The Effect of Video Games on Iranian EFL Learners' Vocabulary Learning

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ABSTRACT

This study explored the effect of video games as a new tool for Iranian EFL (English as a foreign language) vocabulary learning. To conduct the study, 40 intermediate EFL learners, both male and female, were chosen through a TOEFL proficiency test. The participants were divided into two groups (10 males and 10 females in each): a control group and an experimental group. While the control group studied vocabulary via traditional classes, the experimental group experienced vocabulary learning (the same words) via a video game called Runaway: A Road Adventure. *The results of the study revealed that learning vocabulary via video games is beneficial, and that males are more inclined toward video-game learning than females.*

INTRODUCTION

Vocabulary is the main building block of language learning. The words arrange together on a grammar base and form the whole building of message. One cannot learn language without vocabulary (Kang, 1995). Second or foreign language learners experience their greatest inadequacy in vocabulary, and in spite of the many methods used to help learners acquire it, no strategy has emerged as the best. Therefore, the research continues toward the most effective path to vocabulary building.

Computers have changed people's lives, and video games have been part of that revolution. The video-game phenomenon has recently caught the attention of researchers from varied disciplines (e.g., psychology and education) who have sought to utilize it as a tool for advancement and improvement. Most of the studies have resulted in positive and beneficial findings. Video games are another avenue for "experimentation in a safe virtual environment" (Kirriemuir, 2003, p. 7).

LITERATURE REVIEW

Importance of Vocabulary Learning

One thing that students, teachers, materials writers, and researchers all agree on is that vocabulary acquisition is an essential part of mastering a second language. However, the best means of achieving vocabulary learning is still unclear, partly because it depends on a wide variety of factors (Schmitt, 2008).

Nation and Kyongho (1995) categorized vocabulary into two main groups: general-service vocabulary (frequently used words) and special-purpose vocabulary (words for academic purposes). They believe that this classification is important because different types of words require different instructional processes. Kang (1995) found that one of the best ways to enhance second language vocabulary learning is to use a context-embedded approach in which new words are presented in context. In his study, target English words, with their meanings and one or more example sentences, were presented to learners via computer audio. Learners could hear the target words as many times as desired. Zhang and Anual (2008) conducted a study to show the role of the size of vocabulary knowledge in reading comprehension. They found that for students to be able to read texts containing low-frequency vocabulary, knowledge of 2000 to 3000 high-frequency words is necessary. Schmitt (2008) states that, in the current research on second language vocabulary learning, a large vocabulary is needed in order to function in English: nearly 8000-9000 word families for reading, and perhaps as many as 5000-7000 word families for speaking.

Video-Game Studies

The possibility of the pedagogical use of video games has recently caught experts' attention in the field of education. Many researchers concur with Piaget (1962) who believed that play is crucial to learning new skills, and recently, studies and projects, organizations, and books have emerged exploring new uses for game-based technologies in learning (Squire, 2008). Schlimme (2002) believes that video games provide a context in which participants can discuss scenarios and outcomes in order to facilitate their understanding of other concepts and can improve children's reading, spelling, and spatial abilities and critical-analyzing techniques. Schlimme also maintains that some simulation video games present players with unfamiliar words which are needed in order to succeed in the game, and, therefore, the players' vocabulary levels may increase as a result.

Johnson et al. (2004) employed software called the *Tactical Language Training System* to enhance communicative competencies of Arabic language learners. The software provided integrated training in culture and spoken foreign language. Results of their study showed that the software would enable learners, even those with low levels of confidence, to acquire communication skills in difficult languages (such as Arabic).

Shaffer, Squire, Halverson, and Gee (2005) discussed the psychological aspects of video games: the virtual world makes it possible to develop situated understanding, effective social practices, and shared values, and helps gamers acquire an epistemic view of the content. They concluded that the epistemic frame making, as well as the integrated knowing and doing of the virtual world, are powerful tools for learning.

DeHaan (2005) conducted research to examine the role of video games in improving listening and reading in Japanese. The results of his study showed that video games enhance a learner's language acquisition, and when a student plays a game to learn language, s/he balances

play and learning. Furthermore, playing video games increases learners' ability in listening and reading comprehension. Finally, DeHaan found that a video game's repetition, contextual clues, controllability, and simultaneously presented aural and textual language, all contribute positively to language learning.

Ang and Zaphiris (2006) analyzed studies related to video games and language learning. Regarding the psychological concepts in language learning, they found that video games contributed in ways that would be considered behavioral and constructivist in nature. Video games in language learning use repetition (behaviorism) and processes of organization of thought and adaptation (constructivism).

Turgut and Irgin (2009), in their study concerning learning English via computer games, found that video games are effective toward learning sub-skills, especially vocabulary and pronunciation. DeHaan, Reed, and Kuwada (2010) measured the effect of interactivity with a music video game on second language vocabulary recall, and explored the degree to which video-game interactivity would help or hinder the noticing and recall of second language vocabulary. The results of the study revealed that video-game observers recalled more words than the gamers.

Brown, Hall, Holtzer, Brown, and Brown (1997) conducted a study to examine the gender difference in video-game performance. They concluded that males perform better than females in video games, but that both genders improve significantly in their vocabulary skill with video-game use. Lucas and Sherry (2004) examined gender differences in video-game use by focusing on interpersonal needs for inclusion, affection, and control, as well as socially constructed perceptions of gendered game play. Their results showed significant gender differences: (1) young men were more likely to be players than women, (2) young women are less motivated than young men by social-interaction gratification in playing video games, that is, since male players are more eager in playing video games, they share more time playing with peers than females do (social-interaction, here, indicates the amount of time a player spends playing and interacting with another peer in the same game), (3) both young women and young men are highly motivated to play video games with challenge defined as the "ability to beat or control the game" (p. 508), (4) young women enjoy non mental-3D rotation games more than mental-rotation games, that is, games in which the players must have the ability to imagine a 3D visual of an entity (e.g., a house) in their mind and rotate that 3D visual in their minds to get a specific information (e.g., remembering which side of the house had a pink window frame), (5) young men prefer mental-rotation games, (6) young men are more motivated by competition than young women are, and (7) young women are more motivated by challenge rather than by competition, that is, unlike challenge, "it [competition] is against player's personal best or the game itself" (p. 510). Ferguson, Cruz, and Rueda (2008) tested the effect of video games on visual memory between males and females, and concluded that playing violent video games helps males improve their visual memory more than females.

THE STUDY

Although the effectiveness of video games on different areas of learning (as well as vocabulary learning) has been the focus of several studies, the present study tries to answer the following two questions: (1) To what extent do video games help learners acquire vocabulary over those who acquire vocabulary without using video games? (2) Do females acquire vocabulary via video games better, or do males?

Participants

Forty subjects (20 males and 20 females, ages 23 to 27) were selected by administering a paper-based TOFEL proficiency test to determine the English-language proficiency level of 80 undergraduate, intermediate-level students majoring in English teaching at Azad University. Participants whose scores ranged between one standard deviation above and below the mean were considered. They were then placed either in the experimental group or the control group. Each group contained two sub-groups of 10 males and 10 females each.

Instruments

This study employed three instruments. The first instrument was the simulated TOEFL test mentioned above. The second instrument, designed by the researchers and containing forty multiple-choice questions, was an achievement test. The reliability of the achievement test was computed by two pilot studies: the split-half reliability method (treats the two halves of a measure as alternate forms) was used in the first pilot study; the Spearman-Brown formula (which predicts the reliability of a test after changing the test length) was used in the second pilot study wherein a reliability of 0.803 was achieved. The third instrument was a Likert-scaled questionnaire designed to determine the experimental groups' view and experience of learning via videogames.

Materials

Two types of materials were used in the study: the experimental group used video games to learn new words, whereas the control group used five text-drill chapters designed by the researchers. These chapters contained stories adapted from the video game's plot, followed by drills. The words that both groups were assigned to learn were based on the video game, *Runaway: A Road Adventure* (produced in 2003 by a German studio called Pendulo). In this game, the major character (a male) is controlled by a mouse click. Participants, as gamers, must first find some needed objects in every chapter of the game and then combine them together to create a self-made tool to help the game's character overcome the problem he has encountered in that chapter. By solving the problem in each chapter, the game continues, the gamer solves the problem in that excerpt. Solving all problems in one chapter makes the game progress.

The video game was selected according to three criteria. First, Nunan (1999) maintains that every task for learning, either the skills or sub-skills of language, should include presentation, practice (repetition), and production (Nunan's "three Ps"). The game, *Runaway,* provides a list of needed objects and how to combine them to craft new tools. In each chapter, hints are hidden and activated by a combination of codes. The researchers provided these hints in print to the participants and added an Oxford dictionary definition and an example for each object (e.g., a definition for the object "stapler" followed by an example) in English to fulfill Nunan's first P: Presentation. Participants had to understand and use the definitions and the examples to be able to not only conjure the image of the objects in their minds but also find them in the chapters of the game. For example, they had to understand the definition provided for *catapult* and use the example to make the definition crystal clear in their minds to recall the picture and then find it in the game. This situation helps them to repeat the definitions given and activate the images of the objects being sought in a particular chapter. The gamer's behavior fulfills Nunan's second P: Practice or repetition. Utilizing the found objects, combining them,

and crafting new tools based on the hints provided, forces participants to use the newly learned vocabulary items, thereby fulfilling Nunan's third P: Production.

Second, Lucas and Sherry (2004) reported that the most popular genre of video games is adventure, and according to *Gamefaqs.com* (a website regarding information about video games), *Runaway* is categorized under the adventure genre. Third, Chang, Hsu, and Chao (2008) maintain that video games designed for game-based learning should allow each player to examine and move objects in the scenario by clicking and holding their mouses. In addition, players should have backpacks to collect items in the game, and an inventory window should display what items the players own, a common feature in many adventure games. *Runaway* is one such adventure video game allowing players to examine and move objects around by clicking and storing them in the inventory. The game not only presents new vocabulary items, it also provides ample situations for gamers to practice and produce the newly learned vocabulary items.

Procedure

The participants assigned to the experimental group learned how to play the video game for vocabulary learning, whereas the participants of the control group met in a traditional class to practice and drill the same vocabulary. At week five (120 hours), the achievement test was administered to both groups. In addition, the experimental group received a questionnaire which sought to capture the group's views about learning via video games.

Data Analysis

Following the scoring of the tests, the results were put under a series of statistical analyses (SPSS, version 16) to provide answers to the study's two research questions. Inferential statistics, such as *t*-tests and correlation co-efficiency formulas, were used to test the hypotheses. To test the first hypothesis (H01: Video games have no effect on new vocabulary acquisition), the researchers extracted the participants' scores on three phases of the *t*-test analyses. At the first phase, the mean of the males from both groups was compared; the *t*-critical was 2.101, and the *t*-value was 6.707 ($p < 0.05$) which is higher than *t*-critical at the significance level of 0.05 ($\alpha < 0.05$) with *df* (18). It can be surmised that the males of the experimental group outperformed the males of the control group.

Table 1. Comparison of Males in Both Groups

Groups	*N*	Mean	Std. Deviation	Std. Error Mean	*df*	*t*-value	*t*-critical	Sig. (2-tailed)
EG Males	10	17.65	1.131	.357	18	6.707	2.101	.000
CG Males	10	14.35	1.081	.341				

Note. EG: experimental group, CG: control group

At the second phase, the mean of the females of the experimental group was compared with that of the females of the control group by a *t*-test. Statistics showed that the *t*-value was significant at $\alpha < 0.05$ with *df* (18) because the *t*-value (i.e., 3.111, $p < 0.05$) was higher than the *t*-critical (2.101). Thus, it can be claimed that, in the achievement test, the females in the experimental group performed better than the females in the control group.

Table 2. Comparison of Females in Both Groups

Groups	N	Mean	Std. Deviation	Std. Error Mean	df	t-value	t-critical	Sig. (2-tailed)
EG Females	10	15.85	1.491	.471	18	3.111	2.101	.000
CG Females	10	13.75	1.532	.484				

At the third phase, the mean of the experimental group was compared with the mean of the control group (in other words, their overall performances were *t*-tested). As indicated in the following table, the *t*-value is significant at α < 0.05 with *df* (38), and the *t*-value (5.869) is also higher than the *t*-critical (2.042). As a result, it can be claimed that all participants in the experimental group, both males and females, outperformed all participants in the control group.

Table 3. Experimental Group Compared to Control Group

Groups	N	Mean	Std. Deviation	Std. Error Mean	df	t-value	t-critical	Sig. (2-tailed)
EG Total	20	16.75	1.585	.354	38	5.869	2.042	.000
CG Total	20	14.05	1.326	.296				

The results of the three phases were significant; consequently, these results reject the first null hypothesis (video games have no effect on new vocabulary acquisition). Thus, it can be concluded that those who learned new English vocabulary via video games outperformed those who learned them in a traditional way.

To test the second hypothesis (H02: There is no significant difference between males and females in acquiring new vocabulary via video games), the researchers used a correlation coefficient formula. According to the statistics presented in the following table, gender and learning via video games are highly correlated (*r-value* = 0.969) at α < 0.05, and their relationship is also positive. Their correlation is significant (*p* <0.05) because the *r*-critical with *df* (18) for the 2-tailed analysis is 0.443, which is lower than the *r*-value (0.969). Thus, the second null hypothesis is rejected (there is no significant difference between males and females in acquiring new vocabulary via video games). The mean of the experimental group males was higher than the mean of the experimental group females. As presented in Table 4, the correlation coefficient is positive. As a result, we can conclude that, because the performance of the males was better than the performance of the females, there is a significant effect of gender on vocabulary learning via video games. Table 5 reflects the participants' views on using a video game for learning.

Table 4. Male/Female Correlation Coefficient

		EGMales	EGFemales	df	r-critical
EG Males	Pearson Correlation	1	.969	18	0.443
	Sig. (2-tailed)		.000		
	N	10	10		
EG Females	Pearson Correlation	.969	1		
	Sig. (2-tailed)	.000			
	N	10	10		

Table 5. Experimental Group Questionnaire

	Questions	Strongly Disagree	Disagree	No Idea	Agree	Strongly Agree
1.	I'm so motivated when I try to learn via video games.	0%	0%	15%	40%	45%
2.	When I face a word that I don't know, I'm so motivated to learn it.	5%	15%	5%	55%	20%
3.	Video games make vocabulary learning more boring.	70%	20%	5%	5%	0%
4.	Learning vocabulary via video games is stressful.	85%	15%	0%	0%	0%
5.	Facing new words incidentally helped me to get them better.	5%	10%	0%	20%	65%
6.	The virtual world of the game helped me to get the meaning of new words.	0%	5%	0%	25%	70%
7.	The meaning of the words became crystal clear by supports from the virtual world of the game.	0%	5%	5%	80%	10%
8.	When gaming, I felt like I was in an English- speaking country.	0%	0%	0%	15%	85%
9.	I learned new words visually.	5%	0%	15%	50%	30%
10.	When I recall the words I learned via the video game, I remember their images too.	0%	5%	5%	15%	75%
11.	Having fun didn't lessen my learning.	5%	0%	20%	45%	30%
12.	Having fun motivated me to continue my learning for long hours.	0%	0%	5%	35%	60%
13.	Sound bites, pictures, and graphics helped me to get the meaning better.	10%	5%	35%	55%	0%
14.	The video game provided opportunities for deepening my word knowledge.	20%	5%	5%	25%	45%
15.	The video game provided opportunities for developing fluency with known vocabulary.	5%	15%	15%	45%	20%
16.	Repeated exposure provided by the video game helped me learn better.	10%	10%	0%	30%	50%
17.	The video game helped me to learn word features, like collocation.	0%	15%	5%	50%	30%
18.	Video games provide opportunities for the intentional learning of vocabulary.	5%	0%	5%	5%	85%
19.	Video games made learning engaging.	15%	20%	5%	35%	25%
20.	I don't feel the pressure of learning when I learn via video games.	10%	10%	0%	30%	50%
21.	I don't get nervous when I don't know the meaning of a word in a video game.	0%	15%	50%	35%	0%
22.	I think video games make language learning more interesting.	5%	0%	10%	30%	55%
23.	Words in the video game were more related to male occupations.	20%	5%	5%	55%	15%
24.	The main character of the game was a boy so I didn't care as much about the video game.	65%	20%	0%	15%	0%
25.	If the main character were a girl, I would care more about the game.	15%	15%	55%	0%	15%
26.	The video game was male-oriented.	5%	0%	15%	35%	45%

The data from the experimental group questionnaire was analyzed and converted into statistical results (the Likert-scaled answers were converted into percentages). The results show that the 67.5% of the gamers were satisfied with learning vocabulary via the video games.

DISCUSSION AND CONCLUSION

In this study, we explored the effect of video games on vocabulary learning for male and female EFL learners. As the results of this study show, video-game based learning has a strong effect on acquiring new vocabulary, which confirms what Schlimme (2002) and Turgut and Irgin (2009) predicted. In this study, statistical results revealed that using a video game as a tool for vocabulary learning can be much more useful than using a traditional approach. The t-value in each t-test revealed a greater value than the t-critical; comparing the overall performance of the learners revealed 5.869 for the t-value, which is significantly higher than 2.042 for the t-critical. Such a statistical difference indicates a significant effect of the video game on vocabulary acquisition.

However, one key question remains: *How* did the video game help gamers to outperform traditional learners? Shaffer et al. (2005) write that the virtual world created in video games is a powerful tool because it simulates a social context, and helps gamers to become masters of their learning using the *learning environment* provided by the virtual world in the video games. Furthermore, the virtual world, with pictures, voices, and graphics, also helps make an authentic context for learning. In other words, what is going to be taught or learned can also happen in a real-life like situation that provides *situated understanding* for learners. The results of the questionnaire (specifically, questions 6 and 7, with an average of 88.3% agreement) support this idea. The virtual environments of video games offer enormous potential in education; ironically, learning and assessment can be placed in a real-world context easier in a video game than in a standard classroom.

Another beneficial aspect of video games is skill learning. Gass and Selinker (as cited in Turgut and Irgin, 2009) maintain that the natural repetition in games allows a language learner to be continuously exposed to the target language, creating more opportunities for acquisition to occur. Furthermore, according to Turgut and Irgin, the sense of winning increases both the motivation and awareness of the gamers, and the average of 81.3% agreement for questions 1, 11, and 22 (which were designed to elicit ideas about motivation and fun) supports this idea. Finally, another advantage of using video games is its degree of interactivity. According to DeHaan et al. (2010), a defining characteristic of video games is "the extent to which users can participate in modifying the form and control of a mediated environment in real time" (p. 75). They state that video games incorporate various technological and pedagogical elements to both entertain and train the player, and when a degree of interactivity between players and these elements takes place, learning happens.

The results of this study also revealed that there is a highly positive correlation between gender and learning vocabulary via video games. The obtained value for the correlation coefficient was 0.969, which indicates a powerful correlation. It must be noted that the main character of the game was a male who left his doctoral scholarship in physics to save a beautiful girl's life. In doing so, he engages in male-oriented actions. Having a male-dominated atmosphere might have had an effect on the study's results in view of the second hypothesis. Conversely, the game's story—a love story adventure—could equally lower the effect.

Although many studies have explored the consistent gender differences in video-game preferences and play patterns, the origin of the differences remains unexplained (Funk &

Buchman, 1996). Brown et al. (1997) claim that women are more competitive than men, and they respond to challenging tasks better than men. Quaiser-Pohl, Geiser, and Lehman (2006) wrote that video-game preferences are a very important issue in video games and gender studies, and claim that boys are more used to playing computer games than girls. According to their findings, another reason for the gender difference could be the genre itself. According to Ferguson, Cruz, and Rueda (2008), the main reason for gender differences in video games is a difference in men and women in visuospatial ability (the visual perception of the spatial relationships of objects). They added that the higher the visual-memory recall, the better a video game player's performance would be. In their study, it was found that the male players had a better visual-memory recall (or visuospatial ability) than female players because they outperformed female players in a violent video game.

There are aspects of this study that limit its generalizability, but which also provide focus for future research. For example, the sample was small. Larger, and perhaps cumulative, groups of students are needed to make the findings more robust. In addition, the video game covered only a small vocabulary corpus. Therefore, further studies are needed using a video game containing a larger vocabulary corpus.

The results of this study have implications for designers of educational video games, teachers, and students. Language teachers are advised to use video games in their classrooms, especially for vocabulary building. Students could use a variety of media to autonomously learn a foreign language, and as video games continue to gain popularity, it seems likely that learners will import or download foreign-language video games, using video games as an effective media for self study.

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