Vocabulary and Grammar Gain Through Computer Educational Games

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Abstract

The increasing use of computers in the past thirty years has encouraged many to investigate their effectiveness as instructional tools. The unquestionable presence of computers in all aspects of human life and the inner desire of human beings to enjoy learning through the use of computer educational games prompt the integration of computer-based games in EFL teaching and learning environments. This study investigated the effect of computer educational games on Iranian elementary learners' grammar and vocabulary gain. A total of 58 female, who were selected out of 80 elementary institute EFL learners participated in the study. Their age range is between 13-15 one experimental and one control group took part in this study. The study followed a quasi-experimental pre- and post-test design. In order to compare the results of their performance, an independent samples *t*-test was conducted. In comparing the pre-test and post-test scores, the results demonstrated no significant differences between the experimental and control groups. However, the involvement of all learners, their enthusiasm to use the new technology in language learning and learners' positive attitudes toward learning was apparent in the experimental group. The presence of such a high motivation among the learners in experimental group could contribute to their active involvement in the process of learning. This implies that computers have a significant role in motivating learners' involvement in the learning process.

Keywords: computer-assisted language learning; computer-based games; technology integration; vocabulary learning; learning grammar learning

Introduction

Recent advances in technology have prompted its integration into education and this fact is particularly stressed out in ESL/EFL classes. The emergence of the new technology must be followed by thinking about the pedagogical reasons for using it rather than just sticking to the 'wow' factor and expressing the appealing aspects of it. In the eighties, the application of technology in language classrooms included the use of film, radio, television, language labs with audio/video tapes, computers, and interactive video. Enhancement of dull lessons, especially in elementary young learners' EFL classes, into attention-grabbing and motivating learning experiences can be achieved through the incorporation of technology in teaching and learning environments. The undeniable presence of technology as an integral part of education demands the review and revision

of curricula, approaches, and educational tools to add to the efficacy of teaching process (Garrett, 1991).Computer as an integral part of technology has played its crucial role in promoting effective instruction in recent years. The accessibility to individuals and language school and its practical potentials has encouraged a shift in emphasis from computer technology itself to its applications. Consequently, it is time to consider computers as essential instruments of teaching and learning.

All these interests and curiosities have resulted in the emergence of Computer-Assisted Language Learning and the related studies. CALL is a term used by teachers and students to describe the use of computers as part of a language course. This is a broad definition which includes a wide range of CALL uses and approaches to teaching and learning foreign languages, from the traditional drill-and-practice programs to the more recent manifestations of CALL such as virtual learning environment, web-based distance learning, and Computer-Mediated Communication (CMC) like email and chat (Sokolik, 2001) etc. CALL's origins and development trace back to the 1960's when computer-assisted language instructional projects in the USA were conducted on an experimental basis to evaluate the effectiveness of computer-assisted instruction (CAI) in relation to traditional instructional modes (Atkinson & Wilson, 1969). Translation and dictation exercises, grammar and syntax drills were the instructional exercises of these early projects. Through the '70's and up to the present day, computer-assisted language learning projects have grown from research restricted to the effectiveness of the instructional medium to the exploration of application possibilities. Bax's (2003) notion of 'normalization', as the future developmental stage of CALL; soon became a central issue in the discussion of the necessity of integrating computers to instructional environments. Bax defines this stage as a time when computers become:

> *... an integral part of every lesson, like a pen or a book. Teachers and students will use them without fear or inhibition, and equally without an exaggerated respect for what they can do. They will not be the centre of any lesson but they will play a part in almost all. They will be completely integrated into all other aspects of classroom life, alongside course books, teachers and notepads. They will almost go unnoticed.*
>
> (Bax, 2003, pp. 23-4).

As the consequence of such discussions, it is time to consider computers as essential instruments of teaching and learning. The application of computers to language learning has a history of a quarter of a century. A significant amount of literature explored the potentials of computer technology with regard to teaching and learning languages more effectively. Many studies have been conducted to investigate the effects of the use of computers in language learning, and many findings and evidence provide positive evaluation in this field (see Warschauer & Healey, 1998; Chapelle 2001, 2003; Hegelheimer & Tower, 2004). Technology in the classroom is widely believed to help teachers to promote a constructive class environment and it is viewed by many researchers to have an influential effect on the teaching and learning process (Muir-Herzig, 2004). Furthermore, from educators' perspectives, with a variety of computer-based activities, computers can help facilitate needs and challenge students' learning

practices (Warschauer & Healey, 1998). Dunkel (1990), for example, asserted that the possibilities of computer technology as a tool could include increasing language learners' (1) self esteem, (2) vocational preparedness, (3) language proficiency, and (4) overall academic skills. Furthermore, the benefits of multimedia, the internet, and various forms of distance education were explored by many others (Garrett, 1991; Sussex, 1991; Ruschoff, 1993; Armstrong & Yetter-Vassot, 1994).

The fun factor added to the use of CALL is through the presentation of educational games. Fundamental theoretical framework of game play, which is known as the Flow theory, was drawn by Csikszentmihalyi (1990). In his flow theory, Csikszentmihalyi (1990) states that individuals who play games, lose themselves during game activities and fascinating subjects of oncoming events. Gee (2003) highlights the real importance of well-designed computer- and video-games as people reinvent themselves in the virtual world of games and both fun and learning can be achieved simultaneously. The cognitive development of children through the application of games was defined in the literature by Piaget (cited in Demirbilek, Yilmaz & Tamer, 2010). Peterson (2010) examines the psycholinguistic and socio-cultural constructs of games and simulations in computer-assisted language learning. According to the research, simulations and games present precious opportunities for effective language learning. One of the important applications of computer educational games is in the area of teaching grammar and vocabulary. As it goes without saying, grammar and vocabulary learning have always been the challenging aspects of language learning through the history of language teaching and learning.

Though grammar teaching has a history as long as language teaching itself, it has been treated by many learners to be the most boring aspect of learning a new language. It seems that identifying more pleasant ways of presenting it may change the learners' attitudes toward its learning. Integration of a variety of computer-based activities in teaching grammar to second and foreign language teaching is figured out to be effective. Game application is one of the ways to contextualize grammar. Great pedagogical values are provided in the application of games in foreign language classes. The central role of games in foreign language teaching and learning is more outstanding in teaching grammar to young learners (Hong, 2002; Bekiri, 2003; Nedomová, 2007). According to Nedomová (2007, p. 17), "young learners are not able to concentrate for more than 10-20 minutes and after that they start to be bored and tired." This state of losing interest and motivation is more noticeable in teaching grammar because it is too dependent on rules and memorization.

Vocabulary learning is one of the central issues being discussed in all phases of language learning and teaching, it can be regarded as the core building block for any successful communication to take place. Hence, the lack of high vocabulary knowledge may hinder effective communication with members of the target community. The review of literature demonstrates its vital role in successful second/foreign language learning. Smith (1997) claimed that word knowledge has particular importance in literate societies. Lee (1995, p. 35) lists several main advantages when games are used in the classroom, including "a welcome break from the usual routine of the language class", "motivating and challenging", "effort of learning", and "language practice in the various skills." Uberman

(1998) holds the helpful role of games in vocabulary teaching after quoting and analyzing different opinions of experts. In addition, Ersoz (2000) also affirms that games are highly appreciated because of their amusement and interest. Teachers can use games to help their students practice more their skills of communication. Developing EFL learners' word knowledge can be facilitated through the use of computer educational games because they can make vocabulary learning more enjoyable and that is why considerable attention has been given to vocabulary learning in CALL (Ellis, 1995; Goodfellow, 1995; Conrad, 1996). Games have peculiar characteristics that lead to the easier learning of vocabulary. Few studies have been carried out on the effect of computer educational games on grammar and vocabulary learning.

In spite of the undeniable status of this technology in recent years, to be realistic about the application of CALL whether in grammar teaching or vocabulary teaching, it must be taken into account that it has been welcomed in the educational system of highly developed countries such as the USA, Japan, and Western European countries including Turkey while developing countries throughout the world still apply chalk and talk approach to their EFL classes. The application of CALL is not yet commonplace in Iranian EFL classes due to a large number of reasons that insufficient number of PCs, scarcity of trained instructors, lack of computer literacy for instructional purposes, and lack of administrative support are only some of them. This insight of the present reality of CALL in Iranian context demonstrates the very beginning stages of its application in Iranian institutions while planting the seeds for the implementation of CALL by teachers when the institutions are finally equipped with computers. However, it may be ignored that computers like other teaching tools would not promise to bring any benefit to students unless the practical use of computer in a particular context is explored in detail and implemented accordingly (Kern & Warschauer, 2000); the integration of computers in the classroom may be difficult by some and may not be found effective in teaching and learning when introduced within the traditional curriculum setting (Jules Van Belle & Soetaert, cited in Abu Bakar, 2007). In other words, having excellent computer facilities, such as having good language software and programs will not ensure giving students full benefits and opportunities of English learning. This is because computer as itself without any good activities "does not provide adequate instructional value in and of itself" (Means, 1994, p. 13).

Due to these facts, it is necessary to explore whether Iranian elementary students learn grammar and vocabulary of a foreign language effectively through computer-based games. This is the main logic behind conducting such a research in the Iranian context. This paper aims to investigate and to understand the effectiveness of computer-based games in a language school situation within the Iranian context. The present paper addresses these two questions:

Q1: Do computer–based games have any significant influence on Iranian elementary EFL learners' *grammar* knowledge achievement?

Q2: Do computer–based games have any significant influence on Iranian elementary EFL learners' *vocabulary* knowledge achievement?

On the basis of these research questions, the following hypotheses are suggested:

$H_0$1: Computer–based games have no significant influence on Iranian elementary EFL learners' *grammar* knowledge achievement.
$H_0$2: Computer–based games have no significant influence on Iranian elementary EFL learners' *vocabulary* knowledge achievement.

Methodology

Participants

This study was conducted in one of the Iranian language schools enhanced with sufficient number of PCs to implement computer-based activities in the classroom environment. Participants of this study were 58 female EFL learners within the age range of 13-15. Their final exam scores in the last two terms were used as the criterion to address their homogeneity. They were all elementary learners in terms of their language proficiency. These 58 participants were selected out of 80 elementary institute students. For this purpose, the average scores for the two final exam scores were calculated for all of the participants (80 students) and then those participants who scored two standard deviations above and below the mean (±2SD) were selected (58 students).The following table shows the results of the normality check for all of the participants.

In order to get precise information about the participants' achievement in computer enhanced classes and to make sure about the involvement of all participants in doing computer-based activities, they were randomly assigned to four groups: two experimental groups (one consisting of 15 participants and the other 14) and two control groups (the same distribution as the experimental groups).

Instruments

The classroom material was "Family and Friends 1", published by Oxford University Press, which was accompanied by Student MultiRom. In the traditional class, only the book was utilized while in the computer-enhanced class, the Student MultiRom was used in addition to the book. Furthermore, it was assured that only the teacher had access to the CD and not the students. This MultiRom provides grammar and vocabulary games relevant to the grammatical points and vocabulary items presented in each unit.

The second instrument, which was used to assess learners' achievement in the traditional and computer-enhanced classes, was a teacher-made achievement test on the basis of the discussed issues; it was utilized both as a pre-test and post-test. The test consisted of twelve grammatical and twelve vocabulary items that required filling the blanks or providing the complete answers on the part of the learners. The test was reviewed by three other EFL teachers to evaluate its content representativeness and validity. In order to check the reliability of the test, another teacher was asked to score all of the test papers and inter-rater reliability was checked. The correlation between the two sets of scores was a high one of 0.86.

Procedures

To accomplish the purpose of the study, the researcher carried out the following procedure:
A pre-test / post-test quasi-experimental design was developed. One teacher taught the experimental and control groups at different timetables. Two of the classes were randomly selected to use computer-based activities and the other two classes received the traditional instruction. It should be mentioned that the typical classes in the institute consisted of 14 to 15 students. Because of that the researchers decided to have two experimental and two control groups to have enough participants for the analysis.

In the traditional classes, the teacher presented the grammatical and vocabulary sections in the book and then the workbook exercises were focused on. The students were asked to answer the workbook exercises at home and check them in the class. In the computer-enhanced classes after the presentation phase of teaching and checking the workbook, participants worked on computers to play the grammar- and vocabulary-related games as post-teaching activities. The students did not have access to the CD themselves and it was made sure that they did not use it at home. On the first session, all participants tried their performances on the pre-test. The teaching process was followed in four weeks; three sessions per week. After these twelve sessions of teaching the book, whether in the traditional way or computer-enhanced instruction, all four groups took the same test as post-test to evaluate their achievements in this period of teaching.

Data Analysis

The results of the pre- and post-tests in both groups were statistically compared using the independent samples *t*-test with the SPSS statistical software version 17. Significance was set at $p < 0.05$.

Results and Discussion

As mentioned before, the participants of the study were selected out of 80 elementary students. One-sample Kolmogorov-Smirnov test was used in order to make sure that the distribution was normal. The significance value shows that there is normal distribution since the p-value is more than 0.05 (table 1).

Table 1: One-Sample Kolmogorov-Smirnov Test

		Participants' average scores
N		80
Normal Parameters	Mean	51.79
	Std. Deviation	18.16
Kolmogorov-Smirnov Z		.82
Asymp. Sig. (2-tailed)		.51

Then, on the basis of the mean and standard deviation, the researchers chose those participants who scored two standard deviations above and below the mean (51.79±18.16).

In order to make sure that the data of the selected participants did not have any anomalies, the box plot was checked for the total pretest scores for both groups.

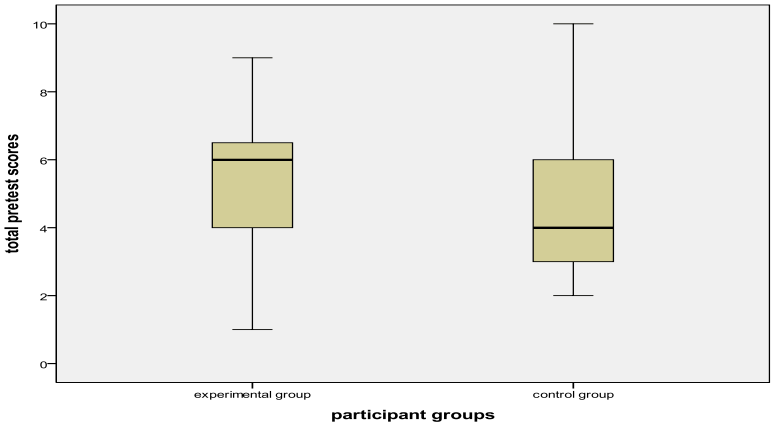

Figure 1: Box plot for the Total Pretest Scores

The box plot shows that there were no outliers or extreme scores in the data. Therefore, the *t*-test could be used for the analyses.

In order to address the first research question that was the effectiveness of computer-based games on Iranian elementary EFL learners' grammar knowledge achievement, a pre-test was utilized to ensure the learners' homogeneity in the experimental and control groups. The post-test was also used to reveal the possible effects of the computer-based activities.

To investigate the first question, an independent samples *t*-test was conducted. The *t*-test was intended to compare the obtained mean scores of the participants in the control and experimental groups on the pre- and post-test to indicate the effectiveness of the treatment. As indicated in Table 2, the mean scores of the experimental and control groups in the pre- and post-test were close to one another.

Table 2: Group Statistics for Grammar

	participant groups	**N**	**Mean**	**Std. Deviation**
pretest grammar scores	experimental group	29	2.34	1.20
	control group	29	1.93	.96
posttest grammar scores	experimental group	29	16.48	1.72
	control group	29	16.86	1.51

Consequently, the results of the independent samples *t*-test revealed that the *p*-value was more than 0.05. Hence, the null hypothesis was accepted: there is no significant difference between experimental and control groups in terms of grammar learning (Table 3).

Table 3: Independent Samples *T*-Test for Grammar

		Levene's Test for Equality of Variances		***t*-test for Equality of Means**		
		F	Sig.	t	df	Sig. (2-tailed)
pretest grammar	Equal variances assumed	3.76	.06	1.45	56	.15
	Equal variances not assumed			1.45	53.39	.15
posttest grammar	Equal variances assumed	.90	.35	-.89	56	.38
	Equal variances not assumed			-.89	54.99	.38

The same procedures were followed to address the second research question: whether computer–based games had any significant influence on Iranian elementary EFL learners' vocabulary knowledge achievement. The same results were obtained for vocabulary learning. Table 4 demonstrates that the mean scores of the two groups were close to each other.

Table 4: Group Statistics for Vocabulary

	participant groups	**N**	**Mean**	**Std. Deviation**
pretest vocabulary scores	experimental group	29	3.31	1.61
	control group	29	2.66	1.45
posttest vocabulary scores	experimental group	29	16.62	1.55
	control group	29	16.07	1.96

Table 5 acknowledges that since the *p*–value was more than 0.05; thus, there is no significant difference between experimental and control groups in terms of vocabulary learning. The result shows that the null hypothesis had to be accepted.

Table 5: Independent Samples *T*-Test for Vocabulary

		Levene's Test for Equality of Variances		***t*-test for Equality of Means**		
		F	Sig.	t	df	Sig. (2-tailed)
pretest vocabulary	Equal variances assumed	.33	.57	1.63	56	.11

	Equal variances not assumed			1.63	55.40	.11
posttest vocabulary	Equal variances assumed	.31	.58	1.19	56	.24
	Equal variances not assumed			1.19	53.07	.24

The results of this study did not indicate any significant difference in Iranian elementary EFL learners' achievement in terms of grammar and vocabulary learning; careful examination of the teaching sessions revealed the possible reasons for such a result. As it is stated by Kern and Warschauer (2000), the practical use of computer in a particular context being explored in detail may specify its effectiveness. The integration of computers in the classrooms may be difficult by some and may not be found effective in teaching and learning when introduced within the traditional curriculum setting (Jules Van Belle & Soetaert, 2001).

It must be taken into account that there are some factors, such as administrative, space, computer literacy, and others that may influence, hinder, or contribute to the computer-based learning environment. In this specific case, it seemed that Iranian elementary learners were not accustomed to the presence of computers in their foreign language leaning classes; they did not have prior experience in using computers in EFL classes and as a consequence they spent so much time on finding out the ways of working with computers. At the beginning sessions, students felt somehow confused; they did not know how to provide their responses to the games, and mostly they were so much challenged by this new technology that they did not pay attention to the content of the games. The present fact about elementary learners implies that learners must receive some training in order to know how to use new means of technology in their classes, and consequently, enjoy the presence of these new instructional tools in their classes. If the degree of their involvement increases, the existing computer literacy gap can be bridged.

One of the advantages of CALL application in the case of these elementary learners was that it led to the improvement of their computer literacy by the end of the term. The other advantages of CALL application in this case were the possibility of practicing and reviewing the English language in a pleasant atmosphere and repeating the activities without any of the errors arising from repetition by humans. Feedback as the computer's response to answers made by learners was another conspicuous point about CALL application. Feedback gives students a feel of how well they are progressing through a lesson, thereby increasing mental effort or involvement that a task imposes their confidence levels. It also reinforces the subject matter. The importance of knowing how to motivate the learners has always been one of the challenging aspects of foreign language teaching for EFL teachers. The key features of these activities were their motivational capacity; learners' reactions while they were doing these activities were demonstrative of this achievement. Hence, the top most advantage that can be referred to was adding the fun factor to EFL classes in order to make them more appealing for elementary learners. Color, animated graphics, and sound captured and maintained learners' attention and thus added to the entertaining aspects of learning. In addition, they

can be considered as a kind of competitive activity that encouraged learners to show their best performance; this brought life and energy to the class.

Conclusion

The results of the present study show that though the mean difference between the experimental and control group was not significant, computers can motivate involvement of the learners as the result of their application; hence, the use of technology can assist teachers in creating a more positive and motivating environment for students to learn and excel in the process of learning a foreign language. As it is apparent, educational goals can be used to enhance learners' learning and improving their attitude, motivation, and overall achievement. Though in this case learners' achievement did not significantly differ, their involvement in the process of doing the activities was noticeable. Games must be treated as an effective way to help students enjoy and entertain with the language they learn. Certainly as learners become more familiar with the computers as instructional tools, they may reveal more effective results.

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