

A SYSTEMATIC REVIEW ON GAME BASED LEARNING

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ABSTRACT

Games play a significant role in the developmental areas for humans. For instance, children spend most of their times playing games. Thus with the help of games, children gain life experiences that supports them to develop in multiple areas. Furthermore, due to the fact that games affect individuals in physical, cognitive and social areas there has been many studies conveyed on game and learning. To add more, games are proven to improve motivation for learning. With the improvements in technology, recent changes have brought educational innovations into our lives. Educational games are considered as one of the most recent assets to help learners create meaningful learning experiences. Considering the utility of the games in the classrooms, it is significant to keep up with changes in the literature. The aim of this study is to examine the studies published in Turkey between 2007 and 2020 by carrying out a systematic literature review, and to determine the perspective of these studies and variables. Within the scope of this study, studies on game and learning were examined in six main areas: characteristics of the authors, years of publication, grades and the classes, research kinds, methods and, models used. It was revealed that the quantitative models (87.5%) were preferred more compared to qualitative models (12.5%). Within the scope of this study, only Google Scholar database was used and although foreign studies were mentioned, they were not examined. In addition, this review study only subjects the articles and theses that were published in Turkey between 2007-2020. Considering the importance of game and learning, it is thought that it would be appropriate to plan future studies in the light of the information in this article.

Keywords: Game and learning, game, educational games.

1. INTRODUCTION

Game is one of the activities from the history of humanity that affects the individual in many developmental areas. Children discover new skills mostly through child games (Irvin, 2017). Individuals in early childhood, spend most of their times playing games, this leads children to learn how to express their emotions, communicate with others and express their thoughts and feelings in different scenerios. Therefore, while children learn through play, they actually learn by living. In addition, it is noted when the child learns his senses, this ensures effective and permanent learning (MEB, 2016).

Many studies subjecting game and its effects on the individual have been conducted until now. Psychologists handled the game within a psychological and emotional aspect, while pediatricians handled the play from a physical view and pedagogists handled the game from the educational and social outlook. Most of these experts agreed on one thing in particular; the effect of game in the early period influenced the individual for a life time (Koçyiğit, Tuğluk and Kök, 2007). Piaget said that most of the activities we adults define as "games" are actually activities for individuals in childhood to explore their surroundings. In other words, children playing games discover themselves and their environment, thus, children engage in some mental acts (Piaget,1992). Even though all these people contributed to the literature in different fields, the idea that they all meet is that the game is an inevitable part of the individual's life (Hazar, 1997).

Game was considered to be an extra-curricular and meaningless activity for a period of time. Later on this belief has turned out to be false and game has been accepted as the most effective tool in children's development and learning, with the emphasis of the approachers such as Plato, Aristotle, Locke, Rousseau, Dewey and Montessori that play should form the basis of the education program (Piaget, 1992; Pehlivan, 2005).

It is known that children develop their psycho-social and mental skills during games. Hence game gives the individual an opportunity to have fun but it also improves the individual's motivation. Children learn behaviors such as making decisions, developing reactions, and expressing their emotions by experiencing them during play. Therefore, game provides permanent and effective learning for children (Ari, Üstün, and Akman, 1994).

With the improvements in technology, recent changes have brought educational innovations into our lives. This caused the emergence of educational games. Educational games are basically games with educational objectives that are considered one of the most recent assets to help learners create meaningful learning experiences (Ketelhult and Schifter, 2010; Connolly et al., 2012). It is noted that including game activities in educational settings can make education more permanent. Integrating the game trainings given by professionals will increase the motivation and participation of individuals in the lessons (Pehlivan, 2005). Therefore, educators are recommended to use educational games to create an effective learning environment in the classrooms (Eow et al., 2010a). The aim of this study is to examine the studies related to game based learning that have been published between 2007-2020 in Turkey and indicate the developments in the literature.

1.1 Research Questions

1-What is the distribution of authors according to gender and branch of science and the distribution of studies according to publication years?

2- Which research designs have been used in studies dealing with games and learning and published between 2007 and 2020?

3- Which research models have been preferred in studies on play and learning and published between 2007 and 2020?

2. METHOD

In this study, systematic review method was used to examine the research on game-based learning and its effects. Systematic reviews consist of a detailed plan and a research process, that is planned with a certain search strategy by eliminating the irrelevant studies and synthesizing the relevant ones (Uman, 2011).

Within the scope of the study, only national studies were used. Theses, including articles published in refereed journals, were also used in the study. Of the scanned articles, the ones which were not research articles were not included in this study. The publication dates of the scanned studies were determined to be between 2007-2020.

Google Scholar database was used to make research. Keywords for the research were chosen, such as "Game and learning", "Game" and "Educational games". As a result of the screening processes, 44280 studies were reached in total. In the first stage, foreign studies were eliminated and only the research in Turkish language has been taken into examination. As a result of this process, the second elimination process was made out of 3300 studies. Of the remaining studies, 21 were evaluated because they were

relevant to the subject. In the second screening process, 13 review articles were also excluded. The remaining 8 studies have been examined, of which 4 are articles and 4 are theses. The selected studies were examined in five main areas: (a) characteristics of the authors, (b) years of publication (c) grades and the classes, (d) research kinds, (e) methods, and (f) models used.

3. RESULTS

3.1. Articles reviewed

In a study conducted by Bakar, Tüzün and Çağıltay in 2008, students' views on the use of educational computer games in social studies lessons were examined. In this descriptive designed research, the study group consisted of 6th grade students. In the data collection stage structured interview and observation tools were used. According to the results of the study, it was found that use of educational computer games in social studies lessons increased students' motivation towards the lessons (Bakar, Tüzün and Çağıltay, 2008).

Çavuş and Özyürek discussed primary school teachers' use of game as an educational method, and their views on game as an educational method in their descriptive research study. To collect data semi-structured interview method was applied with 20 teachers. According to the results of the study, it was determined that all of the teachers used the game method in the lessons it was also revealed that game method provided permanent learning and the active participation rate of the students in the lessons increased (Çavuş and Özyürek, 2016).

On the other hand, in a study conducted in 2015, Atıcı and Akin examined the effect of game-based learning environment and traditional learning method on student achievement and views in the mathematics lesson. In this study, 2nd grade students participated as the study group. The research was a full experimental design and tools such as achievement test, questionnaire and interview forms were used. According to the results, it was revealed that educational games make Mathematics lessons more enjoyable and reduce students' fear and anxiety (Atıcı and Akin, 2015).

In a study conducted in 2007, the effect of educational computer games on the success of primary school students in computer classes and their computer self-efficacy perceptions were investigated. In the study 7th grade students participated and a pre-test post-test experimental design with control group was used. Achievement tests, interview protocol and questionnaire tools were used in order to collect data. As a result, it was found that the game-based learning environment reduces their anxiety, helps them learn individually and visually supports learning (Yağız, 2007).

In his study, Aşcı researched the academic achievements and attitudes of 6th grade students towards the game-based learning method applied in Turkish lessons. In this study, a quasi-experimental design with pretest posttest groups was used. According to the results of the study, it was revealed that the game-based learning method has an increasing effect on students' motivation in Turkish lesson (Aşcı, 2019).

Aydeniz examined the effect of game-based learning method on students' school attachment level and students' awareness of rules in one of his study. Sampling of this study consists of 321 people in the first study group and 226 people in the second study group. A quasi-experimental design was used and to retrieve data personal information form, school attachment scale and rule awareness scale were used. As a result of the study, it was concluded that the game-based learning method helps students maintain their school attachment level (Aydeniz, 2019).

The effect of the game-based learning method on scientific process skills of preschool students was examined in a study. In this study, a pre-experimental design was used and data was collected using the

observation method. In the end it was found that the game-based learning method was effective in developing the scientific process skills of children (Saygılı, 2019).

Kaya focused on the effect of computer game use on students' access and retention of learning in English lessons in a pretest-posttest control group experimental modelled study. In the research academic achievement test was applied to 6th grade students. It was revealed that the use of educational computer games in the lessons has a positive effect on the achievement levels of the students and is also effective on the permanence of learning (Kaya, 2015).

3.2. Findings related to search questions

Department of the authors									
Gender	Computer and Instructional Technology	Turkish Language Teaching Programme	Science Teaching Programme	Guidance and Psychological Counseling Programme	Child Development	Educational Programs and Teaching Programme	Total		
Male	3	1	-	-	-	-	4	(%33.3)	
Female	3	-	1	1	2	1	8	(%66.6)	
Total	6	1	1	1	2	1	12		

Table 1. Characteristics of authors

As seen in Table 1, the majority of the authors who worked in the field of game and learning between 2007 and 2020 are males and females studying in the Computer and Instructional Technology Teaching department (66.6%).

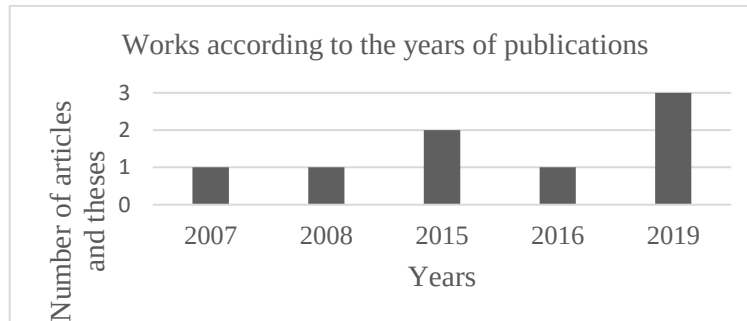


Figure 1. Years of publication

As seen in Figure 1, most of the works on game-based learning have been done in 2019. 2015 follows this year with 2 publications and in 2007, 2008 and 2016 only 1 publication has been published about game and learning.

Table 2.	Disciplines								
	Grades	English	Maths	Social	Studies	Computer Education	Turkish	Unspecified	Total
	Pre-school	0	0		0	0	0	2	2
	1,2,3&4	0	0		0	0	0	2	2
	2	0	1		0	0	0	0	1
	6	1	0		1	0	1	0	2
	7	0	0		0	1	0	0	1
	Total	1	1		1	1	1	4	8
	Distribution of grades and classes								

The studies conducted in the associated disciplines are given in Table 2. According to the table, research about the literature was done in English, Maths, Social Studies, Computer and Turkish classes. It can be seen that most of the studies didn't carry a subject.

Research Model	Department of the authors							Total
	Computer and Instructional Technology Teaching	Turkish Language Teaching	Science Teaching	Guidance and Psychological Counseling	Child Development	Educational Programs and Teaching		
Quantitative	3	1	1	1	-	1	7(87,5%)	
Qualitative	-	-	-	-	1	-	1(12,5%)	
Total	3	1	1	1	1	1	8	

Table 3.

Research kinds used in the articles

As seen in Table 3, after the evaluation of the published studies in terms of their models, it was revealed that the studies in the quantitative models (87.5%) are preferred more compared to the qualitative models (12.5%) related to literature. On the other hand, it has also been revealed that the individuals working in the department of Computer and Instructional Technology Education produced more research on game and learning.

Model	f	%
True-Experimental	2	25
Quasi Experimental	3	37,5
Pre-Experimental	1	12,5
Non-Experimental	2	25
Total	8	100

Table 4. Research methods used in the studies

According to the results, the most used research method was quasi-experimental pretest-posttest control group research design (%37,5).

Method	f	%
Semi-structured interview	4	50
Quasi-experimental pre-test-post-test control group research design	3	37,5
Quasi experimental pre-test end test with no control groups	1	12,5
Total	8	100

Table 5. Research models of the studies

According to the results, the most used reseach model related to the literature was the quasi-experimental research model (%37,5).

4. CONCLUSION

Game is considered one of the earlier acts of humans in childhood years. It is noted that game has shown to have many effects on improving individuals' physical, cognitive and social skills. Therefore, according to researchers, play is qualified as a channel for building brain functions (Garner et al., 2018).

With the technology evolution in the recent years educational platforms have emerged. While the improvements in the decade caused us educators to change our teaching methods, as teachers, it is important to keep in my it is our duty to adjust and prepare students for the educational innovations (Gutiérrez,2016). This has resulted in the emergence of educational games and eventually their application in educational institutions.

According to researchers, educational games have many advantages for the individuals. In a study about appreciative learning approach, applied computer games development class resulted in improving students' creativity and motivation (Eow et al., 2010b). Furthermore, in one study it was revealed that educational games were significantly practical in enhancing students' motivation (Woo, 2014). As Pehlivan mentioned, integrating the curriculum with educational games would increase the motivation and participation of students, thus making learning meaningful (Pehlivan, 2005). Considering the utility of the games in the classrooms, it is significant to keep up with the changes in the literature.

The aim of this review study was to examine the studies published in Turkey between 2007 and 2020 by carrying out a systematic literature review, and to determine the perspective of these studies and variables. Within the scope of the study, studies on game and learning were examined in six main areas: characteristics of the authors, years of publication, grades and the classes, research kinds, methods and, models used. According to the results, it was revealed that mostly women and men who worked in the Computer and Instructional Technology Teaching Programme (66%) have contributed to the literature the most. On the other hand, most of the studies related to the literature were published mainly in 2019.

Furthermore, the research related to the literature was mainly carried out in the English, Mathematics, Social Studies, Turkish and Computer classes. On the other hand, most of these studies focused on game based learning and were not carried out in class.

Furthermore, it was revealed that the studies in the quantitative models (87.5%) were preferred more compared to research in qualitative models (12.5%) related to the literature. Bryman argues that since the quantitative research method is built up by data collections and numbers, it can be put as being scientific in a nutshell (Bryman, 2012). Also, the most used research method was quasi-experimental pretest-posttest control group research design (%37,5) while the most used research model was the quasi-experimental research model (%37,5). On the other hand, it has also been revealed that individuals working in the department of Computer and Instructional Technology Education produced more research on the literature.

Within the scope of this study, only Google Scholar database was used and although foreign studies were mentioned, they were not examined. In addition, this review study only examines the articles and theses that were published in Turkey between 2007-2020. Considering the importance of game and learning, it is thought that it would be appropriate to plan future studies in the light of the information in this article.

REFERENCES

- Akandere, M. (2003). *Eğitici Okul Oyunları*, Nobel Yayın Dağıtım, Ankara
- Akın, F. A. and Atıcı, B.(2015). Oyun Tabanlı Öğrenme Ortamlarının Öğrenci Başarısına ve Görüşlerine Etkisi, *Turkish Journal of Educational Studies*, 2(2), 75-102.
- Arı, M., Üstün, E. and Akman, B.(1994). *Etkin Öğrenme Modelinde Bilimsel Yaratıcılık Programı*, 10.YA-PA Okulöncesi Eğitimi ve Yaygınlaştırılması Semineri, Ya-Pa Yayıncılık, İstanbul.
- Aşçı, A.U.(2019). Eğitsel Dijital Oyunların 6.Sınıf Öğrencilerinin Türkçe Dersi Akademik Başarılarına Etkisi, *Uluslararası Sosyal Araştırmalar Dergisi*, 12(62), 933-41.
- Aydeniz, G.(2019). *İlkokullarda Oyun Temelli Öğrenme Yönteminin Öğrencilerin Okula Bağlanma ve Kural Bilinci Düzeyine Etkisi*(Yüksek Lisans Tezi), Ondokuz Mayıs Üniversitesi Eğitim Bilimleri Enstitüsü Eğitim Bilimleri Anabilimdalı, Samsun.
- Bakar, A., Çağıltay, K. and Tüzün, H.(2008). Öğrencilerin Eğitsel Bilgisayar Oyunu Kullanımına İlişkin Görüşleri: Sosyal Bilgiler Dersi Örneği. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, (35), 27-37.
- Bryman, A. (2012). *Social Research Methods*. 4th edition. New York: Oxford University Press.

- Connolly, T. M., Boyle, E. A., MacArthur, E., Hainey, T., and Boyle, J. M. (2012). A systematic literature review of empirical evidence on computer games and serious games, *Computers & Education*, 59(2), 661–686.
- Cózar-Gutiérrez, R., Sáez-López, J.M. Game-based learning and gamification in initial teacher training in the social sciences: an experiment with MinecraftEdu(2016) *Int J Educ Technol High Educ*,13(2).
- Çavuş, Z. S. and Özyürek, A. (2016). İlkokul Öğretmenlerinin Oyunu Öğretim Yöntemi Olarak Kullanma Durumlarının İncelenmesi, *Kastamonu Eğitim Dergisi*, 24(5), 2157-2166.
- Donmuş, V. and Güral, M.(2015). The Effect of The Use of Educational Computer Games in Learning English on Achievement and Retention, *International Periodical for the Languages, Literature and History of Turkish or Turkic*, 10(15), 313-332.
- Eow, Y. L., Wan Zah, W.A., Rosnaini, M. and Roselan, B. (2010). Computer games development and appreciative learning approach in enhancing students' creative perception, *Computers & Education*, 54 (1), 146-161.
- Eow, Y. L., Wan Zah, W.A., Rosnaini, M. and Roselan, B. (2010). Computer games development experience and appreciative learning approach for creative process enhancement, *Computers & Education*, 55(3), 1131-1144.
- Güneş, F.(2015). Oyunla Öğrenme Yaklaşımı, *International Periodical for the Languages, Literature and History of Turkish or Turkic* 10(11), 773-786.
- Hazar, M. (1997). *Beden Eğitimi Ve Sporda Oyunla Eğitim*, Tutubay Yayınları, Ankara.
- Irvin, M.(2017). *The Importance of Play in Early Childhood Education*, NWCommons, Northwestern College, Iowa.
- Ketelhult, D.J. and Schifter, C.C.(2010). Teachers and game-based learning: Improving understanding of how to increase efficacy of adoption, *Computers&Education*, 56(2), 539-546.
- Koçyiğit, S., Tuğluk, M. N. and Kök, K.,(2007) Çocuğun Gelişim Sürecinde Eğitsel Bir Etkinlik Olarak Oyun, *Kazım Karabekir Eğitim Fakültesi Dergisi*, (15) 325-342.
- MEB(2016). *Okul Öncesi Eğitim Öğretmen El Kitabı*.
- Pehlivan, H. (2005). *Oyun ve öğrenme*, Anı Yayıncılık, Ankara.
- Saygılı, P.(2019). *Okul Öncesi Dönemde Oyun Tabanlı Öğrenme Yönteminin Bilimsel Süreç Becerilerine Etkisinin İncelenmesi*(Yüksek Lisans Tezi), Mersin Üniversitesi Eğitim Bilimleri Enstitüsü Matematik ve Fen Bilimleri Eğitimi Anabilim Dalı Fen Bilgisi Eğitimi Bilim Dalı, Mersin.
- Sevinç,M.(2005). *Erken Çocuklukta Gelişim ve Eğitimde Yeni Yaklaşımlar*, Morpa Kültür Yayınları, İstanbul
- Uman, L.S. (2011). Systematic Reviews and Meta-Analyses, *J Can Acad Child Adolesc Psychiatry*, 20(1), 57-59.
- Woo, J.C.(2014). Digital Game-Based Learning Supports Student Motivation, Cognitive Success, and Performance Outcomes, *Educational Technology & Society*, 17(3), 291-307.
- Yağız, E. (2007). *Oyun-Tabanlı Öğrenme Ortamlarının İlköğretim Öğrencilerinin Bilgisayar Dersindeki Başarıları ve Öz-Yeterlik Algıları Üzerine Etkileri*(Yüksek Lisans Tezi), Hacettepe Üniversitesi Fen Bilimleri Enstitüsü Bilgisayar ve Öğretim Teknolojileri Eğitimi Anabilim Dalı, Ankara.