

The Effect of Web-Based Games on Facilitating and Enhancing Reading and Writing Skills in Learning English

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Abstract

This study aimed to evaluate the effect of web-based games on facilitating and enhancing reading and writing skills in learning English vocabulary. The research employed a pre-test and post-test experimental design with control and experimental groups. To this aim, 36 elementary learners of English in fourth, fifth, and sixth grades from among the students of a school in the west of Tehran were selected as the participants who were randomly assigned to the experimental and control groups. The experimental group used web-based games. Then, a checklist developed by the researchers was used to assess learning and facilitation in the two groups. Having examined the differences between the two groups by removing the pretest factor and controlling the effect of the pretest, the study showed a significant difference in the posttest between the two groups. As a result, the hypothesis that educational intervention (web-based games) had a significant effect on reading and writing scores was confirmed with 95% confidence. The results of the study showed that: (a) Web-based learning has a significant effect on facilitating the learning of English vocabulary; and (b) Web-based learning has a significant effect on improving reading and writing skills. Therefore, it can be concluded that using web-based games can be effective in facilitating and increasing reading and writing skills in learning English vocabulary.

Keywords: Facilitation, reading and writing skills, vocabulary learning, web-based games

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Introduction

Today, globalization and technological innovation have led to the widespread use of technology in almost all sectors including education (Monahan, 2013). In recent years, using education-related technologies has spread widely and rapidly around the world (Harahap et al.,

2022). The integration of technology in education is always open to new opportunities and previous studies have shown that technology enhances teaching and learning experience (Taharim et al., 2016). Innovations and innovative processes, if used properly, enhance learning in contemporary learning environments, and these developments can create rich

learning opportunities for students (Golsan & Hakan, 2017).

As a global medium of communication, English has considerably increased in importance in the present social, political, and commercial contexts (Rao, 2019). With the advancement of information technology in various spheres of society, English has become the only language for the world citizens (Iqram Hossain, 2015) and the urge to improve English language education (ELE) has been increasing steadily. Consequently, the nature of ELE has changed drastically in the last decade. "This has not only brought about a number of changes in the way English is taught and learned, but it has also led to various innovative practices around the world" (Wong & Jhaveri, 2015, p. 6). Learning a second language is included in the curriculum of various countries as a means of communicating with other nations. Many years have passed since English began to be taught in schools and colleges in Iran, where students are taught English through a syllabus. Despite a lot of effort and the use of old methods in the learning process, the desired result has not been achieved yet.

Dewey (2002) argued that learning language connects everyone's speaking, listening, reading, and writing skills together. Meanwhile, learning vocabulary is one of the principles of learning English because words convey meanings to our minds. To communicate better in a foreign language, students must learn a sufficient number of vocabularies and must know how to use them correctly (Bin-Hady, 2021). Sentences, paragraphs, and the whole text are formed with words. Language learning is often thought of as the number of vocabularies a person knows. Therefore, learning and teaching vocabulary is a difficult area deserving special attention. Thus, various educational schemes should be considered to acquire vocabulary and maintain the motivation of the students (Nation, 2003).

On the other hand, the dependence of students on teachers is one of the barriers to learning English. Serdyukov and Hill (2013) emphasized the importance of feeling self-sufficient. Self-sufficiency has a direct relationship with students' motivation, confidence, and success. Computers facilitate language learning and teaching (Chen et al., 2021). Software programs and applications not only have a serious potential for students' self-sufficiency but also enable teachers to change their perception and approach from teacher-centered to student-centered. Amit, Miriam, and Dorit Neria (2006) stated that teaching English as a secondary language to young learners is very challenging. Therefore, English language teachers need special educational skills to perform their duties and new methods must be introduced to minimize problems.

The diversity of students in a classroom (in terms of intelligence quotient (IQ), pre-school learning environment, learning methods, and the like) represents another challenge for teachers requiring proper conditions to be provided for all students in the classroom. Although it seems difficult or even impossible, teachers need to have a proper teaching method to help all students. A noteworthy point in the discussion of education is that teachers rarely use educational media as part of the educational process and may not have an understanding of the value of educational technologies in their particular content (Safitry et al., 2015). However, technological products that have created fun learning activities, such as multimedia, movies, and internet surfing play an important role in the learner's learning model (Fols, 2008). Playing games, just as it is a means of entertainment, can also have an educational and constructive benefit. In some cases, it can be acknowledged that engaging a child in playing games is worth more than reading a book. Children acquire new mental concepts during games, especially educational games. Nand et al. (2018) asserted that technological tools such as computer games can enhance learners' learning in the classroom permeating a lot of educational literature at the moment.

Through active engagement with ideas and knowledge, and also with the world at large, we see children as better prepared to deal with tomorrow's reality, a reality made by themselves. From this perspective, learning through a game is crucial for positive and healthy development, regardless of a child's situation (Zosh et al., 2017). Along with the introduction of computer technology to all walks of life, computer games, as an important aspect of such technology, have created the site for a manifestation of children's lives. Computer games can be considered as a source of learning as well as entertainment, and in this way, learners acquire generalized strategies for learning (Squirick, 2006). Web-based computer games improve spatial visualization and increase subjects' abstract mental skills (Lin & Chen, 2016).

Gaming in education may be viewed as interference to learning but its role in education as increasing students' motivation and engagement, improving visual skills, enhancing students' interaction and collaboration abilities with their peers shows the value of using games in a real-world situation (Zirawaga et al., 2017). Recent studies on computer-based educational games have shown that such games increase development, originality, and flexibility in elementary school students. The results of the research conducted by Partovi and Razavi (2019) indicated that creativity, confidence, and

imagination of learners participating in computer games have increased.

Reading is the most important activity in any language class which operates as a source of information, pleasure, and knowledge of the language (Rivers, 1981). In reading, as a receptive skill, any message must be decoded by the eye and the brain (Sreena & Ilankumaran 2018). It is an active cognitive process that includes reasoning to make meaning from a written text and understanding it comprehensively (Abdelhalim, 2017). Brown (2001) referred to reading as a cognitive-emotional process on which various affective factors are strongly influential. Hence, lower standards of reading proficiency could be due to many various factors, including cognitive or affective ones. However, reading skills can be improved with a lot of material available on the Internet.

Furthermore, it seems that although writing skills are crucial in the development of other language and metacognitive skills, they are the least popular and most difficult skills to acquire in a foreign language (Blanka & Klimova, 2013). There was a time when people used to think that only journalists and digital marketers should have excellent writing skills. But now, thanks to the growing importance of communication, everyone requires effective writing skills in almost every industry and for every job. Good writing skills are essential for all students to meet their educational and internship requirements. Learning to write in a way that is appropriate for the target audience is something that many people do not manage even in the first language, even though a significant part of the educational process is devoted to developing such skills. In practice, many of the problems that learners face in writing are often solved through discussion (Garb & Wakaplan, 2015).

Having challenged the traditional belief that games are unproductive and non-utilitarian, some scholars have attempted to paint a different picture on this issue. Moreover, new technologies, such as the computer, have revolutionized the way games are played. Nowadays, computer games are being used for more than simply entertainment. Some even argue that it is time for games to deal with more serious matters, one of which is in educational issues (Ang & Zaphiris, 2008).

Furthermore, since the education system in Iran is centralized (Hedayati et al., 2017, p.4), teachers and students have to follow the same curriculum and

textbooks rigorously. Teachers usually have to deal with several difficulties, such as large class sizes and limited resources. Therefore, a learning object (LO) like web-based games might be helpful in such schools given the fact that they can afford opportunities to the students to experience new contents without a high cost. Several studies (e.g., Klimova & Kacet, 2017) have paid attention to the content analysis and structure of these games, but few studies have focused on the role of these games in facilitating and increasing second language skills. To fill the gap, the current study aimed to investigate the role of web-based games in facilitating and enhancing English reading and writing skills.

Method

The research employed a pre-test and post-test experimental design with control and experimental groups.

Participants

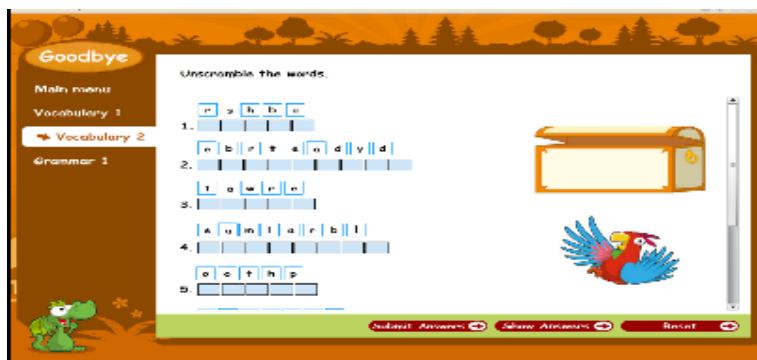
The statistical population of this study included all male students of non-profit public secondary schools in the west of Tehran. Due to accessibility, 36 male students in fourth, fifth, and sixth grades (10-12 years old) who were studying in the academic year of 2019-2020 were selected as the participants. Having been administered the pretest, they were randomly assigned to two groups, each with 18 members. To ensure the homogeneity of participants in the two groups, the researchers selected those with the same average scores of academic achievements, the same background in the use of electronic devices, and similar levels of class participation.

Instruments

The material for the study were new words selected from *Our Discovery Island* (ODI). That was the book taught in school as well as some selected vocabularies items. In both groups, the same topic (clothes) from the same book (*Our Discovery Island*) was taught. The control group just used the book, and the experimental group used online games of the book in each session. It contains various exercises, including drag and drop, item finding, memory card, and listen and match. Some samples of the pictures are provided in Figures 1 to 6.

Figures 1 and 2.
Listening Grammar Exercise

Figures 3 and 4.
Listening Grammar Exercise



Figures 5 and 6.
Listening & Vocabulary Exercise

Also, two tests were developed by the researchers to collect the data and test the hypothesis. The items were designed based on the vocabulary in *Our Discovery Island*. One of the tests was used in both groups and its parallel form was used as the posttest. Moreover, to meet the requirements of the research, the researchers developed a checklist in which facilitation was considered with four options (very low, low, medium,

and high) for answering each question (Table 1). Considering the validity of the tests (i.e., pretest and posttest), expert professors of testing as well as other professors who had experienced teaching in the field were consulted, and the validity of the research questionnaires was finally confirmed. The following are the items in the checklist.

Table 1.*Questions Used in the Checklist*

Items	Very low	Low	Medium	High
1 Does the use of web-based games affect learners' ability to read English vocabulary?				
2 Does the use of web-based games affect learners' ability to write English words?				
3 Does the use of web-based games in the classroom affect learners' concentration time?				
4 Does the use of web-based games in the classroom make learners dynamic in the classroom?				
5 Does the use of attractive images and various songs (using the senses) in web-based games affect the durability of content learning?				
6 Does the use of various incentives in web-based games affect the efforts of learners?				
7 Does the use of rewards in web-based games increase the sense of competition?				
8 Does the use of rewards in web-based games increase the interest of learners?				
9 Does the use of web-based games affect the level of interest of learners in reading exercises in the classroom?				
10 Does the use of web-based games affect the level of interest of learners in doing writing exercises in the classroom?				
11 Does the use of web-based games in the classroom affect the encouragement of learners who need more repetition and practice?				
12 Does the use of web-based games encourage learners to take control of the learning process?				
13 Does the use of web-based games in the classroom as a group affect the creation of a participatory atmosphere?				
14 Does the use of web-based games reduce learners' dependence on teachers?				
15 The use of web-based games has the effect of encouraging learners to work in groups with classmates.				
16 Does repetition of words in different ways and different formats in web-based games affect the durability of learning?				
17 Does the use of basic, intermediate, and advanced levels in web-based games increase the responsiveness of learners?				
18 One of the advantages of web-based games is learners' desire to eliminate their weaknesses and improvements.				
19 Evaluation in web-based games (instant feedback) is effective in trying to learn again.				

In addition, 30 questions were extracted by teachers and researchers according to the content to evaluate reading and writing skills. These items were then given to five highly experienced teachers, including the teachers of the experimental and control groups, to be edited and modified. Finally, out of a total of 30 items, 16 items (with images) were allocated for the pretest and posttest. The web-based educational game was selected based on a review of both reading and writing skills. In

two stages of the pretest and posttest, the tests were based on the second lesson of the book *Our Discovery Island*. The content validity of the two tests was approved by four language teachers holding a bachelor's degree in language, the director of the language department, and two supervisors. The reliability coefficients measured through Cronbach's alpha method for reading and writing skills tests were 0.87 and 0.89, respectively.

Procedure

After administrating the pre-tests, in the experimental group, a web-based game related to the mentioned language book was used for teaching. During five sessions, the topics taught with these games were followed up in the classroom. Using this game, the students worked on the concepts in the second lesson of the book related to the different types of clothes, their dictation, and pronunciation. The teacher had a guiding and facilitating role in this research. The pretest, which included questions to measure the dependent variables (reading skills and writing skills), was administered to both groups. Then, the experimental group was exposed to the independent variable (web-based game and English words) for six sessions. The control group received the same content in six sessions in the

traditional way. Finally, a posttest was administered to the two groups, and the results obtained from the research were collected and analyzed.

Findings

The analysis of covariance was used to evaluate the effect of web-based games on reading and writing skills. However, examining the effect of this intervention on another dependent variable (i.e., facilitation) was rather different. The facilitation variable was measured only in the experimental group in two stages of pretest and posttest. Paired t-test was used to evaluate the effect of playing games on this variable. The descriptive information related to these two variables is reported and examined in Table 2, and then the information related to the hypothesis testing is presented.

Table 2.
Descriptive Information of Research Variables by the Study Groups

Group	Variable	Pretest		Posttest	
		Average	The standard deviation	Average	The standard deviation
Experimental	Facilitation	12/28	1/56	16/72	1/91
	Reading and writing	13/96	2/40	18/12	1/04
Control	Reading and writing	11/90	3/38	14/28	2/58

The mean of reading and writing skills variable in the posttest of both control and experimental groups increased compared to the pretest. Also, the mean of the facilitation variable increased after the test. Yet, to determine its significance, one must refer to the results of the inferential tests. The normality of the distribution

of variables is a basic condition for using parametric tests. Therefore, prior to performing any inferential test, the normality of the distribution of variables should be checked by the Kolmogorov-Smirnov test. The results of this test are reported in Table 3.

Table 3.
Results of Kolmogorov-Smirnov Test

Variable	Test	Group	Statistics	Degrees of freedom	Significance level
Reading and writing skill	Pretest	Control	% 16	18	% 2
		Experimental	% 15	18	% 2
	Posttest	Control	% 19	18	% 09
		Experimental	% 14	18	% 2
Facilitation	Pretest	Experimental	% 20	18	% 08
	Posttest	Experimental	% 19	18	% 09

The distribution of all the variables based on the results of the Kolmogorov-Smirnov test is not significantly different from the normal distribution ($P > 0.05$); therefore, the assumption of normality is established for both variables in both groups, and parametric tests can be used. As mentioned before, covariance analysis is needed to examine the effect of

playing games on reading and writing skills. However, prior to performing covariance analysis, two basic assumptions should be considered, namely the homogeneity of variances and the homogeneity of the slope of regression coefficients. The Levin test was used to evaluate the homogeneity of variances in the experimental group and control group. The results

indicate the establishment of this hypothesis ($P < 0.05$ and $F = 0.63$). In addition, the homogeneity of regression coefficients was checked through the interaction between the pretest and the independent variable, and

this assumption was confirmed ($P < 0.05$ and $F = 2.62$). Table 4 presents the results with an eye to the assumptions of analysis of covariance and the use of this test.

Table 4.

Results of the Analysis of Covariance for Both Experimental and Control Groups

Sources of index change	Total squares	Degrees of freedom	Average squares	F	Effect size	Significance level
Pretest	66/15	1	66/15	33/08	0/50	0/0001
Differences between the two groups in the posttest	65/58	1	65/58	32/79	0/50	0/0001
Error	65/99	33				
Total	265/35	35				

Table 4 shows the results of the analysis of covariance to examine the differences between the experimental and control groups by removing the pretest factor. As shown in the Table, given the fact that the effect of the pretest was controlled, the experimental group and control group have a significant difference in the posttest ($P < 0.05$ and $F = 32.79$). As a result, the observed value of 32.79 is greater than the critical value at the confidence level of 0.05 and the degree of freedom of 1 and 33. Therefore, the posttest scores for the experimental group and control group with statistical

control of the pretest effect are statistically significant at the confidence level of 0.05. Moreover, as shown in Table 2, the scores of reading and writing skills of the experimental group increased after the treatment. Therefore, the hypothesis that educational intervention (web-based games) has a significant effect on reading and writing skills scores is confirmed with 95% confidence. A correlated t-test was used to test the second hypothesis according to the experiment of the group (experimental) in two stages of pretest and posttest. Table 5 shows the results of the test.

Table 5.

Correlated T-Test Results

Variable	Descriptive index		Assurance distance		Statistical test		
	Difference in averages	Standard error	Low limit	Upper limit	t	Degrees of freedom	Significance level
Facilitation	-5/39	0/60	-6/65	-4/12	-8/98	17	0/0001

Table 5 shows the results of the correlated t-test to evaluate the change in the scores of the experimental group from the pre-intervention stage (pretest) to the post-intervention stage (posttest). The results of the test indicate a significant difference between the scores in pretest and posttest ($P < 0.05$ and $t = -8.98$). As shown in Table 2, the average of the facilitation variable in the posttest increased compared to the pretest. Therefore, the research hypothesis that the use of web-based games increases facilitation in students is confirmed with 95% confidence.

Discussion

The purpose of the current study was to investigate the role of web-based games in facilitating and enhancing English reading and writing skills. The findings of the

research showed that educational web-based games has a significant effect on reading and writing skills of Iranian male students. Several studies have been conducted in line with the present study. For instance Yukselturk, Altıok and Başer (2018) stated that students learn a foreign language indirectly and unconsciously through computer games. Yukselturk et al. (2018) pointed to the importance of learners' participation in education through games and multimedia and considered this element involved in the effectiveness of educational technologies. Gholami et al. (2016) emphasize the influence of learners' gender. In addition, the effect of playing games on second language learning and usefulness of technology in teaching listening and speaking have been mentioned in a number of studies such as Farnia et al., 2013; Nouri and Asoudeh, 2013; Altunisici, 2014; Nikpour and Kazemi, 2014; Sarani and

Ayati, 2014; Bousselaoui, 2021; Bin-Hady, 2021; and Al-Noori, 2014.

Education is a key factor influencing the progress of today's societies. If the education system engages in theoretical debates and follows inefficient and old-fashioned methods, all aspects of society will surely face a general recession. The rapid growth of information and communication technologies has brought about changes in the applications and technical processes associated with diverse educational settings (Moore, Dixon, & Galyen, 2011). Such technology plays a key role in education (Groff, 2013) in the readiness of the education system to engage with other social institutions in the age of information and communication technology which is essential in the development of human beings (Grayson & Anderson, 2005).

The educational system is responsible for educating intelligent, faithful, rational, and transformational individuals who can maintain their national-religious identity, stability and dynamism, and integrity in the face of crises and challenges of the current world. Training to achieve such goals requires innovation and creativity. In a world where the life of scientific debates and theories is shortening and changing very quickly, it is not permissible to lead the vast system of education with the same old methods. The tools and mechanisms available in schools do not meet the needs of the new generation, thus, the global movement has emerged in developed and developing countries to change the structure of education by transforming traditional societies to knowledge-based ones and using new communication conditions. As seen in the documents approved by the Ministry of Education, the Iranian officials were well aware of the changing global situation and the need to change the country's education system. Having a great impact on schools, students, and teachers, educational technology requires not only hardware but also an effective educational design process in which computer technology and other media are used properly.

Conclusions

Technology has changed drastically over recent decades. The increasing variety and accessibility of technology has expanded the toolbox and the opportunities for teachers to use technology. Computer devices are more powerful and come in different types, ranging from desktop computers to hand-held ones. Learning with technology has become essential in today's schools. Throughout the world, governments, education systems, researchers, school leaders, teachers, and parents consider technology to be a critical part of a child's education (Eady et al, 2018). Digital technologies provide education with a range of opportunities that are

hard to comprehend, and even harder to address. Learning through technology motivates students and provides a higher level of engagement compared to the conventional "transmission of teaching" (Laurillard, 2008).

Since the aim of designing an education model, at the first step, is to empower education, it is important to examine the challenges and improve performance in this area. The mission of educational systems is to develop quality of education and the use of human potential, which will only happen if education uses information technology to encourage learning and to mobilize talent. The issue of web-based educational equipment and new technologies, especially its application in the educational process, is one of the most important and vital concerns of any educational institution. This equipment must be adequate and meet the required standards. In addition to the need for maintenance and support, it must be used properly and optimally. Lack of application and unavailability of these items are the leading problems in implementing web-based template design. The implementation of the web-based training template has to deal with the following issues: Hardware problems, such as providing and supporting site and equipment required in schools, communication network problems, internet speed limitation in schools, issues related to certain security policies in schools, lack of physical space required to implement the smart plan in schools, and problems related to the required software and its installing and updating.

The availability of teachers with mastery over information technology is necessary to use web-based model in student education and school management. Therefore, it is necessary to improve approaches, review educational policies, reorganize content, improve human resources, design effective programs, and adjust cultural and structural settings to new technologies in order to use information technology effectively and efficiently, especially in the development of education. The important issues that have hindered progress in this area are lack of a unified policy due to successive policy changes with changing officials, low level of government support for such schools, lack of familiarity, and lack of motivation on the part of teachers working in such schools. Moreover, the development of strategies in this field faces some obstacles, such as lack of strong theoretical foundations to support actions and benefit from the developmental model, problems arising from the negative view of officials and parents about web-based education due to unfamiliarity and novelty, and lack of comparative studies in this field. Such a system of learning/teaching can be proved to be powerfully effective for students, teachers, and parents if it is supported by making the right policy and appropriate

culture about it, highlighting the importance and benefits of the method in terms of learning conditions, emphasizing its student-centered approach, conducting comparative studies, and deploying it in different communities.

Like all other studies, the present study suffers from some limitations. First of all, this study was conducted on 36 male students. Therefore, other studies can be conducted with more participants. It is also suggested that in future research, this research be conducted on the female population to compare the results with the present study. In addition, it is suggested that in future research, other web-based technologies be used to compare the results with the present study. Moreover, it is suggested that Ministry of Education include the teacher training program for the implementation of such technologies to prepare the implementation of such web-based tools in schools.

Conflicts of Interest

No conflicts of interest declared.

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