

A comparative analysis of preschool children's views on activities conducted with educational cartoons and traditional methods

Omer Kocak

Ataturk University, Turkey

Yuksel Goktas

Ataturk University, Turkey

Abstract

This study aims to analyze the views of children whose spatial concept development is supported by activities conducted with educational cartoons compared to traditional methods. In this context, preschool children's views on the activities, their memory retention of them, and the levels of awareness caused by the activities were investigated. This study was conducted over a period of 4 weeks with four groups of preschool children. Activities were conducted using educational cartoons with two groups (experimental groups) and using traditional methods with the other two groups (control groups). This study used a quasiexperimental design, but a semistructured interview was used for data collection. The findings demonstrated that, while the majority of children in the experimental groups remembered all the activities, the majority of children in the control groups could not remember the activities. Whereas the majority of children in the experimental groups reported that the cartoons had taught them spatial concepts and games, the children in the control groups reported that the activities had taught them games.

Keywords

Cartoons, animations, preschool children's views, memory, spatial concept learning, spatial perception

Introduction

Communication technologies attract students' attention and thus can cause an increase in their motivation and naturally cause learning to occur more easily and in a more entertaining way (Broussard & Garrison, 2004; Cho, 2012). Keller (2016) argued that five basic conditions should be met for strong motivation: Attention, Relevance, Confidence, Satisfaction, and Volition (the ARCS-V model). Thus, an ideal educational environment catches students' attention, is appropriate for them, is safe and satisfying, and engenders the desired willpower; however, designing such an environment remains challenging.

Recent studies have found that technologies used in education increased students' motivation and made their learning stronger (Chin et al., 2014; Jhurree, 2005). Technology provides a learning environment increasing both teachers' and students' motivation. If integrated appropriately into the classroom environment, communication technologies make the teaching process easier for teachers, increase students' motivation and interest in learning, and support learning (Jhurree, 2005). However, technological devices that cannot easily be integrated into the classroom environment have no pedagogical advantages and remain just devices (Kim et al., 2013). Therefore, technology serves only as a vehicle, and the main elements influential in learning are the methods of learning and teaching (Clark, 1994). In this respect, learning and teaching methods make teaching designers' work easier, and they help in the selection of teaching techniques and instruments suitable for learning situations (Alessi & Trollip, 2001; Ertmer & Newby, 1993). One of the education levels in which technology access and use increases for teaching purposes is preschool classrooms (Lauricella et al., 2020). Technology can be used in preschool education for various purposes, and one of these purposes is concept teaching (Zomer & Kay, 2018).

In children, concept acquisition, starting from birth, is a slow and difficult process. While concept acquisition requires a high-level cognitive process, it also requires generalization according to similar characteristics and decomposition according to similar characteristics (Hayran, 2010; Tepebaş & Haktanır, 2013). In particular, the acquisition of spatial concepts begins at the age of 4 years and is difficult to attain. Concept acquisition can be understood as storing concepts in long-term memory and recalling these concepts with the necessary clues. In the literature, the type of memory that enables the acquisition of such concepts is called retrospective memory. Retrospective memory is often referred to as storing and remembering words, people, and events (Walsh et al., 2014). Of course, the age of a child is also an important factor for memory; the memory of growing children also improves (Bjorklund, 1987). However, children's memory organization increases in line with their levels of knowledge, which contribute to the increase in recall rates (Bjorklund, 1985, p. 117).

In this context, this study examined whether cartoons can improve children's knowledge of spatial concepts and thus improve their memory organization. Cartoons are an example of instruments that enable students to learn effectively and have recently and frequently been used in the learning/teaching process (Banchonhattakit et al., 2015; Booth, 1997; Vereş & Magdaş, 2020). Cartoons increase students' interest and motivation (Banchonhattakit et al., 2015) while reducing their cognitive burden and providing them with unique learning experiences (Gero & Zoabi, 2014).

Studies conducted in different countries such as the US, Turkey, and India have reported that children 2–11 years old spend 3 hours on average watching TV every day, and they watch cartoons for a great portion of that time (Emond et al., 2018; Kocak & Goktas, 2017; Mukherjee et al., 2014). Therefore, it can be said that children spend most of their time watching cartoons. Cartoons appeal to a child’s world of imagination through colorful images and sound effects, and they identify themselves with the characters in the cartoons they watch (Yurtsever Kılıçgün, 2015). Aside from this, cartoons are effective in catching children’s attention (Dalacosta et al., 2009), and their usage in many disciplines for this purpose thus makes learning more effective. Such attention-attracting materials, which help children learn effectively are important in the learning/teaching process (Haque, 2013; Zhang, 2012). Cartoons can help keep children’s attention for longer periods (Zhang, 2012) so that they get the overt and covert messages more easily (Skouteris et al., 2007) and retain what they have learned for longer (Arıkan, 2001). One of the most reported positive contributions of cartoons is that they assist children’s linguistic and cognitive development. Experimental studies have indicated that children can learn new words from cartoons (Krcmar et al., 2007). Additionally, high-quality cartoons can help children acquire useful information, feel and learn positive and good emotions, and improve their thinking skills (Meng et al., 2020). However, cartoons can also have negative effects on children. Particularly, violence is a type of negative content to which children are frequently exposed in cartoons. When children watch violent cartoons, they tend to show aggressive behavior toward their peers (Kirsh, 2006). In addition, such cartoons can cause the development of an antisocial personality in children (Pandit & Kulkarni, 2012; Rashid, 2015; Yağlı, 2013). Christakis and Zimmerman (2007), following a longitudinal study, reported that violent television programs were associated with an increased risk of antisocial behavior. Table 1 summarizes potential positive and negative effects based on a review of the literature.

Table 1
The potential effects of cartoons on children

Potential effects		Study																	
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	
Positive	They can develop children’s imagination.				✓					✓							✓		
	They can be effective instruments in catching children’s attention.							✓										✓	✓
	They can contribute positively to children’s linguistic and cognitive development.											✓		✓	✓	✓			
	They can save time in education.			✓			✓												
	They can be an entertaining tool.		✓			✓				✓									
	They are effective tools in educating and informing.				✓														
	They can increase permanence in memory since they contain visual and aural stimuli.	✓																	
	They can simplify complexities, and they can visualize invisible things.	✓																	
	They can help to develop positive behaviors (e.g., problem-solving, role models and benevolence).								✓									✓	
	They can cause addiction.														✓	✓			
They can be used to give subliminal messages.															✓				
They can cause children to have supernatural perception which is not influenced by emotions, thoughts, or physical perceptions.		✓																	
They can cause emotional, mental, and medical problems.														✓	✓	✓			

Potential effects	Study																
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
They can cause personality disorders and the development of antisocial personality.												✓					
Cartoons with negative content can cause negative behaviors (role models, aggressiveness, disobedience, evil, etc.).																	✓
They can cause children to see violence as a viable solution to a problem and to be biased toward violence.									✓	✓					✓		

Note. (1) Arkan (2001); (2) Aşkaroğlu (2006); (3) Banchonhattakit et al. (2015); (4) Barak et al. (2011); (5) Booth (1997); (6) Chan (2015); (7) Dalacosta et al. (2009); (8) de Leeuw & van der Laan (2018); (9) Eskandari (2007); (10) Habib & Soliman (2015); (11) Ling (2003); (12) Oruç et al. (2011); (13) Pandit & Kulkarni (2012); (14) Rashid (2015); (15) Yağlı (2013); (16) Yurtsever Kılıçgün (2015); (17) Zhang (2012).

When we examine the potential positive effects of cartoons, it can be said that cartoons can be used for concept teaching in line with these characteristics. Though there have been many studies investigating the effect of cartoons on learning (e.g., Dalacosta et al., 2009; Yüceliyiğit & Aral, 2016), there have been no experimental studies comparing cartoons with traditional learning methods and examining this in depth with qualitative methods. Therefore, this research paper addresses this gap. Additionally, this study is an important examination of the usability of cartoons in education. Consequently, the present study comprised a comparative analysis of two different methods to teach spatial concepts to children—through educational cartoons and with traditional activities. It compared the views of the children about the activities, their recall levels, and whether they were aware of the concepts presented.

In this context, this study sought to answer to the following questions:

- 1) What are the views of children about the educational cartoons and about the traditional activities?
 - a. Which parts of the activities do children like the most?
 - b. What are the factors that distract children’s attention during the activities?
- 2) How much do children remember about the activities conducted with educational cartoons compared to those conducted with traditional methods?
- 3) What are children’s levels of awareness of spatial concepts presented with educational cartoons compared to those presented using traditional methods?

Method

A quasiexperimental design was used in this study. Activities were performed with the experiment and control groups for 4 weeks using two different methods, and children’s views on the activities were obtained after each week. Since the number of children in classes is low in preschool education, four classes were included in the study; two were designated as the experimental groups and the other two were the control groups. In this study, the experimental groups were called the “educational cartoon” groups and the control groups were called the “traditional method” groups. The study was approved by the Ethics Committee of Ataturk University, and permission was received from the Ministry of National Education to perform research and interventions in kindergartens. Finally, parents’ permission was sought for including their children in the research.

Children whose parents had not given permission were not included in the experimental intervention.

Participants

This study's sample was chosen through purposeful sampling. Purposeful sampling is used to collect in-depth, detailed information, and it was used in this study to determine the target students' level (Fraenkel et al., 2012). Within the scope of this study, the research sample comprised children aged 48–60 months and attending preschool institutions. Activities were planned for four groups in this study in order to have an adequate sample. Activities were performed with the help of cartoons in two groups and with traditional methods in the remaining two groups. Demographic data of these children are shown in Table 2.

Since it was not possible to interview all children due to time constraints, we decided to interview only 10 randomly selected children from each of the four groups each week. The demographic data on interviewees are shown in Table 3.

Table 2

Descriptive data of the sample

Group	Average age (months)	Gender	<i>n</i>
Educational cartoons	50.7	Male	23
		Female	20
Traditional methods	49.5	Male	24
		Female	16
Total			83

Table 3

Descriptive data of children interviewed weekly, according to activity

Week	Gender	Activity group	
		Educational cartoons (<i>n</i> = 43)	Traditional methods (<i>n</i> = 40)
Week 1	Male	9	8
	Female	11	12
	Total	20	20
Week 2	Male	8	13
	Female	12	7
	Total	20	20
Week 3	Male	7	8
	Female	13	12
	Total	20	20
Week 4	Male	8	9
	Female	12	11
	Total	20	20

The educational intervention

Teaching plans for all groups were designed on the basis of views from experts in preschool education, experts in educational technologies, and preschool teachers. Prior to the main intervention, a pilot was performed. Inadequacies (technical disruptions, interview experience, etc.) were determined, and corrections were made in accordance with feedback, after which the main intervention was performed. The experimental and control groups are presented in the photos in Figure 1. The spatial concepts and intervention methods presented to children in both groups, by week, are given in Figure 2.

In the 4-week intervention in the control group, activities were conducted with traditional methods. In this group, the positions of the objects placed before the children were shown by the teacher, and spatial concept information about the objects was given to the children. In the experimental group, the children only watched educational cartoons. The educational cartoons had been developed by the researchers in line with the concepts targeted for teaching. By organizing the educational cartoons and the traditional activities, they were both aimed at teaching children the spatial concepts (“Under/Above,” “In front of/Behind,” and “In/Out”) determined to be in line with the study. After the activities were completed in both groups, a semistructured interview was conducted with the children by the researcher.

Figure 1

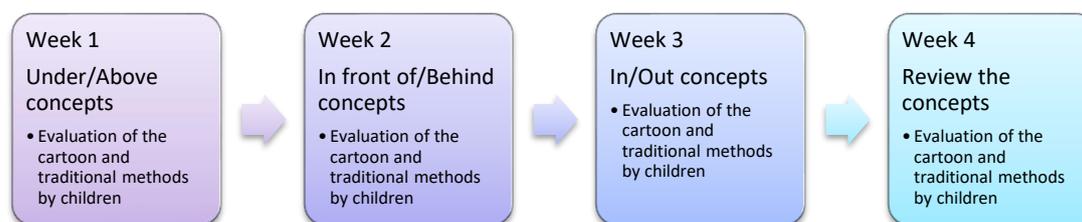
Pictures from the main intervention



Note. Educational cartoons group (top row) and traditional methods group (bottom row).

Figure 2

The process of implementation



Data collection tool

Semistructured interviews were used to determine children's views on the activities in each of the four groups. The form guiding the interviews was created on the basis of a literature review performed in accordance with the research questions and was prepared by consulting the opinions of two experts from the field of early childhood education. The interview form is shown in the Appendix. The interviews with children were conducted by the teacher who had performed the intervention. This was because the teacher who had performed the intervention was a preschool teacher and because he could communicate better with children. Thus, the teacher was informed about how to conduct the interviews by the researchers. Following the pilot intervention, the teacher conducted interviews with children and, consequently, efforts were made to remove any disruptions or errors, and to ensure that the teacher gained interviewing experience. Interviews with children were video-recorded to prevent the loss of data. Interviews were conducted in Turkish. The children's responses were translated into English by the researchers and an English language expert.

Data analysis

The classification of data into codes and themes was used in analyzing the qualitative interview data. In this analysis method, the data is first coded, then the codes are divided into categories, and, finally, content analysis is used to derive themes (Creswell, 2013). For reliability at the stage of data analysis, 10 interviews with children were independently analyzed by both the researcher and an expert in the field of early childhood education, and agreement between the raters was checked; Cohen's kappa was calculated as .75. Because there was considerable agreement between the raters, the remaining analyses were performed by the researcher; these findings are shown as frequencies (f) and in graphs. In addition, the findings include children's responses in interviews. The views of children who watched educational cartoons and who participated in traditional methods are labeled in this paper as "[EC_Child_X_Week_Y]" and "[TM_Child_X_Week_Y]," respectively, where X refers to the child and Y refers to the week. The description in parentheses following this label shows how the view was coded in analysis. For example, if a child expressed that they loved one of the characters in the cartoon, it was "Coded as 'characters'."

Findings

Children's views about the activities conducted with educational cartoons and traditional methods

It was found in interviews with children that, in general, all of them liked whichever method they were taught with. The parts of the activities that children liked most and their thoughts on the factors causing distraction were investigated through interviews, and these comparisons are shown in Tables 4 and 5.

In Week 1, it was found that the scene most liked by children in the cartoon group depicted a game in which the concepts were shown ($f=13$). The only factor distracting their attention was their classmates ($f=1$). In the traditional method group, children most liked assessment, wherein the level of concept learning was evaluated through questions ($f=17$). The only factor distracting children's attention in this group was being ignorant of the activity ($f=1$). One of the children who watched cartoons stated the part he loved in the cartoons was the assessment:

I liked the part they asked the questions. [EC_Child_12_Week_1] (Coded as "assessment part")

Some of the children in each group expressed that they were distracted by their classmates:

When I was watching the cartoon, they were jumping. [EC_Child_4_Week_1] (Coded as "classmates")

I didn't know how to play the game, so I was distracted. [TM_Child_15_Week_1] (Coded as "being ignorant of activities")

In Week 2, children in the cartoon group said that the part they liked most was the scene of tidying up the toys, in which the concepts were presented ($f=9$). In this part, children did not mention any factors distracting them. In the traditional methods group, it was found that children most liked the assessment ($f=15$). One child in the traditional methods group stated that their classmates distracted them. Some of the children in each group replied to the question, "which part did you like most?" as follows:

Collect the toys. Playing games. [EC_Child_4_Week_2] (Coded as "tidy up the classroom" and "game scene")

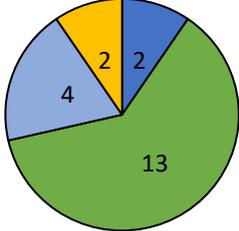
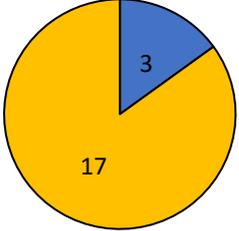
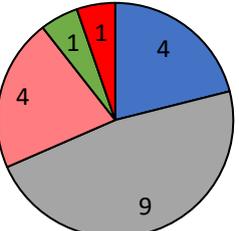
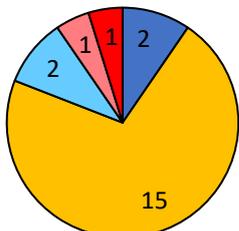
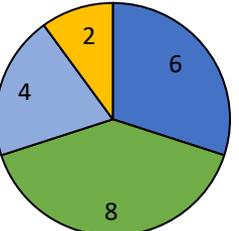
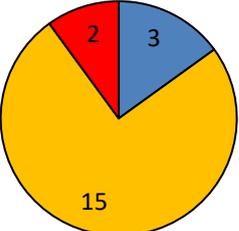
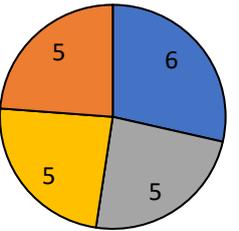
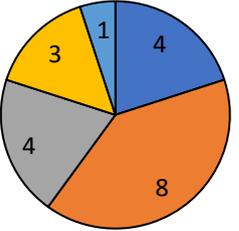
Collect the toys. [TM_Child_12_Week_2] (Coded as "tidy up the classroom")

The musical part. [TM_Child_10_Week_2] (Coded as "assessment part"; assessment was performed in the musical part)

A child in the traditional methods group stated that he was distracted by his friends:

My friends were naughty, so I got distracted. [TM_CHILD_3_Week_2] (Coded as "classmates")

Table 4
 Children's most liked part of the activity, by week and group

Week and concept	Activity group	
	Educational cartoons	Traditional methods
Week 1 Under/Above	 <p>■ All ■ Game scene ■ Characters in the cartoon ■ Assessment part</p>	
Week 2 In front of/Behind	 <p>■ All ■ Assessment part ■ Collect toys ■ Toys ■ Tidy up classroom ■ Environment ■ Not specified</p>	
Week 3 In/Out	 <p>■ All ■ Game scene ■ Characters in the cartoons ■ Assessment part ■ Not specified</p>	
Week 4 Review	 <p>■ All ■ In/Out ■ In front of/Behind ■ Under/Above ■ Playing</p>	

Note. Frequencies are based on interviews with 20 randomly selected children from each activity group (each comprising two groups) each week.

Table 5
Factors causing distraction in the groups

Week	Educational cartoons		Traditional methods	
	Factor	<i>f</i>	Factor	<i>f</i>
1	Classmates	1	Being ignorant of activities	1
2	None	–	Classmates	1
3	Classmates	1	Classmates	3
			Classroom environment	1
4	Classmates	1	Classmates and classroom environment	3

Note. Frequencies are based on interviews with 20 randomly selected children from each activity group (each comprising two groups) each week.

In Week 3, children in the educational cartoon group most liked the scene depicting games ($f = 8$), in which the in/out concept was presented. Two children in this group said that their classmates distracted them. The children in the traditional methods group, by contrast, said that they most liked the assessment ($f = 15$). Four children in this group stated that there were factors distracting them: three said it was their classmates, and one said it was the classroom environment. Some of the children in each group expressed their favorite parts in the activities as follows:

I loved superman very much. [EC_Child_5_Week_3] (Coded as “characters”)

I liked the jumping and dancing part. [TM_Child_2_Week_3] (Coded as “assessment part”)

Some of the children explained how they were distracted by their friends:

My friends got distracted me. They constantly moved, did not stop. [EC_Child_11_Week_3] (Coded as “classmates”)

Children were always making sounds. [TM_Child_9_Week_3] (Coded as “classmates”)

There was a lot of sound in the classroom. Children made noise. I did not understand the rules of the game. [TM_Child_18_Week_4] (Coded as “classmates” and “classroom environment”)

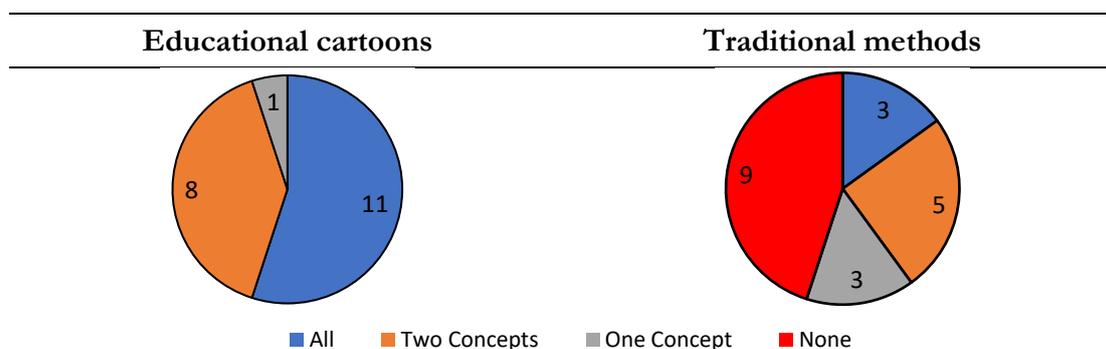
In the final week, Week 4, six of the 20 randomly interviewed children in the educational cartoon group said that they liked all parts very much, eight of the 20 in the traditional methods group said that they liked the activity of the In/Out week. As to the factors distracting children’s attention, only one child in the educational cartoon groups said that their classmates distracted them; three children in the traditional methods groups said that their classmates and the classroom environment distracted them.

Recall level of the activities conducted by educational cartoons or traditional methods

In the final week, a cartoon in which the specified concepts were reviewed was prepared for the educational cartoon groups, and an activity in which the concepts were reviewed

was prepared for the traditional methods groups. In this week, which interventions children remembered were investigated. To present the conceptual recall levels of children in a comparable way, the answers they gave were not coded individually. For example, when a child expressed all the concepts of Under/Above, In/Out, and In front of/Behind while describing the concepts they remembered, this was coded as “all” because they remembered all of the concepts. When they remembered only two of these concepts—for instance, Under/Above and In/Out—this were coded as “two concepts.” When children remembered only one of the concepts (e.g., In/Out), this was coded as “one concept.” Thus, the number of children who remembered all or none of the concepts in the two methods could be compared. On examining the levels of remembering the interventions, 11 children in the educational cartoon groups said that they remembered all parts of the cartoons, whereas only three children in the traditional methods groups said that they remembered all parts of the activities. While nine children in the traditional methods groups did not remember any activities, every child in the educational cartoon groups remembered at least one part of the cartoons. The detailed findings are shown in Table 6.

Table 6
Parts remembered by children after completing all the activities



Note. All = remembered all of the concepts; None = did not remember any of the concepts. Frequencies are based on interviews with 20 randomly selected children from each activity group (each comprising two groups) each week.

Children expressed the concepts by the games they played in the traditional method or the adventures of the main character in the cartoon. For example, since the game of finding strawberries was played in the traditional method, children explained the concept of In front of/Behind by remembering this game. Some of the interview responses used to determine the levels of remembering the cartoons or activities were as follows:

He gathered his toys ... found in the front and behind. He played hide and seek, said above and under. He played in and out. [EC_Child_1_Week_4] (Coded as “all”)

He collected his toys. They played hide and seek. In the game, they went under the table and climbed on the tree. He played in and out. [EC_Child_4_Week_4] (Coded as “two concepts”)

We played games ... We didn’t do anything else. [TM_Child_3_Week_4] (Coded as “none”)

We went in and out of the sea ... We found the strawberries. Behind the cabinet, in front of the door. [TM_Child_17_Week_4] (Coded as “two concepts”)

Children’ levels of awareness of the concepts taught by educational cartoons or traditional methods

The children were asked what the activities taught them, and the detailed findings are shown in Table 7. In Week 1, 14 children from the educational cartoons groups said that the cartoons taught them games; five children mentioned one or two concepts comprising the subject matter of the cartoons and stated that the cartoons taught them concepts. In that week, 15 children from the traditional methods groups said that the activities taught them games; only three children said that the activities taught them concepts.

In Week 2, eight of the children from the educational cartoons groups said that the cartoons taught them concepts; six children said that the cartoons taught them how to tidy toys. In the traditional methods groups, however, eight children said that the activities taught them games, while four children said that the activities taught them concepts.

In Week 3, eight children from the educational cartoons groups stated that the cartoons taught them concepts. While six children said that the cartoons taught them games, six others said that they did not know what the cartoons had taught them. Six children from the traditional methods groups said that they did not know what the activities had taught them; six other children said that the activities taught concepts. Four children from traditional methods groups said that the activities taught games.

Having completed the intervention, the children were interviewed again to evaluate all the activities. In those interviews, eight children from the educational cartoons groups said that the activities taught them games; six, that the activities taught them concepts; and two, that the activities taught them how to watch cartoons. Conversely, four children in those groups said that they did not know what the activities had taught them. Five of the children from the traditional methods groups said that the activities taught them games; and five, concepts. Conversely, three children said that the activities taught them nice things, and two children said that they did not know what the activities had taught them.

The views of some children about whether they are aware of the concepts presented with educational cartoons and traditional methods were as follows:

It teaches to play. [EC_Child_2_Week_1] (Coded as “game”)

He teaches games and teaches below, above. [EC_Child_5_Week_1] (Coded as “game” and “concept”)

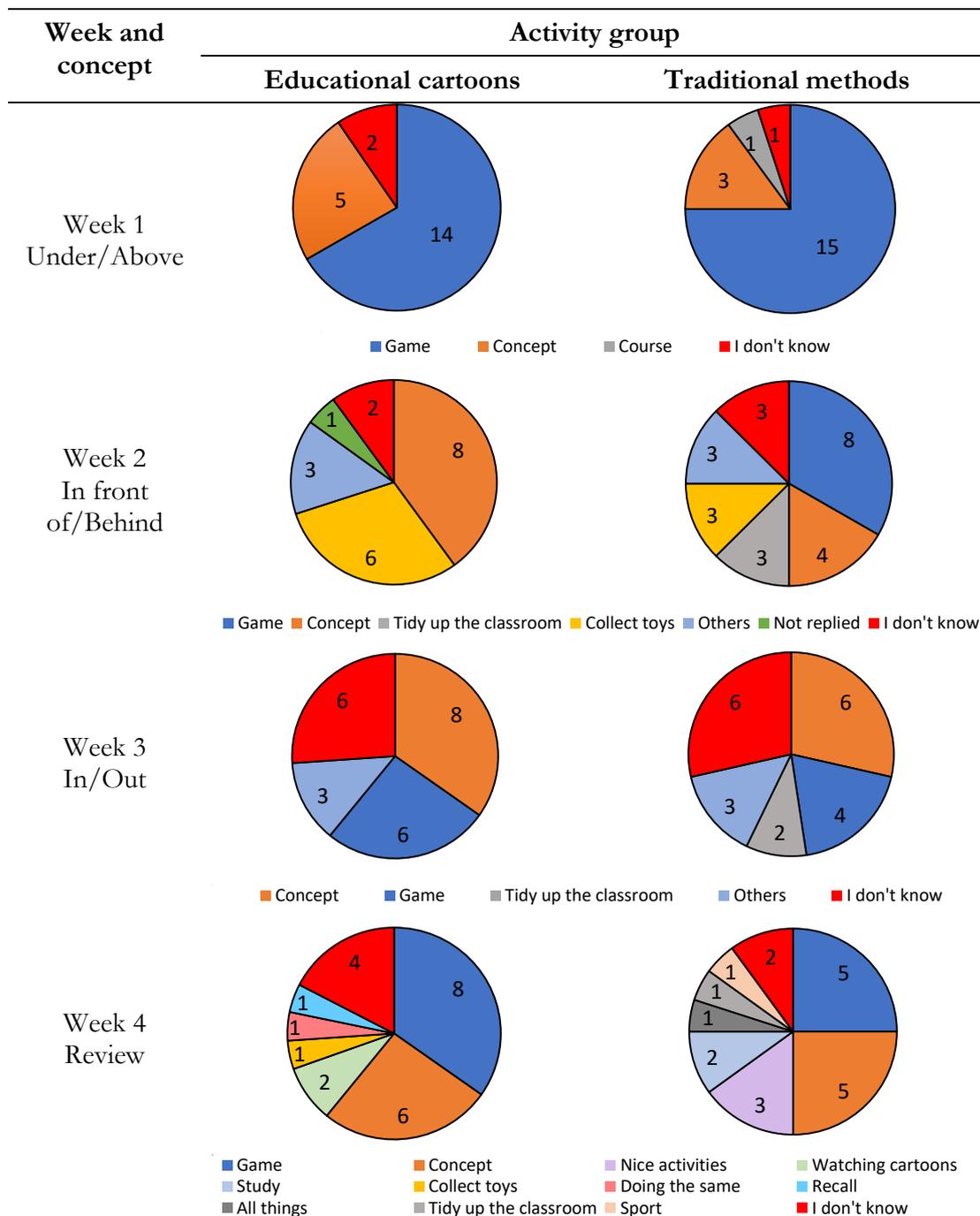
It improves our imagination. [EC_Child_7_Week_3] (Coded as “others”)

It teaches us to be in and out. [TM_Child_11_Week_3] (Coded as “concept”)

It teaches us to collect the class, collect strawberries. [TM_Child_18_Week_2] (Coded as “game”)

Taught lessons and games. [TM_Child_5_Week_1] (Coded as “course” and “game”)

Table 7
 Children's reported awareness of the content by group (educational cartoons or traditional methods)



Note. Frequencies are based on interviews with 20 randomly selected children from each activity group (each comprising two groups) each week.

Discussion

This study obtained the views of preschool children between the ages of 48 and 60 months in relation to educational activities conducted using cartoons and using traditional methods. The children's views were then analyzed and compared. The children were asked to state their views concerning the activities each week following the

activities. It was found that all of the children liked their respective type of activity; it was expected that children would like the educational cartoons. Ulaş Taraf (2011) stated that cartoons help children to have positive attitudes toward activities and that they also help to increase children's motivation. This is because cartoons, which are instruments of entertainment (Booth, 1997; Mohamad Nor et al., 2019), are the programs that children like and prefer most (Adak Özdemir & Ramazan, 2012; Yurtsever Kılıçgün, 2015). Additionally, the fact that the activities conducted using traditional methods were liked by children meant that those activities were successful and that they were suited to the purpose. Since the activities performed using traditional methods were based on games, they were appropriate for preschool children (Milli Eğitim Bakanlığı, 2015), because games are actions that children perform voluntarily (Huizinga, 1995).

The majority of the children in the educational cartoons groups stated that they liked the scene of games in the cartoons most. They also stated that they liked the characters in the cartoons, the materials, and, finally, the questions in the assessment part. The children in the traditional methods groups, by contrast, stated that they liked the assessment part most. The reason why children in educational cartoons groups liked the parts where the concepts were shown more may be because the concepts had been presented in the cartoons within games in entertaining and interesting ways for children. The assessment part was not liked as much, likely because there was no background music and because the main characters were not present in the cartoons. Additionally, the reason why children described liking that part was that children mainly like the characters, people, animals, and mechanical characters (Arıkan, 2001) in cartoons, which were not in the assessment part. The children in the traditional methods groups, by contrast, liked the assessment questions in the activities. This may be due to the fact those children took on more active roles in the assessment parts than in the parts where concepts had been taught. The fact that children who were taught using cartoons liked the parts where the cartoon characters played games and that the children who were taught using traditional methods liked the assessment parts (where they were more active) demonstrates the importance of games in the preschool period: children always consider games as entertaining activities and games, which motivate them without requiring any further reasoning (Pyle & Bigelow, 2015).

It was found in this study that children's classmates were a distraction in both groups of children. However, it was observed that more children attributed their distraction to their classmates in the traditional methods groups than in the educational cartoons groups. Therefore, it may be inferred that cartoons are successful instruments in attracting children's attention and in keeping their attention for longer periods. This inference is consistent with previous studies (e.g., Dalacosta et al., 2009; İvrendi & Özdemir, 2010; Yurtsever Kılıçgün, 2015; Zhang, 2012).

The majority of children in the educational cartoons groups remembered the cartoons they had watched in previous weeks, while the majority of children in the traditional methods groups could not remember any activities. Few children in the latter group could remember all the activities. The observation that most of the children remembered all the cartoons and that children in the traditional methods groups remembered the activities only after being reminded indicates that cartoons are more permanent in children's minds. The permanence of cartoons might stem from the fact that cartoons are more entertaining and more interesting to children (Can, 1995; Eskandari, 2007; İvrendi & Özdemir, 2010). The interaction between material and child, which is very

important in keeping concepts in children's memory, may have also contributed to the permanence (Solso et al., 2005). This supports the view that cartoons are successful instruments in attracting children's interest, as stated by Dalacosta et al. (2009). Additionally, children, in particular, can remember the main characters of cartoons in detail. This can also be an indicator of the fact that cartoons have more permanence in children's minds (Arıkan, 2001; Rashid, 2015). Another reason why cartoons are remembered better may be due to the fact that game-based activities are done with children in preschool institutions, and cartoons are instruments different from those activities—that is to say, they are innovations.

Finally, the children were asked to state what they thought the activities had taught them. The majority of children who had been taught using cartoons stated that the cartoons they had watched taught them concepts and games. The children who had been taught using traditional methods, however, stated, in general, that the activities they had undertaken had taught them games. This could be evidence that cartoons are effective materials for communicating an intended message, because children who had been taught using cartoons were more aware of the concepts intended to be taught, whereas children who had been taught using traditional methods had lower levels of awareness in this respect. This is contrary to Yağlı's (2013) view that children learn without being aware of doing so while watching cartoons. Conversely, the finding that children who had been taught using cartoons were more aware of the concepts presented in cartoons supports the supposition that children can comprehend messages given by cartoons, either explicitly or implicitly, as found by Skouteris et al. (2007). This could indicate that the messages given by cartoons are received by children without questioning (Bandura, 1989) and even that children are aware of the messages they receive. The fact that children saw the activities as games might stem from the importance of the concept of "game" in their minds, because children see any place they are in as places of games (Koçyiğit et al., 2007).

Conclusions and recommendations

This was a 4-week study. Due to the fact that the daily lives of children in the sample had not been controlled and that they had differing lives, their levels of memory of activities (whether conducted through cartoons or traditional methods) could differ. This was a limitation of the study. The activities were performed in four groups since all of the children taking part in the research were not at school at the same time. Potential differences stemming from the teachers' momentary performances in each group or from environmental conditions were also limitations of this study.

This study reaches the following conclusions: Children in groups taught using cartoons liked the cartoons, and children in groups taught using traditional methods liked the traditional activities. While the majority of children who had been taught using cartoons said that they liked all the cartoons, children who had been taught using traditional methods said they preferred the parts of activities in which they were active. While the children in the educational cartoons groups mostly remembered all the cartoons they had watched, children in the traditional methods groups mostly could not remember the activities they had undertaken. This could be evidence that cartoons are more permanent in children's minds. Moreover, children in the groups using cartoons were more aware of the concepts intended to be taught, whereas children in groups taught using traditional methods thought that the activities were games.

In light of all these results, the following recommendations are made: First, in this study, it has been determined that cartoons can be used for concept teaching purposes. In line with this, it can be said that educational cartoons support children's conceptual development. In this context, preschool teachers should select educational cartoons carefully and use them in classroom activities. Second, teachers should be careful in choosing the cartoons because cartoons give the intended messages in a powerful way. Third, this study aimed to teach some concepts associated with spatial perception. Prospective studies could investigate different concepts. Fourth, the assessment section in the traditional methods groups was liked by the children more than they liked other sections. For this reason, it can be suggested that traditional activities to be held in preschool education should be in the form of evaluation—that is, in the form of questions and answers. Finally, it was observed that children who had been taught concepts using cartoons were less distracted due to external factors. Therefore, teachers can use cartoons which keep children's attention strongly in their activities.

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Authors

Omer Kocak is an Assistant Professor in the Department of Information and Document Management at Ataturk University. He received his PhD from the Instructional Technologies Department. His research interests are instructional technologies, mobile learning, interactive whiteboards, and cartoons in early childhood education.

Correspondence: kocakomer@atauni.edu.tr

Yuksel Goktas is a Professor in the Department of Computer Education and the Instructional Technologies Department at Ataturk University. His research interests are 3D virtual worlds, augmented reality, and instructional technologies.

Correspondence: yukselgoktas@atauni.edu.tr

Appendix

Weekly semistructured interview form for experimental and control groups

I wonder about a few points about **the cartoon you have watched / the activity you have done** today. I think you can help me in this matter. Can I ask you a few questions?

- 1) Can you tell me about the cartoon we have watched/the activity we have done?
 - 2) Did you like the cartoon / the activity?
 - a. If yes, which part did you like most?
 - b. If no, why not?
 - 3) Were there any things you didn't like in the cartoon/the activity?
 - a. What part didn't you like?
 - b. Were there any things that distracted your attention?
 - 4) What do you think this cartoon/activity teaches us?
-

Final week semistructured interview form for experimental and control groups

I wonder about a few points about **the cartoon you have watched / the activity you have done** today. I think you can help me in this matter. Can I ask you a few questions?

- 1) Can you tell me about the cartoons we have watched/the activities we have done?
 - 2) Did you like the cartoons / the activities?
 - a. If yes, which cartoon/activity did you like most?
 - b. If no, why not?
 - 3) Were there any things you didn't like in the cartoon/the activity?
 - a. What part didn't you like?
 - b. Were there any things that distracted your attention in the cartoons/activities?
 - 4) What do you think the cartoons/activities teach us?
-