

The Effect of The Using of Computer Games On Academic Success In Teaching English To 8th Grade Students

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Abstract

In this study, the effect of using computer games in an English teaching class of the 8th grade students in secondary school is investigated. A total of 112 8th grade students, 57 in the experimental group and 55 in the control group, participated in the study. Academic Achievement Tests prepared by Ministry of National Education, Measurement, Evaluation and Exam Services Department were used as pre-test and post-test. Eight of the games, which were prepared specifically for Grade 8 students, were used in the Experimental Information Network (EBA). Preliminary tests as covariant, final tests as dependent variables and applied to groups of teaching and traditional teaching were discussed as independent variables. According to the one-way covariance analysis (COVARIANCE) results, it was found that the game was more effective than traditional teaching and this effect was moderate. In addition, it was determined that 36% of the final test scores of the students learning the game were explained by the game.

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Introduction

As of 2013-2014 academic year, English education started in the second grade in our country. In the Primary English Curriculum prepared by the Board of Education, for students from the second grade of the primary school up to the 8th grade in the secondary school; It is stated that they aim to use an English teaching curriculum that is suitable for their social and physical and mental development, which can be used in the classroom and outside environments. According to the report published by TEPAV and the British Council in 2013, despite of the potential of teachers and positive classroom environment and although more than 1000 hours of English education in 12 years more than 90% of students still have a basic level of English (TEPAV, 2013). The importance of developing foreign language skills was emphasized in the 18th National Education Council held in 2010. However, no emphasis was made on the teaching of English in the 19th National Education Council held in 2014 (TTKB, 2018).

Games are one of the popular methods used in English teaching for a long time (Schultz&Fisher, 1988). Teaching English through games is both more effective and attracts more attention than traditional books

(Wood, 2001). Digital games are funnier, more relaxing, and more interesting for students (Liu&Chu, 2010). In the literature on English teaching, the role of digital games in teaching English is emphasized (Hwang, Shih, Ma, Shadiev&Chen, 2016), But the game Education Information Network in Turkey has not been used in regard to the role of secondary students in learning vocabulary. In this study, the effectiveness of game-based teaching with pre-test, post-test and experimental design were investigated.

Literature Review

When we look at the history of computer games, it is seen that the first computer games were used in the late 1970s and early 1980s. (Aguilera ve Mendez, 2003), in today's world, computer games are among the most important entertainments of people, especially school-age children. Games are the most used interactive media by children. The most common activity of children in primary and in secondary school is playing computer games. (Kirriemuir& Mc Farlane, 2004). As to why people play computer games, Malone (1981) states that games increase people's sense of fantasy, challenge and curiosity. Games are not just the leisure time activity of the students, games are also an interactive endeavor where many skills are acquired. For example (Kirriemuir& Mc Farlane, 2004) argue that games enhance students' strategic thinking, planning, communication, negotiation skills and decision-making skills. The continuation of technological advances, the widespread popularity of entertaining computer games and the studies conducted on this issue highlight the potential of game-based learning (Egenfeldt-Nielsen, 2005; Federation of American Scientists, 2006; Mitchell&Savill-Smith, 2004). The development of the Internet, web-supported applications and mobile devices have led to more consideration of game-based learning in educational research (Hong et al, 2009). While some studies show that game-based learning is effective (Papastergiou, 2009; Liu & Chen, 2013), some studies indicate that game-based learning is not effective (Costabile et al, 2003; Eow, Ali, Mahmud ve Baki, 2009). Modern educational theories indicate that learning is much more effective when the student is active, experiential, situational and problem-based (Boyle, Connolly & Hainey, 2011). Games also provide students situations which are mentioned above (Connolly, Boyle, MacArthur, Hainey and Boyle, 2012). In this research we will use the definition made by Tang, Hanneghan, and El Rhalibi (2009) as a definition of game-based instruction. "An innovative learning approach derived from the use of different types of software applications that use learning and educational games such as computer games or learning support, teacher development, and student assessment". In game-based learning, many games are designed for educational purposes. For example, Global Conflicts: Palestine is a 3D role-playing game (RPG) that deals with the Israeli-Palestinian conflict (Egenfeldt-Nielsen & Buch, 2006, pp. 93-97).

Research Design

In this research, with pre-test-post-test, control group and by using experimental design examines the effect of game-based instruction on students' academic achievement. The games used in the research were got from Education Informatics Network site provided by the Ministry of National Education and as academic achievement English tests which are prepared by the Ministry of National Education Assessment and Evaluation Department were used. Research hypotheses were determined as follows:

1. The experimental and control groups are two different groups with similar characteristics.
2. Post-test scores of the experimental group which is based on game-based instruction is significantly higher than the pre-test scores
3. There was no significant relationship between the post-test scores and the pre-test scores of the control group who applied traditional teaching
4. The post-test achievement scores of the experimental group that are based on the game-based instruction are significantly higher than the post-test achievement scores of the traditional teaching group.

Methodology

Participants

This research was carried out with 111 students in 8th grade at Sırrın Hacı Bektaş Veli secondary school in Şanlıurfa, Turkey.

Table 1: Experimental and control groups

Groups	Classes	Gender	Gender	Total
Experimental Group	8/A Class	13 Girls	16 Boys	29
	8/C Class	13 Girls	15 Boys	28
Control Group	8/B Class	14 Girls	14 Boys	28
	8/D Class	12 Girls	15 Boys	27
Total	Total	52 (%46)	60 (%54)	112

When the experimental group is examined, it is seen that 26 of the students are girls and 30 are boys. When the control group is examined, it is seen that 26 of them are girls and 29 of them are boys. There are 57 students in the experimental group and 55 in the control group. The students were asked to participate in this project voluntarily. All of the students stated that they wanted to participate in the project. In addition, the school administration ethically allowed the students to do so when the students declared that they would participate voluntarily. The experimental and control group were elaborated for being equal according to the student identification slips applied by the Guidance and Psychological Counseling Specialist, and the students' grade point average of the 7th grade year-end English course and the pre- test results. In the distribution, the number of boys and girls was balanced.

Data Collection Tools

Academic achievement test

In order to measure the students' pre-knowledge about the 8th grade English course, and the success levels at the end of the implementation, the achievement tests which were published in the Evaluation and Examination Services Department of the Assessment Unit were used. There are at least two achievement tests for each unit. Each of the achievement tests consists of 12 questions. These 12 questions are in accordance with the objectives of the unit and provide a high level of validity by means of substances that associate the vocabulary learned in the target language with real life. Two achievement tests, each with 12 questions, prepared by the Ministry of National Education were applied as pre-test and post-test. As a result of the scoring, the highest score that can be obtained from the test is 100 and the lowest score is 0.

Implementation

The eight games in Marathon book which is published by YDS Publishing in digital format for the 8th grade is used in this research. These eight games are Quizshow, Soccer, Icebucket, Matching, Oddoneout, Sentenceformation, Wordsearch, Flipcards. With these games many activity types were done such as matching the words with their synonyms or their opposite meanings, different from words, sentence completion and word derivation activities etc. The implementation of process of this study is 4 weeks for two groups.

Table 1: Implementation process

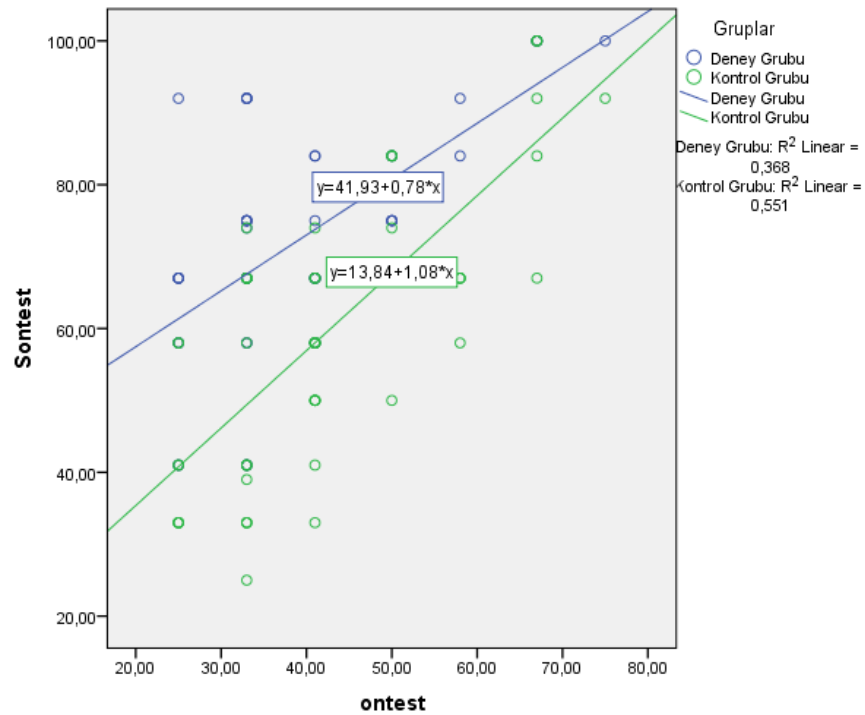
Weeks	Control Group	Experimental Group
1. Week	The teacher gave information about the contents of the unit and the processing of the unit. Old learning was reviewed. Pre-test was performed.	The teacher gave information about the contents of the unit and the processing of the unit. Old learning was reviewed. Pre-test was performed.

Weeks	Control Group	Experimental Group
2. Week	After the unit was entered, the grammar subjects in the unit were processed. At the same time the words in the target language were used in grammar issues.	After the unit was entered, the grammar subjects in the unit were processed. At the same time the words in the target language were used in grammar issues. Games were played by the teacher
3. Week	Listening and speaking activities in the textbook were applied. At the same time, the word and sentence exercises in the book were applied. Word memorization studies were done.	Listening and speaking activities in the textbook were applied. At the same time, the word and sentence exercises in the book were applied. The games in these activities were played in the last ten minutes of the lessons.
4. Week	Activities in the textbook continued. The words learned were strengthened by using them in sentences and in paragraph studies. The pro- test was performed.	Activities in the textbook continued. Individual, paired and group games were played on the digital board. The pro- test was performed.

In the implementation process, besides the traditional teaching of the experimental group, digital games were played at the end of the lesson. In the classes in where using traditional teaching ,exercises in lesson book were done.

Data analysis

Statistical analyzes were conducted to analyze the data and find answers to the research questions. The significance value was taken as $p < 0.05$ The English academic achievement of the students was obtained from the English achievement test. Pre-test success scores of the experimental and control groups were considered as covariant. The difference between the post-test success scores of the experimental and control groups was analyzed by covariance analysis, and the difference between pre-test and post-test achievement scores were analyzed by dependent groups t-test. Before the analysis of covariance, the assumptions of covariance analysis were examined. Firstly, pre-test scores, which were treated as covariants, were measured before implementation. Pre-tests are valid and reliable tests which are prepared by Ministry of National Education, Assessment and Evaluation General Directorate. Since there is only one covariant in this study, it is not tested whether there is a relationship between covariates. Graphical analysis was performed to determine whether there is linearity between covariant and dependent variable.



Graph 1. Linearity between covariant and dependent variable

As seen in the graph, there is a linear relationship between covariant (pre-test) and dependent variable (post-test). In addition, the R square results showed that 37% of the posttest scores of the experimental group were due to the pre-test scores, and that the change in the 55% of the posttest scores in the control group was due to the pre-test scores. Finally, in order to make ANCOVA, the homogeneity of the slope between the regression lines must be tested. In fact, it is seen that the slopes are not very different from each other. This shows that we can do ANCOVA. However, when we look at the relationship between the slopes statistically, there is no significant difference between the slopes.

Tests of Between-Subjects Effects

Dependent Variable: *Post-test*

Source

Intercept

Groups

Pre-test

Groups * Pretest

- .505 MS(pre-test) + .495 MS(Error)
- .505 MS(groups * pre-test) + .495 MS(Error)
- MS(Groups * pre-test)

d. MS(Error)

The table above shows that we meet the assumptions of homogeneity between regression curves. Therefore, ANCOVA analysis was conducted.

Findings

In this section, the analysis of the hypothesis of the research and the results of these analyzes are given.

Table 1: Experimental and control group descriptive statistics

	Experimental Group	Experimental Group	Experimental Group	Control Group	Control Group	Control Group
	Mean	SD	SE	Mean	SD	SE
Pre-test	38,48	12,18	1,65	42,01	13,54	1,84
Post-test	71,83	15,61	2,12	59,11	19,66	2,67

When the mean of the experimental group and control group were compared, the mean scores of both groups increased after the implementation. Independent groups t-test was used to determine whether there was any difference between the pretest scores of the experimental and control groups. Descriptive statistical data on the pre-test scores of the students in the experimental and control groups obtained from the English achievement test are presented in Table 1.

Table 2: T-test analysis for the pre-test scores of the students in the experimental and control groups.

	Groups	N	Mean	Std. Deviation	T	df	P
Pre Test	Experimental Group	54	38,4815	12,18837	-1,42	106	,157
	Control Group	54	42,0185	13,54586			

As seen in Table 2, there is no significant relationship between the pre-test scores of the experimental and control groups. This result shows that the experimental and control groups are identical, similar groups. Therefore, the first hypothesis was accepted. Post-test scores of both groups were increased according to pre-test scores. The dependent groups t-test was used to determine whether this height was significant. The test results are given in the table below.

Table 3: Pre-test and post-test results of experimental and control groups

		Mean	N	Std. Deviation	T	df	P
Experimental Group	Pre-Test	38,4912	57	12,00167	-20,381	56	,000
	Post-test	71,8772	57	15,30648			
Control Group	Pre-Test	42,0185	54	13,54586	-9,505	53	,000
	Post-test	59,1111	54	19,66000			

As seen in Table 3, there is a significant difference between the pre and post test scores of both the experimental group and the control group. Post-test scores of both groups were higher than pre-test scores. While the second hypothesis was accepted, the third hypothesis was rejected. However, while the scores of the experimental group doubled, the score of the control group increased by about half. A covariance analysis was performed to compare the posttest scores of the experimental and control groups. Homogeneity of the regression slopes and equality of variances were tested before the covariance analysis was performed and it was found that the assumptions of homogeneity between regression curves were met.

was seen that there was no obstacle to the analysis.

Table 4: One way covariance analysis table

DependentVariable: Post-test Source	DependentVariable: Post-test Source	DependentVariable: Post-test Type III Sum of Squares	DependentVariable: Post-test df
Intercept	Hypothesis	260556,196	1
	Error	9576,958	6,780
Groups	Hypothesis	2259,296	1
	Error	4013,284	25,596
Pre-test	Hypothesis	15786,726	6
	Error	866,106	6
Groups Pre-test	Hypothesis	866,106	6
	Error	15931,456	94

When we look at the groups tab in the table above, we see that the groups show significant differences when the pre-test scores are checked in terms of the final test scores. ($p=0,001<0,05$). When we look at the effect value, we see that the effect value is 0.36. This shows us a moderate effect (Cohen, 1988). This value also shows that 36% of the change in the dependent variable is explained by the independent variable. Independent variable in here is game based english education which is given by teacher. The table above also shows that there is a significant relationship between covariant (pre-test) and dependent variable (post-test) when the groups are checked. When the effect value is examined, it is seen that covariant explains 94% of the change in the dependent variable

DependentVariable: <i>Post-test</i> Gruplar	DependentVariable: <i>Post-test</i> Mean	DependentVariable: <i>Post-test</i> Std. Error	DependentVariable: <i>Post-test</i> 95% ConfidenceInterval LowerBound
Experimental Group	80,903	2,787	75,369
Control Group	67,119	2,547	62,063

Finally, the table above shows the adjusted averages of the posttest scores of each group when the effect of covariant is eliminated.

As a result, a one-way inter-group covariance analysis was performed to test the effect of game-based learning on post-test achievement scores in the quasi-experimental design, which was planned as traditional learning with game-based learning. The independent variable was the teaching method applied to two groups and the dependent variable was the unit achievement test. Pre-test scores of the participants were evaluated as covariant. Before assuming covariance analysis, the assumptions (homogeneity, normality, homogeneity of variants, homogeneity of regression curves and reliability of covariant) were tested. When the pre-test results were checked, a significant difference was found between the experimental and control groups. $(1,26)=14$, $p=0,001$, etki değeri=0,36. This shows us that 36% of the change in the final test scores in the experimental group is the result of the implementation. There is also a strong relationship between pre-test scores and post-test scores and it shows that the change in the final test scores explained 95% when the independent variable was checked.

Discussion

In this study, in addition to the traditional teaching methods of the experimental group, English language learning games in the Education Informatics Network were played. After the lectures were given in the control group, the exercises in the book were made in the last minutes of the lesson and after the lesson was given in the experimental group, the exercises were done with the games.As a result of the analyzes, there was

no significant difference between the pre-test scores of both groups. This shows that the groups are identical and similar. When the differences between the post-test and pre-test scores of both groups were examined, it was seen that there were significant differences between the pre- and post-test scores of both groups. However, the difference between the mean post-test score and the pre-test score of the experimental group was higher than the difference between the post-test and the pre-test of the control group. A covariance analysis was performed to determine the difference between post test scores of experimental and control groups. According to the results of covariance analysis, the post-test scores of the experimental group were significantly higher than the post-test scores of the control group. In addition, it was observed that 36% of the change in the posttest scores of the experimental group was performed by implementation. Cheng ve Su (2012) found that the game-based learners learned significantly better than the traditional group in their study on game-based learning students and traditional learning students. Liu and Chen (2013) also found that game-based learning increased student achievement. In another study on digital game-based learning, Papastergiou (2009) tried to teach the computer science course with digital play, and found that, in the end, game-based learners learned more effectively and were more motivated than learners without game-based learning. Ke and Grabowski (2007) found that game-based learning increased students' mathematics achievement. The games have instructional effectiveness and that is expressed in many studies (Dempsey et al, 1996). In addition to the studies that show that the students who learn game-based learning are more successful, there are some studies showing that students who are not game-based learners are more successful than game-based students. For example, Eow, Ali, Mahmud and Baki (2009) found that the non-game-based group had significantly higher scores than the game-based learning group. But the effect of that is too small (%2).

Computer games have become an engaging, addictive and time-consuming task for students, for children or for adults. In this sense, as Eow vd., (2009) said, if you look at the game in a negative way, it is not possible to get anything. In this sense, as Eow (2009) said, looking at the game in a negative way, it is not possible to get anything. Therefore, in a positive learning climate (Hayes & Games, 2008), it can be used to increase students' skills such as thinking, making decisions, making comparisons and taking action. Rieber (1996) states that games are important for the psychological, social and intellectual development of children. In addition, students find boring the traditional learning that is not game based (Prensky, 2003). For this reason, studies can be done to use games more effectively in teaching. In particular, it is important to see which kind of games have more effect on learning, and which kinds of games are more effective in what kind of lessons.

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