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Preservice Classroom Teachers' Opinions on Use of Educational Games in Instructions of Primary School Courses

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Abstract

This study aimed to examine preservice classroom teachers' opinions on how educational games improve their teaching skills. In accordance with this purpose, the qualitative research design was employed. The study group was composed of 60 preservice teachers course attending the Department of Primary Education in the Faculty of Education at a state university in the spring term of the 2017/2018 academic year they all who took the physical education and game teaching. A semi-structured, open-ended question form prepared in accordance with the purpose of the research and letters were used as the data collection instruments. Answers of the preservice teachers to the open-ended questions were scanned as images and transferred into digital medium. Next, the obtained data were subjected to a content analysis with the MAXQDA 12 qualitative data analysis software and the data products were analyzed with the "data coding" technique. The data obtained from the preservice teachers with letters were analyzed by both researchers descriptively. The findings achieved in the analysis were utilized to reinforce the findings on themes and codes achieved in the analysis of the data obtained with the semi-structured interview forms. It was concluded that educational games improved the preservice classroom teachers' competencies of planning and implementing the use of games in the instruction of primary school course attainments. It was also concluded in the study that the participants had been very little aware of educational games' definition and their contributions to student learning before the application and their awareness increased after the application.

Keywords: Educational games, game teaching, preservice classroom teachers

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Introduction

Innovations and developments in the social domain have manifested themselves also in the educational domain. Education plays a great role in raising the future generations in a better way and bringing them to the society. In other words, education has a key role in society's scientific and technological development and transformation. These transformations have led to important changes in the perspective of education, causing the rote learning approach based on transferring information to students to lose its validity (Aykaç ve Çakır İlhan, 2014).

The rapid process of change that has been observed in almost every domain orientates societies to a constant search for raising more qualified manpower (Gürkan and Gökçe, 2000). Among such searches, perspective of teacher has naturally changed along with the changing perspectives and approaches of education. Therefore, a teacher has not been an individual who teaches only by transferring information and evaluates whether what he/she has told is learned. In the modern mentality of education, a teacher should be an individual who guides children in their paths to develop freely, express themselves in a better way and become humans who are sensitive, thoughtful, questioning, creative and implementing (Yavuzer, 2008). Important duties fall to teachers in this guidance process. It is expected from teachers to guide the act of learning and take students to the center and contribute to achieving the purposes of courses in primary education by creating a culture in classroom settings which are equipped with the values and attitudes required by democratic life (Doğanay, 2005; Riedler & Eryaman, 2016). In this sense, it is expected from teachers to be equipped with general culture, occupational and content knowledge as well as being competent at using contemporary instructional methods and techniques. That is to say, teachers need to have competencies in regard to using methods and techniques which allow students to actualize themselves in efficient learning environments (Eryaman, 2006; Geist, 2001). One of the main methods that allow students to participate in the learning process efficiently and render the learning process effective is educational games (Adıgüzel, 1993). Educational games are important instruments in children gaining important experiences, being able to think independently, express their thoughts and in the development of the creativity process. With teacher-centered methods that do not enable students to participate in the learning-teaching process, it is not possible for students to take an interest in the courses in primary school.

Theoretical Framework and Literature Review

Akandere (2013) defines educational games as activities which ensure children's mental and physical health development, provide them with good behaviors and habits and give pleasure and joy to players. Demirel (1993) defines it as an instrument that helps learned information reinforced and individuals learn in a more comfortable environment by improving their physical and mental abilities.

According to Güven and Özerbaş (2016), educational games are instruments used in learning the attainments of any course in an entertaining way through a healthy communication among students.

Given these definitions of educational game together, it is possible to define educational game as activities which make courses effective and fun to ensure that children enjoy the course, establish interactions and improve their mental activities accordingly to achieve the attainments of the related course. Furthermore, educational games function to address children's cognitive, affective and psychomotor skills in a holistic way to provide a rich and retentive learning environment with versatile stimuli.

Since some of the courses in primary education (Mathematics, Science, etc.) contain abstract subjects for students, they may find it hard to focus their attentions in these courses. Once attainments of these courses are structured with educational games, children use all their senses efficiently during a game. Consequently, educational games can provide them with an opportunity learn by doing, experiencing and having fun within a group. Importance of educational games included in the learning process comes forth in regard to this function (Kırbaş and Koparan Girgin, 2018).

Particularly in primary education, educational games are activities that can be included in the instructional part of courses (Demirel, 1993). There are great duties and responsibilities that fall to teachers in using educational games as instruments in the teaching of course attainments. Teachers to achieve this need to have skills and competencies required by the curriculum.

Being aware of positive effect of a game on children, a teacher can benefit from educational games to render the learning-teaching process more entertaining and help students achieve attainments of a course and reinforce what they have learned (Çangır, 2008). It is expected from teachers to train themselves in educational games and use educational games as an instructional method in the classroom so that the curriculum can be effective. It is important for teachers to have an effective planning and implementing skill to do this in the required way. Hence, preservice classroom teachers who will raise new generations in future need to have the competency to plan and implement educational games in the instruction of primary school courses. Because primary school years are of special importance in personality development and development of linguistic skills. Performed by teachers for students who are just starting the primary school, educational games present a brand-new experience.

There are studies from several domains which explore that educational games have positive effects on students' learning. Studies carried out by Gülhan (2012), Özyürek and Çavuş (2016), Koç (2017), and Varan (2017) on primary education courses; Randel, Morris, Wetzel and Whitehill (1992), Altunay (2004), Çuha (2004), Tural (2005), Çankaya (2007), and Gökbulut and Yumuşak (2014) on Mathematics course; Özaslan (2006), Gül (2009), Gedik (2012), and Gülsoy (2013) on Turkish course;

Bayazıtoğlu (1996) and Hanbaba and Bektaş (2007) on Life Sciences course; Kaya (2007) and Işık (2016) on English course; Karabacak (1996), Pehlivan (1997), Altınbulak (2004) and İlter (2015) on Social Studies course; Ercanlı (1997), Şaşmaz Ören and Erduran Avcı (2004), Yurt (2007), Coşkun, Akarsu and Kariper (2012), Bayat, Kılıçaslan and Şentürk (2014), Kaya and Elgün (2015), Alıcı (2016), Çelik (2017), and Can (2017) on Science and Technology course; Doğanay (2002) on History course; Zengin (2002), Çangır (2008), and Karasan (2013) on Religious Culture course; Gökay (2003) on Art course; and Duman (2013) on Visual Arts course concluded that educational games increased students' achievements levels. Moreover, it was emphasized in these studies that educational games ensured an effective learning-teaching process. These studies on educational games tried to identify the effect of use of educational games in primary education courses on student achievement and teacher opinions on the use of educational games in the instructional process. However, no studies were observed on increasing the educational game repertories of primary school teachers and preservice classroom teachers to be used in the instruction of primary school courses and improving the planning and implementing skills for the instruction of primary school courses' attainments by using such games. Hence, it was aimed in this study to identify preservice classroom teacher opinions on educational games improving their teaching skills. To this end, answers to the following research questions were sought for:

What are the pre- and post-application opinions of the preservice teachers on the definitions of educational game?

What are the pre- and post-applications of the preservice teachers on advantages and disadvantages of using educational games in the instruction of primary school courses?

What are the pre- and post-application opinions of the preservice teachers on which courses educational games can be used in?

What are the pre- and post-application opinions of the preservice teachers on planning the use of educational games in the instruction of primary school courses?

What are the pre- and post-application opinions of the preservice teachers on implementing the use of educational games in the instruction of primary school courses?

Method

Research Model

Aiming to identify the opinions of preservice classroom teachers on educational games improving their teaching skills, this study used the qualitative research design. Qualitative research ensures that data are read over and over to be divided into codes and categories based on their

similarities and differences and research results are presented (Merriam, 1998; Çepni, 2012; Karasar, 2016; Yıldırım and Şimşek, 2016).

Study Group

The study group was composed of 17 male and 43 female students (60 preservice teachers in total) attending the Department of Basic Education in the Faculty of Education at a state university in the spring term of the 2017/2018 academic year and they all took the physical education and game teaching courses.

Data Collection Instrument

A semi-structured, open-ended question form and letters were used as the data collection instruments. One of them is the question form which was composed of 5 open-ended questions prepared in accordance with the purpose of research. The open-ended questions allowed preservice teachers to express the reasons for their answers and reflected the way they thought of these concepts (Gronlund and Linn, 1990). This is why open-ended questions were utilized as data collection instrument.

Before preparing the question form, the related literature was reviewed in detail. Next, 10 open-ended questions were prepared in accordance with the purpose about concept of educational game and use of educational games in primary school courses and for determining the competencies of preservice teachers at using these games. These questions were submitted to the review by three field experts. Since some of the questions prepared in accordance with the opinions of the field experts were similar and serve the same purpose, 5 of them were excluded from the form to finalize it. The finalized open-ended questions in the form are given below:

1. What do you think an educational game is? Explain with examples.
2. What do you think of using educational games in the instruction of primary school courses (Turkish, Mathematics, Science, Social Studies, etc.)? Explain your opinions in terms of advantages and disadvantages.
3. In which of the abovementioned courses would it be more appropriate to use educational games in your opinion? Why? Explain.
4. Do you find yourself competent at planning and preparing exemplary activities for using educational games in the instruction of primary school courses? Explain.
5. Do you find yourself competent at implementing educational games in the instruction of primary school courses? Explain.

At the end of the Physical Education and Game Teaching course conducted for 14 weeks, the preservice teachers were asked to write letters, as the second data collection instrument used in the study, according to the following instruction: "Write to a friend of yours with whom you have exchange letters on professional, cultural and artistic matters for a long time about the benefits of the Physical Education and Game Teaching course you took in this term to your professional field, your opinions and recommendations on the instruction of the course and what you have learned in this course in the format of letter."

Data Collection and Analysis

The data were collected in two stages in this study. In the first stage, the question form prepared by the researchers were applied to the preservice teachers to determine their current status before informing them of instruction with educational games at the beginning of Physical Education and Game Teaching course. The preservice teachers were subjected to the same question form again at the end of 14-week instruction of Physical Education and Game Teaching course in the second stage. In addition, the preservice teachers were asked to write letters according to the following instruction: "Write to a friend of yours with whom you have exchange letters on professional, cultural and artistic matters for a long time about the benefits of the Physical Education and Game Teaching course you took in this term to your professional field, your opinions and recommendations on the instruction of the course and what you have learned in this course in the format of letter."

After the application of the question form, form of each preservice teacher was assigned a number. For example, "PT1" represents the preservice teacher 1. Next, answers of the preservice teachers to the open-ended questions were scanned as images and transferred into digital medium. The data were subjected to MAXQDA 12 qualitative data analysis software and "data coding" was utilized as the data analysis method (Yıldırım and Şimşek, 2016).

To analyze the obtained data in a reliable way, the answers given by 10 randomly chosen preservice teachers to the question form were classified and analyzed categorically according to their similarities and differences separately by the two researchers (Merriam, 1988; Yin, 1994). The degree of agreement of the coding performed separately by the researchers was calculated with the formulation "Reliability=(Number of agreed categories) (Total number of agreed and disagreed categories)" (Miles and Huberman, 1994). The reliability values achieved in regard to the agreement of the analyses performed separately by the researchers were found to be 0.88 for data on the definition of educational game, 0.86 for data on the use of educational games in primary school, 0.85 for data on the courses in which educational games would be more appropriate to be used according to the preservice teachers, 0.86 for data on preservice teachers' competencies at planning the use of educational games in the instruction of courses, and 0.88 for data on preservice teachers' competencies

at implementing educational games in the instruction of courses Miles and Huberman (1994) state that concordance between the two coders being 0.70 and above is sufficient for reliability. Accordingly, it was decided that the concordance between the coders was reliable.

These themes and codes created by the researchers were submitted to the review by three field experts. Themes and codes created in accordance with the opinions of the field experts were reviewed by the two researchers together to clarify the agreed categories, the disagreed categories were discussed and a consensus was achieved (Merriam, 1988; Yin, 1994). The answers given by the remaining 50 preservice teachers were categorically analyzed by one of the researchers in terms of their similarities and differences. The codes and themes created once the analysis of all the data was completed were submitted to the review by the same field experts and finalized in accordance with their recommendations; they were next presented in tables (Table 2-Table 6) with percentage-frequency values and citations from the actual answers given by the preservice teachers.

The data obtained from the preservice teachers through letters were subjected to descriptive analysis by the two researchers and the resulting data were presented descriptively in the findings section to reinforce the data on themes and codes created in the analysis of the answers given to the question form.

Validity and Reliability Measures

The validity and reliability measures required for the qualitative research method were taken in this study (Yıldırım and Şimşek, 2016). Hence, it was ensured that the participant preservice teachers answered each question in consideration of their current status to achieve internal validity during the implementation of the data collection instruments. For the external validity, the findings were presented in consistency with the research questions in an effort.

To achieve the external reliability, the position of the researchers conducting the data analysis within the research process, conceptual framework used for the data analysis as well as the codes and themes were described and detailed explanations made on the data collection and analysis methods. For the internal reliability, the researchers and the three field experts participated in the analysis steps and the achieved data were presented in a detailed way and in a descriptive approach.

Instructional Process of Physical Education and Game Teaching Course

At the beginning of the research, the preservice teachers were informed of the physical education and game teaching course. The study was conducted in three stages: preparation-pre-application of the question form, implementation process and post-application of the question form-general evaluation. The form of five semi-structured questions were completed by the preservice

teachers in the first course. The Physical Education and Game Teaching course was performed with the preservice teachers in 42 hours in total as 14 workshops with each taking three hours between February-May 2018. The first seven workshops were managed by an instructor. The instructor had the preservice teachers play seven different games in each course, and the attainments of the games were discussed and evaluated together. Furthermore, ideas were exchange on which courses and attainments the games can be used in. Each week, the games managed by the instructor were played in a certain theme. The Table 1 below presents the themes, games played and an attainment with which they can be associated in a detailed manner.

Table 1. Games Played in Physical Education and Game Teaching Course

Weeks	Themes	Games	Examples of relatable attainments
Week 1	Introduction	Hello Tell Your Name Name Chain Do you like your neighbor? Onion Garlic Sheet Wheel of Fortune	Each of these games were for students getting to know each other and saying their names. The games can be adapted according to targeted attainments. For example, in the game "Name Chain", rhythmic numbers from 1 to 20 can be thought instead of names.
Week 2	Communication and Interaction	Puss in the Corner in a Circle Scream Parasite Chinese Whispers Mrs. İnci Ashure Landlord / Tenant	These games are based on communication and interaction. Each of them for talking about different aspects of communication. For example, the game "Parasite" is for understanding the importance of both verbal and non-verbal (gestures and mimics) and an appropriate environment for an effective communication. Moreover, the game "Parasite" can be used for the attainment of another course. The information that "zero is the neutral element of addition" can be taught with "Parasite".
Week 3	Trust Activities	Car Where are you? I am here Pilot Trust Walks Walking by holding shoulders -Walking hand in hand Walking by holding index fingers Walking with voice	These games are for students to realize the importance of trusting each other. Moreover, the game "Car" can be used for the attainment of another course. For instance, concepts of left-right, forward-backward, forth-back can be taught.
Week 4	Harmony Activities	Follow the Leader Guess who is the Leader	These games are for students to move in harmony. Moreover, the game "Magnet" can be used for the attainment of another course. For

		Managing and Managed Persons Mirror Magnet Cushion Filling Counting from 1 to 20	example, forces of thrust and attraction can be taught.
Week 5	Rhythm and Sense Games	Shattered My name is Cho-Co-La-Te I have, Neighbor has Glass with Rhythm Game Drawing on the Back Recognizing the Hand	These games are for improving students' rhythm senses and skills and efficient use of their senses. Moreover, the game "Shattered" can be used for the attainment of another course. For instance, names of aquatic, terrestrial and aerial animals can be taught.
Week 6	Self-Expression and Roleplay Games	What Are You Doing? It is Available Next to Me Pantomime Simon Says Who is the Murderer The Ghost Find your Pair	These games are for students' expressing themselves efficiently and preparation for roleplaying and improvisation activities. Moreover, the game "Find your Pair" can be used for the attainment of another course. For example, synonyms and antonyms can be taught.
Week 7	Problem-Solving and Psychomotor Skill	Knot Drum Shawm 1, 2, 3 Fruit Basket Cabbage Field Dominos Dribbling Stop	These games are for improving students' psychomotor and problem-solving skills. Moreover, the game "Fruit Basket" can be used for the attainment of another course. For example, geometric shapes can be taught

After the instructor had had the preservice teachers played the games, they created pairs and chose any attainments of primary school courses (Mathematics, Social Studies, Life Sciences, Turkish, English, etc.) and made and implemented plans to teach that specific attainment through game. Following the presentations, the group who did the implementation evaluated their own plan and the implementation process in terms of teaching skills. Next, their classmates and the instructor assessed this process in a detailed way and provided feedbacks. At the end of the fourteenth week, the preservice teachers were asked to complete the semi-structured form of five questions which had been applied at the beginning of the study and to write letters which were mentioned in detail in the data collection instruments section.

The following is an exemplary activity for a Mathematics attainment of addition with natural numbers performed by the instructor with educational games.

Course: Mathematics

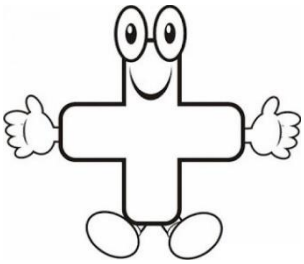
Subject: Addition with Natural Numbers

Group: First-Grade Students (20 girls and 10 boys; 30 students in total)

Place: Classroom

Tools: Flashcards, Thin Stick, Posterboard, Plastic Cup, Carrot-shaped colorful cardboard, Patafix

Attainment: Student operates addition with natural numbers (including 20) of which sum is up to 20.



Go learn the properties of addition (Adapted from Addend, plus, Equal and Result-Port-Starboard-Deck game)

Teacher draws four imaginary lines parallel to each other in the classroom. Names of the lines are “Addend”, “Plus (+)”, “Equal (=)” and “Sum”. Both names and images are hung next to the imaginary lines. With the instruction of the teacher, students change places among these lines quickly. If anyone mixes up where to go or goes there late, they read the information hung on the wall by the teacher. The game continues until one player is left, and all cards are read for a few times. In the second stage of the game, if the student who mixed up where to go or went there late tells a property that remained in his/her mind from the flashcards, he/she is back in the game; otherwise, he/she is out. The last student wins the game.

Go Add: The class makes a circle and is divided into two groups by counting 1-2. Student operates the addition by materializing the problem written on the carrot across with sticks in the cup and tries to complete the carrot by getting the right result written on the carrot leaf before his/her rival. The student who completes the carrot in the right way scores 1 for the group. The game goes on like this and the winning group is determined.

Annexes:

On the Flashcards

1. To add means bringing together, including.
2. Symbol of addition is plus and it is illustrated as “+”.
3. Equals is the symbol used to give the result of problem or operation after the necessary operations required for a given problem have been done. It is illustrated as “=”.
4. In an addition, the added numbers are called “Addend” and the result of the operation is called “Sum”.
5. Neutral element of addition is “0”. It does not affect the result of addition.
6. Elements of addition can be replaced. For instance, 1+2=2+1.
7. Addition is done vertically and horizontally.
8. The operation line in vertical addition functions as equal in horizontal addition.

Operations on the Carrots:

a) 2+1= 3 b) 13+2=15 c) 5+1= 6 ç) 9+7=16 d) 10+3= 13 e) 11+5=16 f) 3+4= 7

Findings

The findings achieved with the analysis of data that were obtained with the instruments specified in the methods section of this study aiming to identify the opinions of preservice classroom teachers on educational games improving their teaching skills are explained in tables. Percentage values may exceed 100% because the expressions of the pre-service teachers were placed under

multiple codes. Data achieved on the opinions of the definition of educational game are presented in Table 2.

Table 2. Opinions on the definition of educational game

Codes		Pre-application		Post-application	
		f	%	f	%
1	Teaches while entertaining	18	30	56	93.33
2	Ensures effective learning	2	3.33	56	93.33
3	Improves attention skills	2	3.33	50	83.33
4	Contributes to self-expression	3	5	48	80
5	Improves thinking skills	4	6.66	45	75
6	Ensures physical development	6	10	35	58.33
7	Ensures mental development	6	10	32	53.33
8	Ensures materialization of concepts	3	5	25	41.66
	Blank	16	26.66	0	0

According to Table 2, 8 different codes referring to the attributes of educational game were achieved given the distribution of statements of the preservice classroom teachers on the definition of educational game. Although 26.66% of the preservice teachers provided no statement on the definition of educational before the application, it was observed that all of them defined educational game by featuring some attributes of educational game in their own way. While very few preservice teachers defined educational game by emphasizing its basic characteristics before the application, almost more than half of them emphasized attributes of educational game after the application. For instance, 30% of the preservice teacher emphasized “teaches while entertaining” attribute of educational game before the, and 93.33% of them stated that after the application. Likewise, before the application, only 3.33% of the preservice teachers emphasized that educational game ensures effective learning whereas 93.33% of them defined educational game by featuring this attribute after the application. 3.33% of the preservice teachers before the application, 83.33% of them after the application emphasized that educational game improve attention skills; only 5% before the application and 80% after the application stated that it contributes to self-expression; only 6.66% before the application and 75% after the application stated that it improves thinking skills; only 10% before the application and 58.33% after the application emphasized that it ensures physical development; 5% before the application and 41.66% after the application stated that it ensures mental development; and 10% before the application and 53.33% after the application emphasized that it ensures materialization of concepts.

For example, the following is the statement of PT7 who defined educational game by featuring the codes of "teaches while entertaining", "ensures effective learning", and "contributes to self-expression":

> *"PT7: Educational games are games that have important contributions to children's learning while having fun and to their development. Educational games also improve students' physical and mental abilities. They can ensure that they express themselves in a better way. It helps learned information be more retentive, effective and entertaining in their minds."*

The statement of PT22 who defined educational game by featuring the codes of "improves attention skills", "improves thinking skills" and "ensures mental development" is as follows:

> *"PT22: When children are distracted, their attention can be drawn with games. Attainments taught to children can be made more fun by reinforcing them. Ensuring their mental development, games can also contribute to the development of their thinking skills."*

PT13 wrote in the letter after the application that educational games would be effective in the instruction of courses involving abstract concepts such as mathematics and geometry for materializing the concepts:

> *"PT13: This course made significant contributions to my personal and professional life. I communicated with others more comfortably, and this process made me socialized. I will teach social values with educational games when I will become a teacher. Educational games are very important for more enjoyable and retentive learning of numerical courses such as mathematics and geometry which are abstract."*

Data obtained from the opinions on advantages and disadvantages of using educational games in the instruction of primary school courses are given in Table 3.

Table 3. The opinions on advantages and disadvantages of using educational games

Codes			**Pre-application**		**Post-application**	
			f	**%**	**f**	**%**
Advantages	1	Increases interest to ensure overcoming the prejudice against the course	3	5	57	95
	2	Facilitates learning	18	30	56	93.33
	3	Ensures learning by having fun	18	30	56	93.33
	4	Ensures students blow off steam	0	0	55	91.67
	5	Ensures learning by doing and experiencing	1	1.67	52	86.67
	6	Keeps from getting bored	16	26.67	50	83.33

	7	Increases participation in the course	1	1.67	45	75
	8	Ensures students get socialized	1	1.67	48	80
	9	Ensures students overcome the gender barrier	1	1.67	42	70
	10	Ensures materialization	5	8.33	36	60
	11	Improves communication skills	2	3.33	35	58.33
	12	Attracts attention	3	5	28	46.67
	13	Makes learning retentive	21	35	28	46.67
	14	Facilitates conceptual learning	0	0	14	23.33
Disadvantages	1	Classrooms being unfit for playing games	2	3.33	45	75
	2	Preparation of educational game for each subject being difficult	0	0	43	71.67
	3	One might stray away from attainments	0	0	42	70
	4	If not played properly, it may become a loss of time	11	18.33	35	58.33
	5	Managing the class is difficult	0	0	28	46.67
	6	When not associated with the attainment, interest is lost	2	3.33	27	45

According to Table 3, regarding the distributions of opinions on advantages and disadvantages of using educational games in primary school courses, advantages were gathered under 14 different codes whereas disadvantages were gathered under 6 different codes. Although minority of the preservice teachers stated the codes about advantages and disadvantages of educational games in the instruction of primary school courses before the application, the preservice teachers stated these codes at higher rates after the application. Considering the instructional advantages of educational games, 5% of the preservice teachers before the application and 95% of them after the application stated that they increase students' interest in the course and ensure that they overcome their prejudices; 30% before the application and 93.33% after the application stated that it ensures students learn by having fun and facilitates learning; 1.67% before the application and 86.67% after the application stated that it ensures learning by doing and experiencing; 26.67% before the application and 83.33% after the application stated that they would prevent the course from becoming boring; 1.67% before the application and 75% after the application stated that they would increase participation in the course; 1.67% before the application and 80% after the application stated that they would ensure students overcome the gender barrier; 8.83% before the application and 60% after the application stated that they would ensure learning through materialization; 3.33% before the application and 58.33% after the application stated that they would improve students' communication skills; 5% before the application and 46.67% after the application stated that they would attract attention to the course; and 35% before the application and 46.67% after the application stated that they would make learning retentive. Whereas none of the preservice teachers provided the codes "Ensures students blow off steam" and

"Facilitates conceptual learning" before the application, 91.67% and 23.33% of them stated that they would ensure students blow off steam and they would facilitate conceptual learning, respectively.

As for the advantages of educational games in the instruction of primary school courses, the statements of PT11 who featured the codes "Increases participation in the course", "Ensures students blow off steam", and "Attracts attention", PT13 who featured the codes "Ensures materialization", "Facilitates learning", "Makes learning retentive", and "Ensures students get socialized" and PT25 who featured the codes "Ensures learning by having fun", "Makes learning retentive", "Increases participation in the course", and "Ensures students overcome the gender barrier" are as follows:

> *"PT11: It may ensure that introvert students and students with lack of confidence become more active in the course. It prevents courses from being monotonous and boring and ensures student blow off steam and draws their attention toward the course. That is, it teachers by entertaining."*
>
> *"PT13: I think that using educational games in the instruction of primary school courses will teach a lot of things to children. Abstract concepts that are hard to learn in courses especially such as mathematics can be taught in a more entertaining, easier and retentive way. When playing, students participate in the course actively, communicate with their friends and get socialized.*
>
> *"PT25: Teacher can teach the attainments to students in an entertaining, retentive and easier way. Moreover, participation in the course increases when attainments are taught with games, and their communication skills improve as they interact with each other. The gender barrier is overcome."*

PT15 stated in the post-application letter that subjects can be learned more easily by having fun through educational games, and games would ensure that students are socialized and blow off steam as follows:

> *"PT15: … My communication with my friends is now better thanks to this course, and I can now get along with people whom I prejudge as we played games. I think that I can implement the games I learned in this course in many course during my teaching. We can teach more easily, efficiently and entertainingly in the courses such as Mathematics and Science with which students have trouble. This way, it will help them blow off steam and acquire many skills such as attention, quick thinking, rhythm and efficient use of senses."*

Regarding the codes on the disadvantages which educational game might present from certain aspects, 2% of the preservice teachers before the application and 75% after the application stated that

classrooms are unfit for playing games; 11% before the application and 58% after the application stated that if not played properly, it may cause a loss of time; and 2% before the application and 45% after the application stated that When not associated with the attainment, interest may be lost. While none of the preservice teachers mentioned about the disadvantages that preparation of educational game for each subject is difficult, one might stray away from attainments when not played properly and managing the class is difficult before the application, 71.67% of them stated that preparation of educational game for each subject is difficult, 70% stated that one might stray away from attainments when not played properly and 46.67% stated that managing the class is difficult after the application.

For instance, the following is the statement of PT22 who featured the codes "Classrooms being unfit for playing games" and "Managing the class is difficult" in regard to the disadvantages that might be posed by the use of educational games in the instruction of primary school courses:

> *"PT22: Level of effect would decrease when game and attainment are not properly associated. Crowded classrooms may not be fit for playing games. Teacher might lose the dominance."*

The statement of PT35 who emphasized that preparing or finding an educational game for every subject of primary school courses might pose a disadvantage for the instruction with a game is as follows:

> *"PT35: It is nice to teach attainments with games but it may be really hard to find and prepare a game suitable for every subject."*

Data obtained from the opinions on which courses it would be more appropriate to use educational games for instruction in are presented in Table 4.

Table 4. Opinions on which courses it would be more appropriate to use educational games

Codes			**Pre-application**		**Post-application**	
			f	**%**	**f**	**%**
Mathematics	1	Geometric shapes	0	0	45	75
	2	In teaching the multiplication table	1	1.67	42	70
	3	Our moneys	0	0	42	70
	4	In teaching numbers	9	15	36	60
	5	In teaching numerals	2	3.33	36	60
	6	Four operations (addition, subtraction, multiplication and division)	2	3.33	28	46.67
	7	Rhythmic counting	3	5	26	43.33
	8	Improves mental four operation skills	1	1.67	18	30
	9	Pattern	0	0	17	28.33

	10	No explanation	15	25	0	0
Turkish	1	Synonyms	1	1.67	30	50
	2	In teaching letters	2	3.33	30	50
	3	Antonyms	1	1.67	28	46.67
	4	Punctuation	0	0	25	41.67
	5	Proverbs	0	0	23	38.33
	6	Idioms	0	0	21	35
	7	Elements of sentence	0	0	20	33.33
	8	No explanation	17	28.33	0	0
Science	1	Seasons	3	5	39	65
	2	Digestive system	2	3.33	37	61.67
	3	States of matter	0	0	36	60
	4	Effects of force	1	1.67	35	58.33
	5	Light pollution	1	1.67	33	55
	6	Motions of Sun	0	0	32	53.33
	7	Motions of Earth	0	0	29	48.33
	8	Senses	0	0	28	46.67
	9	No explanation	6	10	0	0
Social Studies	1	Natural disasters	7	11.67	34	56.67
	2	Individual traits	6	10	33	55
	3	Occupations	0	0	32	53.33
	4	Geographical regions	0	0	26	43.33
	5	Individual needs	4	6.67	23	38.33
	6	No explanation	15	25	0	0
Life Sciences	1	Types of transport	4	6.67	38	63.33
	2	School and classroom rules	6	10	38	63.33
	3	Traffic signs	3	5	35	58.33
	4	Values	3	5	32	53.33
	5	Seasons	1	1.67	30	50
	6	Family members	5	8.33	28	46.67
	7	Life of Atatürk	0	0	18	30
	8	No explanation	1	1.67	0	0
English	1	Occupations	2	3.33	31	51.67
	2	Colors	0	0	30	50
	3	Numerals and Numbers	0	0	28	46.67
	4	Seasons	0	0	26	43.33
	5	Sports	1	1.67	25	41.67
	6	Months	0	0	22	36.67

According to Table 4, as for the distributions of opinions on which primary school courses it would be more appropriate to use educational games for instruction in, the preservice teachers suggested that educational games can be used in the instruction of several courses (9 subjects of Mathematics; 7 subjects of Turkish; 8 subjects of Science; 5 subjects of Social Studies; 7 subjects of Life Sciences; and 6 subjects of English).

While few number of preservice teachers provided opinion on which primary courses it would be appropriate to use educational games for instruction in before the application, number of the preservice teachers who provided such opinions increased after the application. Although significant number of preservice teachers gave the name of courses in which educational games can be used for instruction but did not stated any subjects before the application, it was observed that all of the preservice teachers stated names of courses and subjects for which educational games can be used.

Whereas the number of preservice teachers who stated that educational games can be used in the instruction of Mathematics was low before the application, 75% of them suggested geometric shapes, 70% multiplication table and our moneys, 60% numerals and numbers, 46.67% four operations (addition, subtraction, multiplication and division), 30% mental operation skills, and 28.33% patterns for the instructional use of educational games after the application. The following is the statements of PT30 and PT42 who stated that it would be appropriate to use educational games in the instruction of Mathematics subjects:

> *"PT30: I think that educational games are suitable rather for the instruction of subjects in Mathematics courses. Since Mathematics is an abstract course, students are generally afraid of it. Therefore, educational games can be benefited in the instruction of multiplication tables, numbers, moneys, rhythmic counting, pattern and geometric shapes both to make Mathematics loved and increase students' interest in it and overcome their prejudices against it."*

> *"PT42: Game teaching can be used in Mathematics very well. Because students are more afraid of Mathematics than other courses according to studies. They find it difficult to learn because they are afraid. Therefore, if several subjects of Mathematics such as numbers, mental operation, four operations and numerals are taught with games, they will learn them in a better way and they will have learned them more retentively. Consequently, Mathematics can be rendered an entertaining rather than a boring course to reduce students' mathematical fear."*

Similarly, while the number of preservice teachers who stated that educational games can be used in the instruction of primary school Turkish courses was low before the application, 50% of them suggested letters and synonyms, 46.67% antonyms, 41.67% punctuation, 38% proverbs, 35% idioms,

and 33.33% elements of sentence for the instructional use of educational after the application. The statement of PT37 who stated that it would be appropriate to use educational games in the instruction of Turkish subjects is as follows:

> *"PT37: I think that educational games are much more suitable for the instruction of Turkish subjects. They can be efficiently used particularly for teaching synonyms and antonyms, proverbs, idioms, punctuation and letters."*

Likewise, although few preservice teachers stated that educational games can be used in the instruction of primary school Science course before the application, 65% of them suggested seasons, 61.67% digestive system, 60% states of matter, 58.33% effects of force, 55% light pollution, 53.33% motions of Sun, 48.33% motions of Earth, and 46.67% sense for the instructional use of educational games after the application. The statement of PT54 who stated that it would be appropriate to use educational games in the instruction of Science subjects is as follows:

> *"PT54: Educational games would be more effective and retentive for teaching Science subjects primarily such as states of matter, senses, digestive system, motions of Sun. Because tools such as visual materials can be used in the game, too."*

Another primary school course that was suggested by the preservice teachers for the use of educational games was Social Studies. Although few preservice teachers stated that educational games can be used in the instruction of Social Studies before the application, 56.67% of them suggested natural disasters, 55% individual traits, 53.33% occupations, 43.33% geographical regions, and 38.33% individual needs for the instructional use of educational games after the application.

Another primary school course that was suggested by the preservice teachers for the use of educational games was Life Sciences. Whereas the number of preservice teachers who stated that educational games can be used in Life Sciences course was quite low before the application, 63.33% of them suggested types of transport and school and classroom rules, 58.33% traffic signs, 53.33% values, 50% seasons, 46.67% family members, and 30% life of Atatürk for the instructional use of educational games after the application.

The statement of PT45 who stated that it would be appropriate to use educational games in the instruction of Social Studies and Life Sciences subjects is as follows:

> *"PT45: If planned well, educational games can be used in all courses. But Life Sciences and geographical regions, occupations, individual traits and values subjects of Social Studies can be taught very easily with games. Children can learn them through games by doing and experience in an entertaining way. I think they would not forget what they learn."*

English is another course that can use educational games according to the preservice teachers. Although the number of preservice teachers who stated that educational games can be used in English course before the application, 51.67% stated that they can be used for teaching occupations, 50% colors, 46.67% numerals and numbers, 43.33% seasons, 41.67% sports and 36.67% months after the application. The statement of PT51 who stated that it would be appropriate to use educational games in the instruction of English subjects is as follows:

> *"PT51: I think educational games can be very effective in teaching the English equivalence of Turkish words and sentences in the English course. The results of the application I performed with my classmates confirm it. Children can learn especially English equivalences of months, seasons, colors, numerals and occupations in Turkish more easily in games."*

Data obtained from the opinions on planning the use of educational games in the instruction of primary school courses are presented in Table 5.

Table 5. Competencies at planning the use of educational games in courses

Codes			Pre-application		Post-application	
			f	%	f	%
Yes	1	I can prepare games that can attract children's attention	1	1.67	52	86.67
	2	I may have difficulty because I do not have enough experience	5	8.33	7	11.66
No	1	I do not have enough knowledge	54	90	0	0
	2	Because it is difficult to prepare a game	0	0	1	1.67

According to Table 5, regarding the distribution of opinions on planning the use of educational games in the instruction of primary school courses, opinions of the preservice teachers were grouped in two themes: yes and no. While 90% of the preservice teachers reported that they did not have enough knowledge on planning the use of educational games before the application, it was observed that the rate at the beginning descended after the application. Furthermore, while the number of preservice teachers who found themselves competent at planning was quite low before the application, 86.67% of them stated that they could prepare games that attract children's attention and 11.66% found themselves competent but stated that they might have difficulty as they do not have enough experience of game preparation. The following is the statement of PT31 who found himself/herself competent at planning the use of educational games in the instruction of primary school courses:

> *"PT31: Thanks to the game teaching course I took, I find myself competent at planning the use of educational games in the instruction of primary school courses. I think I have enough*

knowledge on which game is more suitable for which course and subject. In this sense I can do the necessary planning."

Data obtained from the opinions on implementing the use of educational games in the instruction of primary school courses are presented in Table 6.

Table 6. Competencies at implementing the use of educational games in courses

Codes			Pre-application		Post-application	
			f	%	f	%
Yes	1	I can use a readily-given game	8	13.33	2	3.33
	2	I can design and implement a game suitable for attainments	0	0	57	95
	3	I may have difficulty because I do not have enough experience	0	0	1	1.67
No	1	I cannot implement games in the course	52	86.67	0	0

According to Table 6, regarding the distribution of opinions on implementing the use of educational games in the instruction of primary school courses, opinions of the preservice teachers were grouped in two themes: yes and no. While 86% of the preservice teachers reported that they did not have enough knowledge on implementing the use of educational games before the application, it was observed that much less participants reported so after the application. Although few preservice teachers (13.33%) who found themselves competent at implementing reported that they can use a readily-given game before the application, 95% stated after the application that they can design and use a game suitable for attainments of each course in primary school. Pre-application and post-application statements of PT45 who found himself/herself competent at implementing the use of educational games in the instruction of primary school courses are as follows:

"PT45: (Pre-application) … I do not find myself competent at implementing because I have not done much of it. That is why I think I have a lot to learn. I believe I can manage the classroom fully by using the games."

"PT45: (Post-application) … We have learned a lot about how we can use games in the course, done applications; therefore, I now think that I can prepare an exemplary activity. Not only I can integrate the games we learned with attainments but also teach the attainments by designing new games. I can implement the games in primary school courses easily. I can prepare games after identifying the attainments. I do not think I would have trouble with implementing the plan I made with children. I find myself very competent at implementing."

Results and Discussion

In this section, the relevant literature was associated with the findings of this research which aimed to identify preservice classroom teachers' opinions on educational games improving their teaching skills, the findings were discussed and recommendations were made on the results.

As for the findings about the opinions on the definition of educational game, very few of the preservice teachers emphasized the basic characteristics of educational game in its definition before the application, and in fact, about one fourth of them did not make any explanation about the definition of educational game. On the other hand, all the preservice teachers defined educational game by emphasizing its certain attributes after the application. In other words, almost all of the preservice teachers emphasized the attributes "teaches while entertaining", "ensures effective learning", "improves attention skills", "contributes to self-expression", and "improves thinking skills", almost half of them defined it by emphasizing the attributes "ensures physical development" and "mental development" and "ensures materialization of concepts" after the application. Considering the findings overall, the preservice classroom teachers defined educational games as games that make courses effective and fun and help children enjoy the course, interact with each other and improve their mental activities to enable them to achieve the attainments of related course. The statements of the preservice teachers on the definition of educational game coincide with the definitions made by Demirel (1993), Akandere (2013), Koç (2017) and Varan, (2017) for its contribution to physical and mental development, Güven and Özerbaş (2016) and Onay (2006) for teaching while entertaining and contributing to self-expression and Çangır (2008) for improving thinking skills. It is observed that "contributing to self-expression" and "ensuring the materialization of concepts" attributes of educational game achieved in this study are not emphasized in the definitions made in the literature. In this study, it can be understood from the fact that the preservice teachers emphasized these attributes when defining the educational game after the application that they noticed the potential of educational game in students' learning. Hence, it is recommended in the light of the result regarding the definition of educational game that contributions to be made by educational games to the preservice teachers in the game teaching courses for students' learning are addressed and attributes of educational game are scrutinized.

As for the findings achieved from the preservice classroom teachers' opinions on the advantages and disadvantages of using educational games in primary school courses, few of the preservice teachers stated the advantages and disadvantages before the application whereas significant number of them became aware of the advantages and disadvantages of educational games for students' learning after the application. It was observed after the application that almost all of the preservice teachers became aware of the instructional advantages of educational games such as increasing interest

in the course and overcoming the prejudice, facilitating the learning, learning by having fun and ensuring that students blow off steam. In addition, about third fourth of the preservice teachers realized that educational games would provide advantages such as students' learning by doing and experiencing, preventing the course from being boring, helping students get socialized, increasing their participation in the course, ensuring that they materialize the concepts and improving their communication skills. This result coincides with the results of several studies in the literature. In the studies performed by Bayazıtoğlu (1996), Şaşmaz Ören and Erduran Avcı (2004), Altınbulak (2004), Gülsoy (2013), Gökbulut and Yumuşak (2014), Alıcı (2016), Işık (2016), Can (2017) and Çelik (2017), it is stated that the students learned the subject more easily and retentively and had increased academic achievement in the courses reinforced with educational games. Similarly, Özyürek and Çavuş (2016) concluded in their research on the instructional use of educational games by primary school teachers that it facilitated the learning when the primary teachers benefited from games during the instructional games, they ensured that the students learned by having fun, therefore increasing both teachers' teaching skills and students' achievements. Furthermore, Çuha (2004) states in the study titled "Effect of educational games in mathematics teaching on achievement, academic self, achievement motive and retention" that the group which was exposed to educational game aided instruction became more successful than the traditional instruction group.

Although very few preservice teachers were aware of the disadvantages that might educational games have instructionally before the application, about three fourth of them reported instructional disadvantages such as classrooms being unfit for playing games, difficulty of preparing educational game for each subject and one might stray away from attainments when proper guidance is not provided during the game after the application. Considering the results regarding advantages and disadvantages of educational games in the instruction of courses as a whole, it can be argued that the preservice teachers became more aware of the advantages and contributions of educational games for students' learning and the instructional process when used properly after the application. Since no studies putting forth instructional disadvantages of educational games when not used properly were observed in the literature, it is anticipated that this result of the study would contribute to the literature.

As for the findings obtained from the opinions on which courses it would be more appropriate to use educational games in, although the number of preservice teachers who suggested courses in which it would be appropriate to use educational games in teaching the attainments was very low before the application, great number of preservice teachers stated that educational games can be used in certain courses after the application. In other words, there was a great increase in the number of preservice teachers who thought that educational games can be used for teaching the primary school attainments after the application. After the application, more than half of the preservice teachers had higher awareness of using educational games in the instruction of geometric shapes, multiplication

table, our moneys, numbers and numerals subjects in Mathematics course; seasons, digestive system, states of matter, effects of force, light pollution and motions of Sun subjects in Science course; natural disasters, individual traits, occupations subjects in Social Studies course; types of transport, school and classroom rules, traffic signs, values and seasons in Life Sciences course; and occupations and colors in English course. It can be argued in the light of these results that the preservice classroom teachers became more aware that educational games can be used in teaching several attainments after the application. Indeed, it is also seen that the results in regard to planning and implementing the use of educational games in the instruction of primary school courses reinforce this result.

In regard to the findings on planning and implementing the use of educational games in the instruction of primary school courses, while almost all of the preservice teachers found themselves incompetent at planning and implementing the use of educational games before the application, again, almost all of them achieved the competency at preparing games that would attract children's attention and use these games when teaching the primary school attainments after the application. It can be understood from this result that applications supported with activities using the educational games in the course contributed to the development of preservice classroom teachers' teaching skills and their increased competency at using them as an instructional tool.

According to these results, it is recommended that studies are conducted with broader samples to improve planning and implementing skills of preservice classroom teachers and classroom teachers so that they can use educational games more effectively and efficiently during the educational-instructional process. Furthermore, in-service trainings should be organized to improve relevant skills and competencies of classroom teachers actively serving at schools.

Recommendations

According to these results, it is recommended that studies are conducted with broader samples to improve planning and implementing skills of preservice classroom teachers and classroom teachers so that they can use educational games more effectively and efficiently during the educational-instructional process. Furthermore, in-service trainings should be organized to improve relevant skills and competencies of classroom teachers actively serving at schools.

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