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The effect of educational digital games on education, motivation and attitudes of elementary school students against course access*

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Abstract

The use of computer games is becoming more and more common among children thanks to its many features; from multimedia opportunities to motivation. This increase in its use also increases the importance of educational games. The purpose of this study is to investigate the effect of the use of educational games in education on the academic success, motivation and attitudes of elementary school students. The participants of the research consist of 90 students studying in a public primary school in the 2017-2018 academic years. The research is also important for carrying out with primary school students as younger individuals who are missing in the literature. In the research designed in the quasi-experimental model, an experimental process was carried out with two different units ("In the Classrom" and "Numbers") in the English lesson, and it was observed that the educational games increased the students' access to the lesson. On the other hand, while educational games caused a difference in motivation towards the English lesson, no difference was found in the attitudes towards the lesson.

Keywords: Digital game, educational game, motivation, attitude,

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1. Introduction

As the beginning of the 21st century and the number of individuals born in this century increased, the practices made for the generation of the 21st century also gained diversity and the design for the applications started with the applications. Digital natives, net citizens (netizens) is a generation born with the 21st century generation, known with different names such as netizens, and internalizing and interpreting technology in daily life as if there was no life without technology (Bozkurt , 2014). In addition to children growing up with computers and technological advances, a generation called the G-generation has grown up with digital games. For G generation, playing digital games is a priority for them (Zicherman & Linder, 2010). G-generation children grow up to be good players because they spend a lot of time in digital games, since the game is more than ten thousand hours for the G-generation, where the game is so prominent (McGonigal, 2011).

With the development of technology, the widespread availability of computers everywhere, and the fact that computers become mobile and accessible from everywhere, the fact that new generation children spend a lot of time in digital games has led to criticisms that digital games reduce sociality (Kukul, 2013). The opposing view of presenting a different form of social communication with the developing internet structure can be expressed to the criticisms that digital games reduce sociality. Game designers have added a different dimension to the socialization needs of children by allowing children who play the same game to play together. With this opportunity, children do not play the game alone, and can also interact with a large number of people playing the same game in the world. In digital games, children are given various tasks in games so that they spend more time, and children are provided with a sense of success after the fulfilled task (Guo, Hsu, Lin, Lin & Huang, 2020).

Digital games and he has also formally placed him in Turkey. The most important indicator of having found a place founded in 2010 in Turkey Digital Games Federation (TÜDOF) is established. Established in 2010, TÜDOF continues its activities in the form of forming a national team and providing support services to participate in digital game competitions at an international level (Kukul, 2013).

Digital games can be classified in different ways according to their features, design style or purpose of use. Considering the classifications made by gamers, developers, marketers and researchers in classification can be expressed as an important suggestion (Gelibolu, 2013). From this point of view, classifications made by different researchers can be examined.

Wright et al. (2001) classified the digital games in six main categories; Educational or informative games, sports games, affective-motor games, simulation games, strategy games and other games. Funk and Buchman, in their study in 1996, classified the games of digital games in six main categories: general entertainment games, educational games, fantasy violence games, human-violence games, non-violent sports games and violent sports games. In this context, educational games are widely accepted as a type of game.

Educational Digital Games as a Game Type

Educational digital games are software aimed at improving the students' problems in their lessons or the problem solving skills of students (Acquah & Katz, 2020). Educational games are used today in many fields such as science, medicine, mathematics and language teaching in order to gain problem solving and strategic thinking skills (Persico et al., 2019). The following common usage examples can be used for the use of educational digital games;

- In preschool education, children can learn the alphabet and reading through educational digital games.
- Writing games played for students to learn to write are among the most sold games on the market.
- Big companies teach how to manage the system in many areas with the help of simulation.
- Candidates trained in the military field receive real war training with computer games.

Features of Educational Digital Games

Educational digital games have a very important place in providing mental development and reinforcing what is learned, as it can be done almost anywhere where technological possibilities allow, as it is usually dependent on mental characteristics. While the goals differ in all educational digital games, the way to reach the goal varies accordingly. It can be stated that it is this feature that attracts players and allows them to spend more time. Due to the difference in the combat aspects of the games, the players are affected and develop in many ways. Some psychomotor skills of the players also improve. In addition, the coordination increases, the passive student becomes active, the students in the classroom environment are given the opportunity to abstain, and their emotions such as struggle, respect, and love can also develop. The use of digital game as an instructional tool generally results from the following features (Çetin, 2013):

- Motivation
- Free environment
- Possibility to test psychomotor properties
- Uncertainty of the result
- Complexity

The Use of Educational Games in Education and Advantages

In order to combine digital games and education, it can be defined as software in which educational content is embedded, used as an auxiliary material for students or used directly as course teaching material. It is an approach that combines many approaches to learning digital games. The first of these approaches is "Fun Education" which is derived from the combination of the words "Entertainment" and "Education". The concept of fun education is an area that provides products especially for preschool and K-12 educational communities. The games in the concept of fun education use simpler methods such as exploring, learning, on-site experience and trial and error (Squire, 2002).

According to Egenfeldt-Nielsen (2011), educational computer games are used in three forms in education:

- Using for the purpose of motivation in learning the course topics
- Using for teaching of course topics

- Using for computer games to revive the subject

Prensky (2008) expressed that children growing up with digital games show different development compared to others. Also, the cognitive development of children playing digital games is expressed more than the cognitive development of children who do not. Ke (2014) found that young people playing digital games think differently than adult people and also use different parts of their brain.

Research problem

Today, as technology usage increases, its role in life increases and it becomes a natural part of life. In this respect, its impact on children becomes undeniable, and the number of people advocating for technology to become a part of education is also increasing. This development affects both the student and the teacher in many ways (Wells, De Lange & Fieger, 2008). In the context of the child, digital games and digital educational games become important.

The use of digital technologies plays an important role in concretizing the concepts to the level that students can understand, presenting them to the student as if they are real, and presenting them for learning as they are considered as the target audience where the research is carried out. In this respect, technology is used more effectively due to the features it possesses in order to offer rich content in education, and its widespread use is increasing thanks to its mobile transformation. In order to keep up with this transformation, technological investments were made in parallel with the developments by the Ministry of National Education (MoNE), and utilization of digital technologies was ultimately expressed as the highest need with the Project for Increasing Opportunities and Improving Technology (FATIH) (MEB, 2017).

Although there are different software types in the effective use of technology, educational games do not develop between these types and lose their competitiveness because of not being able to produce enough qualities and numbers in terms of production (Hawlitschek & Joeckel, 2017). The educational use of this software's, which are the most computerized purpose of children in daily life, was also considered important, and the interest of students in this software group was curiosity in terms of different variables through a developed game (Burnam, 2005). The study, in which the concepts regarding attitudes and motivations towards the course are researched together, is limited in the literature. It can be said that this study will add a different perspective.

Importance of the research

In today's education system, teacher-centered approach has been replaced by constructivist education. In the constructivist education approach, it is aimed to raise individuals who absorb knowledge, question information and run to work. It is accepted by many experts as a basis for the transition to the constructivist approach of instructional technologies with the Cone of Life, put forward by Edgar Dale (Çetin, 2013; Revelle, 2013). Technology plays an important role in this transition. Every day, a new technology is added to the education process in order to make the students concrete, to present information to the complex rather than to complex, to appeal to many senses and to learn by living by doing. Today, educational games play an important role when it comes to game and education.

The game is expressed as an important part of their lives for children. With this aspect, the educational-oriented usability of the games also gains importance. Especially with the development of digital technologies, digital games, which have more place in the daily lives of children, have made these software usable in their education. In addition to the motivation it provides, positive attitudes of children towards these software have increased this importance. Educational game software is especially important as a game genre. Although there are many researches on this subject, the design quality of the games, the differences in the research groups, the separation of the research topics and especially the need for software on this subject require new researches on this subject. In

this respect, the research was designed on a different platform on language education; In terms of revealing the effect of educational games in teaching English, it is differentiated from other studies and research gains importance in terms of choosing elementary school children as target audiences.

Purpose of the research

The purpose of this research is to investigate the effect of the use of educational digital games in education on students' access to lessons, attitudes and motivations towards the lesson. For this purpose, answers were sought for the following sub-goals:

1- Do educational digital games use in education cause a significant difference on students' access to lessons?

2- Do educational digital games use in education cause a significant difference in students' attitudes towards the course?

3- Do educational digital games use in education cause a significant difference in students' motivation for the lesson?

2. Method

In this part of the research, the concepts of the population and its sampling, application process, data collection tools and data analysis are given in titles.

Research model

The study examines the effect of the use of digital educational games in education on attitudes, motivations and classrooms. In this context, a pretest-posttest control group quasi-experimental model, which is a real experimental model, was used to measure dependent variables. In the pretest-posttest control group model, two neutral groups are formed as the experimental and control groups. In two groups, two measurements are made before and after the experiment (Fraenkel, Wallen & Hyun, 2011). Howitt and Cramer (1997) states that experimental studies with pretest-posttest allow the two groups to compare their scores. According to Maxwell (2012), they are a model that can be compared between the experimental and control groups.

Participants

In the experimental process, application was made with two groups as experiment and control. For this purpose, in the first semester of the 2017-2018 academic years, the application was carried out with students studying at the Erdoğan Şahinoğlu Primary School in Adana province, Sarıçam. The main reason for choosing this school is that there is a computer laboratory in the school and the English teacher has volunteered for the application to be carried out. The application of “IntheClassroom” and “Numbers” determined by the course teacher was applied to the 2nd grades since it was the 2nd grade unit of primary education. In this context, lots and lots (A, B, C, D, E, F, G, H) were selected from the 2nd grade and an experimental and control group was selected. A total of 90 students, 45 in the A and D control groups, 45 in the E and F experimental groups, participated in the study (Table 1). Written permission was obtained from the parents of the students before the research.

Table 1. Demographic Information of the Students Participating in the Research

		Experimental group		Control group		Total	
		N	%	N	%	n	%
Gender	female	19	42,2	21	46,7	40	44,4
	male	26	57,8	24	53,3	50	55,6
Personal Computer / Tablet	available	8	17,8	12	26,7	20	22,2

Smartphone	non available	37	82,2	33	73,3	70	77,8
	available	4	8,9	5	11,1	9	10,0
Educational Game	non available	41	91,1	40	88,9	81	90,0
	played	17	37,8	9	20,0	26	28,9
	did not played	28	62,2	36	80,0	64	71,1
	total	45	50	45	50	90	100

As can be seen from Table 1, 45 (24 male, 21 female) students in the control group and 45 (26 male, 19 female) students in the experimental group participated in the research. The majority of students (71.1% in terms of educational experience) have been shown to have not played an educational game before.

Data collection tool and data collection

In line with the research aims, attitude and motivation scales towards the English course, academic achievement test and attitude scale towards technology were applied within the scope of the research. Information about the scales is given below.

Attitude Scale towards English Course

In the research, the Attitude Scale for the English Lesson developed by Dalkılıç (2001) was used to determine the attitudes of the students towards the English lesson. This scale consists of 33 items. The scale includes 3 likert type attitudes towards the activities carried out in the English lesson in accordance with the content of the new curriculum (I Disagree - I am Undecided - I Agree). The attitude scale was developed with 104 primary school students, and the reliability coefficient of the scale was expressed as 0.90. Using permission was obtained from the scale owner to use the scale within the scope of the research.

Academic Achievement Test

to measure the academic success of the students on the topics "In The Classroom" and "Numbers", two achievement tests consisting of 10 questions for each unit were developed by the teacher, in line with the sub-objectives of the course. Since the target audience is still at the 2nd grade of primary school, expert opinion was taken during the development of the achievement test. The items in the scale were presented to the three field specialists consisting of one English teacher, one Turkish teacher and one Information Technology teacher, and their opinions were received by presenting the target behaviors in the form of a sign of statements. Although field experts confirmed the suitability and inclusion of the questions, they suggested correction in two questions in order to ensure clarity in writing and expression. Finally, the achievement test developed was applied to 5 students in the 3rd grade of primary school, and they were asked to express the places they did not understand. In line with the feedback, an academic achievement test consisting of 20 questions and two units was obtained.

Motivation Scale

In the research, the Motivation Scale for English Course, which was developed by Yılmaz (2013) and consists of 14 items, was used to determine the motivation of the students for the English lesson. The scale includes 3 Likert-type motivational items for activities carried out in the English lesson in accordance with the content of the new curriculum (I Disagree - I am Undecided - I Agree). The motivation scale was applied to 68 students and analyzed. The reliability coefficient of the attitude scale was expressed as 0.90. Using permission was obtained from the scale owner to use the scale within the scope of the research.

Data collection and analysis

n order to collect the data in the research, the measurement tool consisting of all measurement tools has been reproduced in sufficient number. The replicated data was applied to the students in the experimental and control groups, whose permission was obtained from their families, before and after the training process together with the researcher and the teacher. Considering the age groups of the students, explanations were made in the same way in both groups regarding how to fill out the forms without orientation.

In the process of analyzing the data obtained from students, the validity of the forms was checked, and after the confirmation of the suitability of the data, the education and analysis processes were started. In the analysis of the data of this research, different analysis techniques were used for different processes. Descriptive statistics consisting of percentage and frequency were used to analyze students' demographic data. Dependent Sample T-Test was used to determine whether there is a difference between the pre-test and post-test scores (academic achievement, course-oriented attitude and motivation) of the students in the groups. Also, Independent Sample T-Test was used to determine whether the experimental and control groups differed in terms of the variables specified before and after the training process. The level of significance was taken as 05.

3. Findings

Findings obtained from this research, in which students' academic success, motivation and attitudes towards English lesson are given in the sub-titles.

The Effect of Educational Game Usage on Students' Course Success

Within the scope of the sub-objectives of the research, firstly, the effects of educational games on students' course success were investigated. For this purpose, two success tests, consisting of 10 questions for each unit described in the method section, were applied to the students at the beginning and at the end of the training process. The results of the analysis made to determine the difference in the course-oriented activities of the students are given in Table 2.

Table 2. Course achievement levels of groups before the education process

Course success	n	$\overline{X}$	sd	df	t	p
Experimental group	45	34,77	9,650	88	-1,716	.090
Control group	45	38,77	12,300			

*p<.05

As can be seen in Table 2, there is no significant difference between the course academic achievement test results developed for the course to be explained to the experimental and control groups before the use of educational games [$t_{(88)}$=-1,716 p>.05]. In other words, there is no significant difference between the experimental group academic achievement test average results ($\overline{X}$ =34.77), and the control group academic achievement test average results ($\overline{X}$ =38.77). It can be said that the academic success levels of the experimental and control groups is the same before the training.

After the training process ended, the same test was applied again to measure the course access of the experimental and control groups. As a result of the application, the academic success levels of the control and experimental group students were evaluated and the results of the analysis are given in Table 3.

Table 3. Course achievement levels of groups before and after the training process

	Course achievement	n	$\overline{X}$	sd	df	t	p
Experimental group	Pre-test	45	34.77	9.650	44	-33.029	.000*
	Post-test	45	88.88	7.142			
Control group	Pre-test	45	38.77	12.300	44	-8.638	.000*
	Post-test	45	60.88	13.198			

* p<.05

When Table 3 is examined, there is a significant difference between the academic success levels of the experimental group students before and after the training process [$t_{(44)}$=-33.029, p<.05]. It is seen that there is a statistically significant difference between the academic success of the experimental group students after education ($\overline{X}$=88.88) and the academic success before education ($\overline{X}$=34.77). Similarly, there is a significant difference between the academic success levels of the control group students before and after the training process [$t_{(44)}$=-8.638, p<.05]. It is seen that there is a statistically significant difference between the academic success of the control group students after education ($\overline{X}$= 60.88) and the academic success before education ($\overline{X}$=38.77). According to the academic achievement test results, the academic success of the experimental and control group students has increased for the research units.

On the other hand, in order to determine the level of difference in the academic achievement of the experimental group using educational games and the control group without educational games, the academic achievements of the experimental and control groups were compared and the results of the analyzes are given in Table 4.

Table 4. Comparison of academic achievement level of groups after training process

Course success	**n**	$\overline{X}$	**sd**	**df**	**t**	**p**
Experimental group	45	88.88	7.142	88	12.516	.00*
Control group	45	60.88	13.198			

*p<.05

It is seen in Table 4 that the course success of the experimental and control group students differed [$t_{(88)}$=12.516 p<.05]. When Table 4 is examined, there is a statistically significant difference according to the course achievement average results ($\overline{X}$ = 88.88) of the students in the experimental group and the academic achievement average results ($\overline{X}$= 60.88) of the students in the control group. It can be said that the use of educational digital games in English lesson at the end of the training process has a significant difference on students' academic success.

It was seen in the academic achievement tests that the academic success of the experimental and control group students, who did not find any significant difference before the education process, increased their academic success at the end of the education process. However, as a result of the analysis conducted to determine that the academic success of the groups differed, it was concluded that the experimental group using educational digital games increased more than the control group, which was teaching the traditional method. As a result, it can be said that the academic success of students will increase more than the traditional method in teaching English lessons with the effective use of educational digital games.

The Effect of Educational Game Usage on Students' Motivations towards English Course

Within the scope of the research, the effect of the use of educational digital games on students' motivation towards English courses was also investigated. For this purpose, the Motivation Scale for the English Course was applied to students before and after the training process. The motivation levels of the students for the English course before the education process are given in Table 5.

Table 5. Comparison of the motivation scores of the groups towards the English course before the training process

Motivation	n	$\overline{X}$	sd	df	t	p
Experimental group	45	2.29	.297	88	1.535	.128
Control group	45	2.19	.300			

*p<.05

As can be seen in Table 5, the motivation of the experimental and control group students towards the English course does not differ before the education process [$t_{(88)}$ = 1,535 p> .05]. In other words, the difference between the motivation scores ($\overline{X}$ = 2.29) of the experimental group students and the motivation scores ($\overline{X}$ = 2.19) of the control group students is not a statistically significant difference. It can be said that the motivation of the students towards English course before the education is the same.

After the training process, the same scale was applied again to measure the motivation levels of the experimental and control groups. As a result of the application, the motivation of the control and experimental group students towards the English course was evaluated and the results of the analysis are given in Table 6.

Table 6: comparison of groups' motivations for English courses before and after the training

	Motivasyon	n	$\overline{X}$	sd	df	t	p
Experimental group	Pre-test	45	2.29	.297	44	-5.042	.000*
	Post-test	45	2.46	.152			
Control group	Pre-test	45	2.19	.300	44	-2.572	.014*
	Post-test	45	2.30	.280			

* p<.05

When Table 6 is examined, there is a significant difference between the motivation of the experimental group students about the English course before and after the training period [$t_{(44)}$=-5.042, p<.05]. It is observed that the experimental group students' statistically significant difference between the post-training motivation score ($\overline{X}$=2.46) and pre-training motivation score ($\overline{X}$=2.29). Likewise, there is a significant difference between the motivations of the control group students about the English course before and after the training process [$t_{(44)}$=-2.572, p<.05]. It has been observed that the control group students' statistical difference between the motivation score ($\overline{X}$ =2.30) and the pre-education motivation score ($\overline{X}$=2.19) after education significantly. According to the motivation scale for the English course, the motivation values of the experiment and control group students increased.

On the other hand, the post- motivation scores of the experimental and control groups were compared and the analysis results are given in Table 7 in order to determine the level of motivation of the experimental group using educational games and the control group students who do not use educational games.

Table 7. Comparison of the motivations of the groups for English courses after the training process

Motivation	**n**	$\overline{X}$	**sd**	**df**	**t**	**p**
Experimental group	45	2.46	0.152	88	3.401	.001*
Control group	45	2.30	0.280			

*p<.05

It is seen in Table 7 that there is a significant difference between the motivations for English courses in both groups who use and do not use educational digital games after the training process [$t_{(88)}$=3,401 p>.05]. There is a statistically significant difference between the experimental group students 'motivation average scores ($\overline{X}$ =2.46) towards the English course after the training process and the motivation average scores ($\overline{X}$ =2.30) of the control group students' orientation to the English courseafter the training process. At the end of the training process, it can be said that educational digital games have an impact on students' motivation.

The Effect of Educational Game Usage on Students' Attitudes towards English Courses

Within the scope of the Student Research, the effect of the use of educational games on the attitudes of students towards English lesson was investigated. For this purpose, the Attitude Scale towards the English Course was applied to the students before and after the training process. The attitude levels of the students towards the English course before the education process are given in Table 8.

Table 8. Comparison of the attitude scores of the English course before the training process

Attitude	**n**	$\overline{X}$	**sd**	**df**	**t**	**p**
Experimental group	45	1.86	.460	88	.791	.431
Control group	45	1.78	.515			

*p<.05

As seen in Table 8, the attitudes of the experimental and control group students towards the English course do not differ before the education process [$t_{(88)}$=,791 p>.05]. In other words, the difference between the attitude scores ($\overline{X}$ =1.86) of the experimental group students and the attitude scores ($\overline{X}$ =1.78) of the control group students is not statistically significant.

After the training process, the same scale was applied again to measure the attitude levels of the groups towards the English course. As a result of the application, the attitudes of the control and experimental group students towards the English course were evaluated and the results of the analysis are given in Table 9.

Table 9. Comparison of the attitude scores of the groups before and after the training process

	Attitude	n	$\overline{X}$	sd	df	t	p
Experimental group	Pre-test	45	1.86	.460	44	-2.132	.039*
	Post-test	45	2.05	.332			
Control group	Pre-test	45	1.78	.515	44	-3.401	.001*
	Post-test	45	2.07	.210			

* p<.05

When Table 9 is examined, there is a significant difference between the attitudes of the experimental group students towards the English course before and after the training [$t_{(44)}$=-2.132, p<.05]. It is seen that the experimental group students' statistically significant difference between the attitude average ($\overline{X}$ = 2.05) and the pre-education attitude point average ($\overline{X}$ = 1.86). Similarly, there is a significant difference between the control group students' attitudes towards the English course before and after the training process [$t_{(44)}$=-3.401, p<.05]. It is seen that there is a statistically significant difference between the post-education attitude scores of the control group students ($\overline{X}$ = 2.07) and the pre- attitude scores ($\overline{X}$ = 1.78). According to the attitude scale towards the English course, the attitude values of both the experiment and control group students increased.

On the other hand, the post- attitude scores of the experimental and control groups were compared in order to determine the difference level of the attitudes of the experimental group using educational games and the control group students who do not use educational games towards English courses and the analysis results are given in Table 10.

Table 10. Comparison of the mean scores of attitudes towards english lessons after the training

Attitude	n	$\overline{X}$	sd	df	t	p
Experimental group	45	2.05	.332	88	-.390	.697
Control group	45	2.07	.210			

*p<.05

It is seen from Table 10, there is no significant difference between the attitudes towards English course in both groups who use and do not use educational digital games after the training process [$t_{(88)}$=-,390 p>.05]. There is no statistically significant difference between the experimental group students 'attitude towards English course after the education process ($\overline{X}$ = 2.05) and the control group students' attitude ($\overline{X}$ = 2.07) towards the English lesson after the educational process. The attitudes towards English courses of both groups with and without educational games are at the same level after the training.

4. Discussion and Conclusion

Educational digital games are software that aims to improve the students 'problem solving skills or students' lessons in computer games (Acquah & Katz, 2020). Educational games are used today in many fields such as science, medicine, mathematics and language teaching in order to gain problem solving and strategic thinking skills (Prensky, 2008).

In this research, an experimental group in which digital games are used in education and the control group in which traditional education continues are determined and the effects of educational games on students' course success, motivation and attitudes towards the course are investigated. In this context, an educational game limited to "In The Classroom" and "Numbers" subjects has been developed for the English lesson. As a result of the application, the following results were obtained.

The use of educational games has led to a significant increase in students' course achievement. While there was no difference in the education process between the experimental and control groups, at the end of the education process, course success increased significantly in both groups. However, this increase is significantly higher in the experimental group using educational games. This is important in terms of demonstrating that the use of educational games increases the success of the students. This finding is in parallel with the finding that Melek (2014) improved her academic success according to the post-game pretest and posttest results she developed for Diamon educational game Spiral Educational Game Design Model for kindergarten students to learn English. Similarly, according to Akın and Atıcı (2015), Egenfeldt-Nielsen (2011), Erekmekçi and Fidan (2012), Kebritchi, Hirumi and Bai (2010) and Prensky (2008), educational digital games increased the student's attention and success. Papastergiou, (2009), the games combined with the flexible use of computers offer students the opportunity to provide learning with fun. According to Bayırtepe and Tüzün (2007), games offer environments that support students 'collaboration and increase students' motivation level towards the course, increase their interest in the content due to the game, increase their motivation towards the lesson and increase the motivation of the student, thereby increasing their success in that course.

The effect of the use of educational games on the motivation of students in the English course was also investigated. While there was no significant difference in the motivation of the students in the education process, there was an increase in motivation towards the lesson at the end of the education process in both groups. However, more motivation was observed in the group where educational games were used after the training process. In other words, playing educational games has increased the motivation of students towards English courses. This finding shows parallelism with the result of the research conducted by Klein and Feitag (1991). It can be stated that the opportunities offered by students to digital games have an impact on increasing their motivation for the course.

Finally, the effect of the use of educational games on attitudes towards the course was also researched. While there was no difference between the groups before the training, attitude at the end of the course increased in both groups. Also, at the end of the training process, the attitude towards the course increased at the same level in the experimental and control groups. In other words, both groups using and not using educational games were found to have the same level of attitude towards the lesson at the end of the education process. When evaluated, it was found that there was a significant difference in favor of the students in the experimental group. In their study, Çankaya and Karamete (2008), it was concluded that there was no significant difference between the experiment- control group and applied to the students studying at the 7th grade level. According to Çankaya and Karamete (2008), the reason why there was no significant difference in their attitudes was that the study was not performed for a long time and that the change of attitude could take a long time.

5. Recommendations

The use of educational digital games significantly increased students' academic success. In this context, it can be suggested that educational digital games should be used more in the education of primary school students.Considering that educational digital games increase the success and motivation of students, materials related to educational digital games can be offered to teachers in

order to increase student success in accordance with the curriculum of the MoNE. Observations in the research process also revealed the importance of the research teacher in the application process. It may be recommended that teachers receive training on educational games and provide them with materials in this regard. The research is limited to teaching English and it can be suggested to practice in different branches.

References

Acquah, E. O., & Katz, H. T. (2020). Digital game-based L2 learning outcomes for primary through high-school students: A systematic literature review. *Computers & Education, 143,* 103667.

Akın, F. A., & Atıcı, B. (2015). Oyun tabanlı öğrenme ortamlarının öğrenci başarısına ve görüşlerine etkisi. *Turkish Journal of Educational Studies, 2(2),* 75-102.

Bayırtepe, E., & Tüzün, H. (2007). The effects of game-based learning environments on students' achievement and self-efficacy in a computer course. *H H. U. Journal of Education, 33*, 41-54.

Bozkurt, A. (2014). Homo ludens: Dijital oyunlar ve eğitim. *Eğitim Teknolojileri Araştırmaları Dergisi.* 5(1), 1-21.

Burnam, B. C. (2005). *Children's reasoning about moral dilemmas involving computers and internet use in school and at home.* University of California, Los Angeles.

Çankaya, S., & Karamete, A. (2008). Eğitsel bilgisayar oyunlarının öğrencilerin matematik dersine ve eğitsel bilgisayar oyunlarına yönelik tutumlarına etkisi. *Mersin Üniversitesi Eğitim Fakültesi Dergisi, 4(2),* 115-127.

Çetin, E., (2013). *Eğitsel dijital oyunlar.* Ankara: Pegem A Akademi Yayıncılık.

Dalkılıç, N. (2001). An investigation into the role of anxiety in second language learning. Yayımlanmamış Doktora Tezi. Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana. publications.

Dalkılıç, N. (2001). An investigation into the role of anxiety in second language learning. Yayımlanmamış Doktora Tezi. Çukurova Üniversitesi Sosyal Bilimler Enstitüsü, Adana.

Egenfeldt-Nielsen, S. (2011). *Beyond edutainment: Exploring the educational potential of computer games*. Lulu. com.

Erekmekçi, M., & Fidan, G. (2012). Oyunun tasarım platformları. Oyunun eğitim ve kültüre etkisi. *Yaşam Bilimleri Dergisi (1) 1,* 851-861.

Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2011). *How to design and evaluate research in education.* New York: McGraw-Hill Humanities/Social Sciences/Languages.

Gelibolu, M. F. (2013). *Eğitsel dijital oyunlar.* Ankara: Pegem A Akademi Yayıncılık.

Guo, J. L., Hsu, H. P., Lin, M. H., Lin, C. Y., & Huang, C. M. (2020). Testing the Usability of Digital Educational Games for Encouraging Smoking Cessation. *International Journal of Environmental Research and Public Health, 17(8),* 2695.

Hawlitschek, A., & Joeckel, S. (2017). Increasing the effectiveness of digital educational games: The effects of a learning instruction on students' learning, motivation and cognitive load. *Computers in Human Behavior, 72,* 79-86.

Ke, F. (2014). An implementation of design-based learning through creating educational computer games: A case study on mathematics learning during design and computing. *Computers & Education,* 73, 26-39.

Kebritchi, M., Hirumi, A., & Bai, H. (2010). The effects of modern mathematics computer games on mathematics achievement and class motivation. *Computers & education, 55(2),* 427-443.

Klein, J. D., & Freitag, E. (1991). Effects of using an instructional game on motivation and performance. *The Journal of Educational Research, 84(5),* 303-308.

Kukul, V. (2013). *Eğitsel dijital oyunlar.* Ankara: Pegem A Akademi Yayıncılık.

Maxwell, J. A. (2012). *Qualitative research design: An interactive approach* (Vol. 41). Sage

McGonigal, J. (2011). *Reality is broken: Why games make us better and how they can change the world.* Penguin.

MEB, (2017). Movement to Increase Opportunities in Education and Improve Technology (FATİH) Project-About the Project. Official Website of the Ministry of Education, FATİH Project. Retrieved April 22, 2018 tarihindefrom http://fatihprojesi.meb.gov.tr/proje-hakkinda/.

Melek, C. G. (2014). English education with serious games. Unpublished Phd thesis, Bahçeşehir University, Istanbul.

Papastergiou, M. (2009). Digital Game-Based Learning in high school Computer Science education: Impact on educational effectiveness and student motivation. *Computers & Education, 52(1),* 1-12.

Persico, D., Passarelli, M., Pozzi, F., Earp, J., Dagnino, F. M., & Manganello, F. (2019). Meeting players where they are: Digital games and learning ecologies. *British Journal of Educational Technology, 50(4),* 1687-1712.

Prensky, M. (2008). Students as designers and creators of educational computer games: Who else?. *British Journal of Educational Technology, 39(6),* 1004-1019.

Revelle, G. (2013). Applying developmental theory and research to the creation of educational games. *New directions for child and adolescent development, 2013(139),* 31-40.

Squire, K. (2002). Cultural framing of computer/video games. *Game studies, 2(1),* 1-13.

Wells, P., De Lange, P. A., & Fieger, P. (2008). Integrating a virtual learning environment into a second-year accounting course: determinants of overall student perception.*Accounting & Finance, 48(3),* 503-518.

Wright, J.C., Huston, A. C., Vandewater, E.A., Bickham, D.S., Scantlin,R.M., Kotler, J. A., Caplovitz, A. G., Lee, J.H., Hofferth, S., Finkelstein, J.(2001). American children's use of electronic media in 1997: A national survey. *Journal of Applied Developmental Psychology, 22(1),* 31-47.

Yılmaz, E. (2013). Determining the Motivation Levels and Motivation Types of High School Students in English Classes, *Karaelmas Journal of Educational Sciences,*1, 130-139

Zichermann, G., & Linder, J. (2010). *Game-based marketing: inspire customer loyalty through rewards, challenges, and contests.* John Wiley & Sons.