) was to explore students' perceptions towards combined learning. The focus of this study was on the following points: students' perceptions considering the combined learning situation and students' views towards combined learning depending on their level of achievement and participation frequency to the forum. The number of participants taking part in this study was 64 students selected from the computer education and instructional technologies department in 2005 and 2006. Data was collected through the following measures: a questionnaire that was chiefly intended to elicit students' opinions regarding combined learning, open ended questions presented to students at certain periods, students' achievement scores, and records showing students' participation in online activities. Results showed that students enjoyed learning in a combined learning situation as their score improved. In addition, they had a positive attitude regarding using combined learning in classes. Accordingly, this means an enormously high significance of the usage of communication and interaction for the success achievements of online learning.

Johnson and Heffernan (2006) conducted a study to have a description of a software called "Short Reading" and the way it can be used as a device in improving vocabulary knowledge. Therefore, this study aimed to assess the

influence of reading on students' vocabulary comprehension in both audible and written forms. The participants in this study were 119 Japanese students and the most important instrument used in this study was "Short Reading" software which was planned to provide 112 vocabulary items to students through fifteen short readings. The main purpose of that software is repeating the target words for six times. For collecting the data, the participants were provided with a pretest in the first week and during the following seven weeks they were inquired to read two passages with vocabulary checks every week. In the pretest, the students were assessed after each reading on 10 randomly chosen words from the 112 words. The participants first read the fifteen short passages and by that time they were exposed to the target words for at least three times. The short passages comprised the target vocabularies where the students could click on any of them to see the definition, example, and image, if applicable. There were also circumstantial clues presented within the target vocabularies in order to boost the prediction of target words meaning. After reading each passage, the researchers measured students' comprehension concerning the target words. Then, believing that the target words need to be introduced to students after finalizing the reading and responding the comprehension questions, the researchers displayed some clips to the students in order to strengthen their long-term memory by being exposed to target words many times. Indeed, these clips covered 112 words which were utilized in the short passages. Finally, the posttest was administered to the students after completing the reading in the ninth week. They were also permitted to work on the short passages with the comprehension check vocabulary as they wished. The software showed students' extremely meaningful scores after being exposed to the "Short Reading" software. In other words, the participants' vocabulary knowledge improved after they exploited the software.

Ma and Kelly (2006) conducted a study to investigate the impact of a computer- assisted vocabulary learning software called "WUFUN" on vocabulary acquisition of Chinese students. In this study, the following research questions were posed: How much does WUFUN help Chinese students in acquiring difficult vocabulary both inside and outside the classroom? Does WUFUN assist students in learning vocabulary? What is the students' evaluation regarding WUFUN? What were students' attitudes regarding the results of their learning? In this study, the data was collected from two groups of freshman students at three different universities. Thirty five low intermediate students constituted the participants. The first group contained 17 volunteered students, while the second one comprised 18 students that had been deliberately selected by their teacher; the second group underwent the experiment. The experiment was conducted in eight stages as follows: pre-productive and receptive tests, pre-questionnaire, software usage, post-questionnaire, post-productive and receptive tests, and finally an interview. The interview was conducted among only those who used the software to elicit their attitudes about it. First, a pretest was administered to students. This test included both receptive and productive activities. In order to ensure that the participants did not know the target words, students took receptive and productive tests before using the software. Students were presented with a pre-questionnaire, before using the software, in order to find about their learning strategies and their anticipations regarding using the software. Second, in order to enhance the students' background information, they were provided with a description of the context. Then, students were presented with a number of target words listed in a mini dictionary with collocations, words in sentences, translation, definition, and pictures. Moreover, students listened to a sentence and were inquired to make a mental picture concerning it. Actually, students were presented several clues to remember the word; affixes, roots, or any connections with other words could be of such clues. Researchers aimed to use various assistances to help students memorize words, taking into consideration their different learning styles. Besides, to become familiar with the target words, students were asked to complete different exercises. These exercises included: synonyms, acronyms, and collocations. These exercises had to be repeated more than once. Third, students were provided with idioms. Indeed, the participants found idioms intricate as their meanings were subtle. Hence, the researchers helped students in learning these idioms by presenting them pictures related to the meaning popping up with a voice describing them. Finally, the same tests were administered to students after using the software to recognize their vocabulary improvement and a post-questionnaire was given to students, after using the software, in order to identify their statements and ideas for increasing the software usage in meeting their needs. The results of the study showed that computer-assisted vocabulary learning i.e., "WUFUN" was effectual inside and outside the classroom. Students distinguished intricate words better from "WUFUN"; the receptive learning amount was limited than the productive learning amount and the majority of students had positive attitude towards the use the software to learn vocabulary.

In a study conducted by Al-Jarf (2007) in Saudi Arabia, the effect of online instruction on vocabulary development was investigated. To this end, 53 EFL female freshman students of King Saud University were chosen to participate in an online learning program done at home, as a supplement to classroom instruction. They were concurrently taking listening, speaking, reading, writing, and grammar courses in EFL. The participants were all Saudi and native speakers of Arabic. In this study, all of the students were registered in the online course.

Registration in the online course was noncompulsory, since all the students had no earlier experience with online instruction because of administrative limitations. The vocabulary course lasted for 12 weeks. All the students were under the same traditional in-class instruction, studying the same textbook. The students did most of the vocabulary exercises in class. Only errors engaged in the rule or topic under study were underlined. Feedback was given on the occurrence and location of errors but no correct forms were supplied. In addition to the traditional in-class instruction, the students exploited an online course. Vocabulary websites (hyperlinks) related to the vocabulary topic covered in class were added in "Link Sharing". The links comprised explanations, examples, exercises and quizzes, and daily vocabulary lessons. The students checked the specific vocabulary links posted, responded the quizzes, and were motivated to check the daily vocabulary lesson. The students were required to write a paragraph utilizing the vocabulary items reviewed in the textbook. Throughout the semester, the author served as a facilitator. She presented technical support on utilizing the various modules of the online course. At the end of the course, all of the students sat for a posttest and answered an open-ended questionnaire to know their attitude toward the program. The results of the study indicated that online instruction had an impact on vocabulary improvement. The use of technology at home and even as a supplement to traditional classroom techniques enhanced EFL students' learning motivation. It was found that active and inactive students were significantly different in vocabulary achievement. Achievement in active students improved as a result of exposure to online instruction. This means that the use of online instruction proved to be a powerful tool for improving students' achievement in vocabulary. Moreover, online instruction raised the good and average students' performance and the lowest-performing students' performance as well.

Christensen, Merrill, and Yanchar (2007) conducted a study to compare the effects of two pieces of software; Computer-Assisted Vocabulary Learning (CAVL) software which was based on the diglot theory ("di" means two and "glut" means language) and the other complex computer software application on the acquisition of vocabulary. In this study, the following research questions were raised: Does the diglot method develop the acquisition of vocabulary learning more than an ordinary complex computer-based drill program? Does the diglot approach intensify the development of vocabulary more than an ordinary complex computer-based drill program? Does the diglot approach seem to be more appealing to students than an ordinary complex computer-based drill program? Two important pieces of software were used in this study; first, the "diglot reader" software contained fifteen chapters including a list of 5417 words. A total of 326 Spanish words existed in these chapters. This software included texts written in English with underlined Spanish words. A new Spanish word was shown every fifteen words in the text. The participants could see and hear English translation and pronunciation of Spanish words respectively. The participants were first inquired to read a story written in English with Spanish words. Second, computer-based drill program software contained Spanish words in the form of a list with its English translation through electronic flash cards. It included words in isolation without context. Using this software, the participants were able to choose the proper English equivalences from among the provided choices. Getting immediate response and listening to the native pronunciation of the Spanish words were among the features of this software and moving the word from the practice section to the review section and vice versa was another feature of this software. In this study, the data was collected from 27 volunteer students registered in a big private university taking preliminary Spanish courses. Most of the participants were female. Twenty seven participants were randomly assigned to two treatment groups. The first treatment group used the diglot method while the second group used the computer-based drill method. In the first session, both groups were presented the vocabulary test as a pretest. Next, they were requested to apply the method which they were allotted to. The treatment lasted for one week and the students practiced for three sessions, 50 minutes each. Students were, then, inquired to complete a posttest and then an affection questionnaire. The findings of this research indicated that both groups functioned correspondingly when using both the diglot reader and the computer-based drill method. Yet, the students were more absorbed with using the diglot reader than the practice program. They also declared that the diglot reader increased the usage of vocabulary since it contextualized vocabulary learning.

The major goal of Stockwell's study (2007) was to examine the impact of using mobile technology on vocabulary acquisition. In this study, the researcher focused on the following research questions: Do students prefer using the mobile or the computer for vocabulary learning? Are there any differences between the activities implemented on the mobiles and those implemented on the computers? What are students' attitudes towards using mobiles in vocabulary learning? Participants contained 11 students learning English language at Waseda University. The data was gathered through students' logging into the system and an inquiry. The data, regarding students' logs, included the following: exercise scores, the number of attempts logging into the system, time spent on each exercise, and the platform used (mobile versus computer). At the end of the semester, an analysis was managed to elicit students' opinions regarding using either the computer or the mobile. In addition, the aim

of the inspection was to recognize why they prefer one platform over the other and elicit implications regarding improving them. The findings demonstrated that students preferred computers more than mobiles in vocabulary acquisition and many learners did not like to utilize mobile phones for learning vocabulary at all.

In a study conducted by Licenjacka and Filologia (2007), two alternative approaches of learning vocabularies (i.e., traditional and CALL-based) were examined. The control group was requested to study a list of adjectives in seven days with no access to technological tools and the word processing software. It was supposed to let the participants free to memorize the words in the way they select themselves. But, the experimental group was provided with the access to the word processing and the occasion to acquire the new words via computers in seven days. The results of the research revealed that, as far as related to learning adjectives, the experimental group outperformed the control group.

The chief aim behind Loucky's study (2007) was to seek out novel methods intended to improve both vocabulary learning and online reading. He compared different kinds of programs to inspect how useful they are in directing learners during vocabulary acquisition and how they evaluate students' vocabulary in a more creative and innovative way. The researcher projected to reprocess the exposure of vocabulary more than once for expanding learners' achievement of vocabulary through using different vocabulary programs and online readings. Forty five graduate students including 43 males and two females participated in this study. These students who studied in the national university in Kyushu, during the semester, used to do extensive readings containing online readings. The instruments used were: vocabulary knowledge scale, online testing, and a computerized management system. The researcher used these instruments to assess the participants separately. The researcher aimed to enhance students' motivation in learning vocabulary through reading. Besides, the researcher employed various features like: listening to the text and instant glossing. These features were utilized by the researcher to improve students' vocabulary learning during their spare time without being unfocused. Students could organize the most used lexical strategies by evaluating the various vocabulary programs and tests used by the researcher. The results of the study showed that computer-assisted vocabulary learning improved students' vocabulary acquisition. The researcher also found that several strategies for word knowledge need to be employed to ensure a satisfactory acquisition of most words' aspects.

The aim of Zapata and Sagarra's study (2007) was to examine the influence of both paper workbook and online workbook on learning vocabulary. The researchers' hypothesis was that students would have identical performance in online workbooks and paper workbooks in a short period of time. In addition, they asserted that students' higher performance would be surveyed after employing the online workbook for a longer period of time. Data collection was conducted through 549 Spanish students registered in an American university. The students received four hours training per week with either online or paper workbooks. They also took four vocabulary tests and a screening test, two of which were administered to them in the first semester while the other two in the second semester. In the first week of the second semester course in Spanish, students were requested to complete a vocabulary test and a questionnaire. The questionnaire encompassed questions related to the students' previous knowledge of Spanish and the vocabulary tests which were on the computer included synonym and antonym questions. For 24 weeks, students accomplished their homework every week. In order to simplify the comparison procedure, both the quantity and quality of the assignments in both the paper workbook and online workbook were the same. The assignment contained vocabulary, grammar, and listening activities. Students were provided with instant feedback in the online workbook software. Immediate feedback with the several exposures to exercises accelerated the procedure of learning in the online workbook. Thus, the students had numerous chances for improving their vocabulary by practicing more. The aforementioned merits did not exist in the paper workbook because the students had to wait for a longer time to have their teacher's feedback. The four tests were matching in terms of vocabulary knowledge. Between the pretest and posttest, there was a two-month gap. The tests were productive in the form of using words in sentences and receptive in the form of recognizing the meaning of Spanish words. The findings of the study showed that there was no meaningful difference between students who used an online workbook and those who used paper workbooks for a short period of time, still a meaningful difference in more vocabulary gain occurred when using online workbooks for a longer period of time.

The major aim of Lenders's study (2008) was to examine the impact of online dictionaries on English vocabulary acquisition. The researcher pursued the following questions: When and how do learners use electronic dictionaries? What are the learners' views about electronic dictionaries as a tool for vocabulary acquisition? The researcher's hypothesis was that students would learn how to use electronic dictionaries and the electronic dictionaries would develop active vocabulary learning. Seventy four learners took part in this study. Their proficiency level was between upper-intermediate and advanced levels. For collecting the data, screen

observation, Likert scale questionnaire, and interviews were employed. The study lasted for four sequential semesters in a real classroom where students were introduced to the electronic dictionary during their reading tasks. The results of the research indicated that electronic dictionaries developed students' vocabulary knowledge. Electronic glosses were also perceived as an effectual instrument for teaching particular vocabulary and useful for general language teaching goals as well. Moreover, the students perceived it as a beneficial assistance in learning and applicable for their jobs in the future. They also stated that it helped them in learning low frequency words.

Bekleyen and Yılmaz (2011) conducted a study to evaluate the use of Jing™ program in language classes to teach new vocabularies in an enjoyable and innovative way. Jing™ is a free computer program that allows users to take a picture of what they see on their computer monitor. It also allows adding texts and highlighting the picture. The study participants were 10 freshman students of Dicle University, Elazig, Turkey. The first instrument used in the study was a vocabulary test prepared by the researchers to measure the knowledge of the students regarding the words that were planned to teach. Second, three different texts were used by the researchers to provide the context for the words. Finally, an Interview Protocol was used to obtain the students' perceptions about the usage of computers and especially Jing™ program in teaching vocabulary. The study lasted for three weeks. Three courses were presented to the students by one of the researchers. First, the teacher provided a short tutorial for the students aiming to teach the Jing™ program. The tutorial focused on downloading the program to the students' computers, using the program to capture images, adding texts, colors, arrows or highlighting the pictures, saving the pictures, sharing the pictures over the World Wide Web, or placing the links of recordings in an e-mail. The results of the study showed that 1) this particular group of students demonstrated positive attitudes towards the autonomous learning approach although they came from traditional and authoritative backgrounds. 2) The Jing™ program helped teachers and students provide the visual images for unfamiliar words easily. 3) Within the context of this study, the students worked together well to learn vocabulary items. 4) The participants all reported positive opinions about their learning experience.

Dewan and Sripetpun (2014) conducted a study in Thailand to investigate the effectiveness of a CAVL package on vocabulary acquisition and retention of nursing students and their learning attitudes. To this end, 60 second-year nursing students at Prince of Songkla University were recruited. Three research instruments employed for data collection were 1) the CAVL package consisting of 10 lessons, each lesson contained 12 vocabulary words related to nursing topics; 2) a pre- and posttest on vocabulary; and 3) questionnaire on students' attitudes towards learning vocabulary using the CAVL package. A vocabulary pretest was administered to the research participants to assess their prior knowledge of the target words before the learning session. After the intentional vocabulary learning sessions from the CAVL package, the same version of the vocabulary pretest was administered as the immediate posttest to assess the students' vocabulary learning achievement. A set of questions asking for the learners' learning strategies and their attitude toward their learning from the package was administered. The retention vocabulary test was given to the learners to test the retention level of the learned vocabulary two weeks after the posttest. The findings of this study indicated that after learning new words by CAVL package, the students' knowledge of the learned vocabulary increased significantly. The students perceived that provision of several different word lexical features helped enhance their vocabulary acquisition and retention. The students stated that the lesson features teaching the target word pronunciation and word meaning given in Thai language were most useful for their word acquisition and retention. Although the students' attitude towards the CAVL package has no significant correlation with their vocabulary achievement scores, they put forward that the CAVL package provided them with essential techniques for independent learning of new vocabulary.

Abu Bakar and Nosratirad (2013), conducting a case study and using a computer game, intended to explore how much adult learners sustain vocabulary independently and to explore how a computer game could encourage adult learners to learn English vocabulary independently. To this end, a qualitative research method was used in this study. Three adult ESL learners, aged between 22 and 30 and with low English proficiency, were selected. They were from different backgrounds; participant A was a freshman; participant B had a diploma certificate engaged in studying English; participant C had just a diploma certificate. The participants used SIM 3(a computer game) for learning vocabulary for two months. The instruments used in this study for data collection were semi-structured interviews, observation, self-report check lists, SIM 3(a computer game), pre- and posttest on vocabulary, and vocabulary lists. The English words and phrases in the tests were chosen from the game SIM 3, which was the context of the study. The computer game selected for this study was SIM 3. It was chosen because it provided the language needed for this study and it was free online. The language used in all conversations and instructions in this game was English and it was packed with English words in different

meaningful contexts that created an authentic language learning environment. Vocabularies in this game were relevant to different aspects of life which provided a good platform for learners to learn the meaning and used different English words and phrases. Learners were exposed to different types of vocabularies in every level of the game. The game had different levels in which players needed to complete one level before going to another level. They were allowed to set their own learning goals/game goals and to stop at any phase of the game. Learners were encouraged to learn as many new vocabularies as they desire without any restriction of syllabus because the main purpose was to learn the words unconsciously or automatically. The findings of the study showed that 1) computer games were beneficial in sustaining language learning, especially in providing space to learn independently; 2) computer games were a tool for self-study and created an independent learning (IL) environment; 3) the computer provided the learners with a stress-free learning environment; 4) this technique of vocabulary learning helped low proficiency language learners learn vocabulary in a fun learning environment; 5) the computer game made teaching and learning vocabulary more interesting, thus, enabling the learners to achieve successful vocabulary learning independently. Another crucial point is that learners must have objectives for the learning to take place. Learning without objectives can be meaningless.

Children who enter school with limited vocabulary find reading difficult, resist reading, learn fewer words, and consequently fall further behind. Historically, Mexican-American students have experienced the lack of vocabulary in English in elementary years. Reyna, Feng and Nzai (2012) conducted a study to examine if vocabulary acquisition through systematic cyber reading instruction is more effective for native Mexican-American elementary students in South Texas. In this research which was a quasi-experimental one, "digital cyber reading resources" was considered the independent variable and "vocabulary acquisition" was measured as the dependent variable/outcome. A convenient sample of 48 Mexican-American students participating in an afterschool program at an elementary school in South Texas took part in this study. They were assigned to cyber reading workstations or traditional teaching sessions twice per week. The experimental group consisted of 24 students and received vocabulary instruction using Ekiaka and Feng's (2011) experimental cyber learning workstations pedagogical model. The control group, consisted of 24 students, received no cyber reading instruction. They acquired new vocabulary words via traditional means: memorization, repetition, silent reading, reading aloud, and pair reading. The results of the research study showed that teaching English vocabulary through implementation of cyber reading workstations approach had significant impact on participants' vocabulary acquisition processes in comparison to the traditional teaching strategies.

In a study, Yusuf, Sim and Su'ad (2014) set out to investigate whether the use of computer textual glosses could aid vocabulary development. To this end, 117 students recruited in the initial stage of this research. They were diploma students from four intact classes of a public university in Malaysia. They were in their first semester of their studies and their age range was 18-20. The final number of students who fully completed the research process was 99 students. Computer textual glosses, a story titled "A Scary Night", uploaded on the internet, and appropriate pre- and posttests were the instruments which were used in this study to collect the necessary data. To do the study, first, a short narrative text titled "A Scary Night" was adopted from a study by Yoshi (2006) and uploaded on the internet. Then, vocabulary items in the text that were unfamiliar to the students were glossed. The type of glosses which were created was textual ones at word and sentence levels. The word gloss provided definitional meaning of the words while sentence type of glosses provided meaning in contextualized form. Second, to measure the vocabulary knowledge, two sets of tests were designed. Based on the tests scores, the students were stratified into three categories, low, mid, and high proficiency levels. Third, the intended tasks were performed in the groups where they accessed the website which contained the story. They read the story and by clicking on the glossed words, they had the meanings of those words at the word or sentence level. Finally, after reading the text, the students were given both the productive and receptive vocabulary tests. These tests formed the immediate tests. After three weeks, the students were given the same set of vocabulary tests. For this delayed test, the items in the tests were not in the same sequence as in the immediate test. This was done to avoid the test effects of the earlier immediate test. Having conducted the study, the researchers came to the conclusion that textual glosses enhanced students' vocabulary knowledge in short term and increased the students' productive vocabulary.

Wang, Teng, and Chen (2015) conducted a quasi-experimental study to investigate the effect of iPad App on students' English vocabulary acquisition in a Taiwanese classroom. To this end, two freshman English classes with a total of 74 students in a private university in Taiwan were chosen to be the research participants. The instruments and techniques used in the study were iPad "Learn British English Word Power App" which included approximately 2000 words and phrases showing the spelling, translation, pronunciation, and image related to the words, semantic map method, and appropriate pre and posttests. The research participants were

divided into two experimental and control groups. After taking the pretest, the instructor used iPad Application to teach English vocabulary in the experimental group, and used the traditional semantic-map method to teach English vocabulary in the control group. In the treatment period which lasted about 18 weeks (15 minutes each session), students under the iPad instruction were able to study the words by watching words, word pictures, and example sentences through the classroom projector. At the end of the treatment, the students were asked to fill out the questionnaire to understand their attitude towards iPad App teaching in the classroom. Then, both of the two classes took the same English posttest, which was administrated at the end of the course to check the students' progress. The findings of this study were summarized as follow:

1) The iPad App created significant progress in students' English vocabulary acquisition. 2) The experimental group, who learned English vocabulary through the iPad instruction performed better in the English posttest than the control group. 3) Using ICT teaching in the classroom had positive effects on students' English learning motivation. 4) The use of iPad teaching created a relaxed learning environment. 5) The use of iPad App in English vocabulary teaching provided lots of pictures, words, sentences, audio-files, and pronunciation practices in the traditional classroom. 6) With the use of iPad, there were more interactions between the teacher and students and students seemed to be more focused during the study. 7) The iPad App provided a meaningful learning interface in the traditional Taiwanese classroom. 8) The ICT teaching had influenced students' willingness of using computers in English learning.

3. Iranian Studies

In a study, Ghabanchi and Anbarestani (2008) attempted to examine the influence of CALL programs on the long-term retention of vocabulary learning and the influence of CALL programs on contextualized vocabulary learning. For conducting the study, 56 EFL learners took part in this study; 28 of them who had access to their own computers at home were voluntarily chosen. This group constituted the experimental group, and the remaining constituted the control group. The experimental group exploited technological tools and computerized services at home to find the definition and meaning of the instructed vocabularies and to use them. Yet, the control group pursued the usual approach of finding the meaning of new words. This group utilized desktop dictionaries and participants were able to provide a bilingual list of new words to memorize them. Thirty new words were taught each session. The teacher provided both groups with the definition, pronunciation, and some synonyms and antonyms of the target words. The results of the study showed that, when using CALL, learners had an intensive mental processing, resulting in long-term recall of words. CALL also generated better results in contextualized vocabulary learning and pronunciation. Nevertheless, the scores on the immediate tests were significantly higher for the control group but the scores on the delayed tests were significantly lower for the control one.

In an Iranian EFL context, Shahrokni (2009) explored the impacts of online textual, pictorial, and textual pictorial glosses on the incidental vocabulary learning of 90 adult elementary Iranian EFL learners. To do the study, from among 140 EFL learners, 90 participants were selected, based on their function on an English placement test along with the knowledge test of the target words in the study. They were randomly allocated to three groups of 30 and afterward exposed to the research treatment. During three sessions of tratment, five computerized reading passages containing 25 target words were studied. The students read the passages for comprehension and, at the same time, could check the glosses attached to the target words. After reading each passage under each research circumstance, the participants were tested on their incidental vocabulary learning through two research instruments, word and picture recognition tests. The results of a one-way ANOVA analysis of the data suggested that a combination of passages and still images resulted in significantly better incidental learning.

Bagheri, Roohani and Nejad Ansari (2012) conducted a study whose chief goal was to clarify which approach of vocabulary teaching, (a CALL-based or a non-CALL based approach) result in better outcomes in teaching and learning English vocabulary in a short and longer period of time. In other words, the effectiveness of the above approaches was examined. For this study, the following research question was formulated by the researchers: Is CALL-based approach of teaching more efficient than non-CALL-based approach of teaching in short and long run? Consequently, the following null hypothesis was drawn from the research question of the study: CALL-based approach of teaching is not more efficient than non-CALL based approach of teaching in short and long period of time. To answer the research question and consequently reject or accept the null hypothesis, the researchers took the following steps: They recruited 61 Iranian EFL learners, as participants, from a private language institute in Isfahan, Iran. They were all females and their age range was 11-13. The instruments that they used in this study for data collection were a proficiency placement test, a vocabulary software program called 'Phonics' and pre and posttests. To collect the data, first, a proficiency placement test was administered to

90 EFL learners in a language institute in Isfahan, Iran, to have a more homogenous group. Second, the participants were randomly allotted to two groups: CALL and non-CALL. Third, CALL group was taught by Phonics software in a language laboratory equipped with sufficient computers; the Phonics software helped learners learn pronunciation and vocabulary. Fourth, the non-CALL group practiced the same vocabulary but they did it in the classroom. The teacher utilized paper, pictures, cassette player, flash cards and other realia to teach vocabulary to the control group. Finally, the vocabulary test was given to both groups after twenty sessions of instructions to assess their immediate learning, and 20 days later the same vocabulary test was administered to both groups, as delayed posttest, to see the influence of instructions in both groups. The findings of this study illustrated that the function of the CALL users and non-CALL users on the L2 vocabulary test were not significantly different in the immediate and delayed posttests. The results also indicated that both CALL-based and non-CALL based approaches significantly enhanced their L2 lexical knowledge in short and long period of time.

Tamjid and Moghadam (2012) conducted an experimental study to investigate the effects of Narsis software on Iranian intermediate EFL learners' vocabulary acquisition. To this end, 46 homogeneous intermediate EFL learners were invited to participate in this study. They were randomly assigned to experimental and control groups. The experimental group received the treatment by Narsis software which was based on "504 Absolutely Essential Words" book over a one-month period of time. The control group was taught the same vocabulary by traditional method. After the treatment, both groups sat for the same posttest. The analysis of the results showed that the experimental group outperformed the other group and the participants in the experimental group (through interviewing) had positive attitudes towards Narsis software.

An experimental research study by Pahlavanpoorfard and Soori (2014) investigated the impact of using computer on vocabulary learning of Iranian EFL university students. The research question which was intended to be answered by the researchers was: Does CALL have any impact on Iranian EFL learners' vocabulary acquisition? The research design and methodology was as follow: The participants of the study were a sample of 40 male and female intermediate university students at Larestan Islamic Azad University. They were all English major students. To be sure of homogeneity among the participants of the study, students were given the Oxford Placement Test (OPT). Based on the results of the OPT, 20 students were randomly assigned into the experimental and 20 students were randomly assigned into control group. Gender was not considered as a variable to be controlled in this study. The instruments used in this study were OPT, word lists, vocabulary tests, and a piece of computer software which was an intelligent software including the pronunciation, spelling, and definition of the intended words. It also included some special games for vocabulary learning. The experimental group was taught by two different techniques including software-assisted and game-assisted techniques respectively by the software, and this software had already been installed on the students' laptops. The students in the control group received usual classroom instruction. Treatment period lasted 10 weeks for each group (twice a week on different days). After the students received the treatment, they received a posttest to evaluate the effects of the treatment. The findings of the study indicated that computer group had a better performance than that of the traditional group, and the students in computer group learned more vocabulary than the students in traditional method group. The better performance of the using computer group was in terms of vocabulary achievement that was due to the following factors. The students could control their learning during the implementations. It promoted motivation among the students and facilitated learning vocabulary. There was a one to one interaction between the students and the computers which made the vocabulary learning easier. Getting immediate feedback from the computer and thus correcting the mistakes committed by themselves, students were only people who could see the answers. Therefore, students did not have any fear for making mistakes.

In a study, Noeparast and Khatami (2014) aimed at examining the effect of employing Net Support School program as Local Area Network (LAN) software on Iranian intermediate EFL learners' vocabulary retention and reading comprehension. To this end, 60 female learners as grade-two students of high school after a proficiency test were selected as the participants of this study, their age range was 17 to 18, and they were homogeneous in terms of their Foreign Language (FL) proficiency. They were divided into two groups of experimental and control. The study was carried for 20 sessions. The students in the control group were taught new words from the printed pages, while the other group (experimental) was taught new words by Net Support School. In the last session both group had the posttest. According to the results of this study, LAN-based instruction through Net Support School enhanced and improved the learners' vocabulary retention and reading comprehension. In other words, the students who were taught by Net Support School software significantly performed better than students who were taught by the traditional printed text.

In a study, Mansouri (2014) in Payam Noor University of Guilan discussed and analyzed two different methods of using technology and determined which of the methods worked better. A comparison between vocabulary software flashcard and word clouds on vocabulary learning (retention) compared by the researcher. He decided to see which method encourage learners more and they would do better with which kind of using technology? Since using different technology-related tools for vocabulary learning was the goal of the study but not different ways of vocabulary teaching, there was no control group in the study and both groups were treatment groups. As a result, the method used for vocabulary teaching for both groups was the same. The method used for vocabulary teaching was a normal method using examples, pictures, miming, etc. After teaching different vocabularies, different questions were asked to make sure that the students had understood the meaning of words. There were 44 participants in this study, all being male learners. Their native language was Farsi and they were studying English for two to four years. Their age range was 16 to 21.

The instruments used in this study were Top Notch 1B book (Saslow & Ascher, Pearson Education, 2011), Michigan Test of English Language Proficiency (1997) as a pretest, flashcard software, a hard copy of word clouds and a posttest. Two intact classes were used in the study and that was because of the effect of intact classes on increasing face validity of the research. To ensure homogeneity, a Michigan Test of English Language Proficiency (1997) was administrated at the beginning of the study to assess the participants' level of language proficiency. In this study which lasted for one and a half month (three times a week and 90 minutes for each session), the first treatment group (chosen through randomization) was taught vocabularies by word clouds methods and the other treatment group was taught vocabularies by software flashcard technique. At the end of the semester, a posttest was given to the learners to check their progression. The finding of the research revealed that the group with word clouds welcomed the way and got better results in comparison to software flashcard group. The participants' vocabulary learning in the word cloud group was improved via using word clouds as a tool for vocabulary learning and retention. The significance difference between both groups proved that although technology is helpful in most of the aspects of everyday life and especially learning vocabulary, every type of using technology cannot be that helpful.

Akhlaghi and Zareian (2015) conducted a study to examine the effect of PowerPoint presentations on grammar and vocabulary learning of Iranian pre-university EFL learners. The research question posed in the study was: Do PowerPoint presentations have any effects on EFL learners' grammar and vocabulary acquisition? Accordingly, the research null hypothesis was: PowerPoint presentations would not have any effect on EFL learners' grammar and vocabulary acquisition. For data collection two methods including quantitative and qualitative methods were used. The instruments used for this purpose were PowerPoint software, pre and posttests and an interview. To collect the data practically, 54 female students were randomly selected from Shahed high school in Gonabad, Iran. They were randomly divided into two groups of 27 participants; the participants' age ranged from 17 to 18. The population of the study was fourth grade beginner language learners of Shahed high schools in Gonabad, Iran. Both groups of the study shared the same linguistic and cultural background with Farsi as their first language. For collecting quantitative data, an experimental design was used in which the experimental group was taught by using PowerPoint presentations while the other group (control group) was taught using a traditional method of instruction in classroom setting (each group for eight weeks). For qualitative data collection, a survey design through interviews (six students from the experimental group) was used. The findings of the study indicated that PowerPoint presentations enhanced the learners' grammar and vocabulary knowledge. It was also found that the learners had a positive attitude towards the use of PowerPoint presentation.

4. Discussion

Nowadays vocabulary teaching and learning is deemed an imperative issue by all those who are directly or indirectly involved in language acquisition. Consequently, the present study has proposed detailed information about technology integration, particularly CALL, in the area of English vocabulary teaching and learning. In most research reviewed in this study, prior to the treatment, the participants' familiarity with the target words has been verified through a vocabulary test and they indicated that they do not know the meanings of the target words, but after the instructions, the learners' English vocabulary knowledge developed prominently This development in English vocabulary knowledge was based on the mean scores of both groups in the pre and posttest scores. The results first, underline the vital role of explicit and CALL-based teaching of English vocabulary; Second, indicate that the status of vocabulary teaching should alter and CALL-based teaching should be given more attention; Third, CALL-based method can be used for improving English lexical competence; Finally, it should be mentioned that for using CALL-based method two things including the competence of language teachers and the context of method application should be taken into consideration.

The findings of the present study are supported by Wang, Teng and Chen (2015) who explored the influence of iPad, a word power application, on learners' vocabulary knowledge. They found that those who exploited this software had better improvement in their vocabulary knowledge over those who did not use it. In the same way, Ahmadian, Amerian and Goodarzi (2015) conducting a study, compared two groups of learners. One of them was offered contextualized vocabulary learning on paper and the other experienced vocabulary learning using PowerPoint software. At the end, the software-used group had better performance than the other group and this improvement was due to the use of software because all the participants had the same background knowledge based on the proficiency test scores.

The results of the current study are also not compatible with the results of Bagheri, Roohani and Nejad Ansari's study (2012) in which they investigated the effect of two methods of vocabulary teaching containing CALL-based and Non-CALL based on vocabulary learning of elementary learners and they found that CALL-users and non-CALL users were almost the same in terms of vocabulary performance in both short-term and long-term learning. However, the most studies reviewed here indicated that CALL users outperformed those who did not use it.

5. Conclusion

Vocabulary acquisition in a foreign language is a problematic and time-consuming task. Hence, using an appropriate method for teaching and learning vocabulary is extremely crucial. Technology application, particularly CALL has recently encouraged some researchers to examine the influence of CALL on vocabulary acquisition of EFL learners. In the same line, this study deals precisely with CALL integration in vocabulary learning to see whether it would have any impact on vocabulary knowledge of EFL learners. In other words, it reviewed the efficacy of CALL-based method on English vocabulary knowledge of EFL learners. The results confirmed that CALL users benefited from CALL and CALL-based method had the potential to greatly improve EFL Learners' English vocabulary competence.

In conclusion, having reviewed the above studies, the researcher found that many researchers confirm CALL integration in language acquisition in general and vocabulary acquisition in particular. It is clear from the studies that CALL application in vocabulary learning is more beneficial and helpful for the learners in comparison to other methods and techniques. In other word, most of these studies showed that the use of CALL in vocabulary acquisition was highly recommended by the researchers.

Based on the findings, computers can be used to improve other aspects of vocabulary knowledge. By implication, EFL teachers can make use of computers for purposes such as fostering learners' (at all levels of language competence) lexical competence, improving learners' reading and writing ability including paraphrasing, spelling competence and reading fluency.

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