

## **COMPARISON OF CONCEPTUAL KNOWLEDGE LEVELS OF STUDENTS WHO TOOK AND DID NOT TAKE PRESCHOOL EDUCATION: EXAMPLE OF EARTH, SUN, AND MOON**

Nilüfer Okur Akçay<sup>1</sup>, Ahmet Akçay<sup>2</sup>

<sup>1,2</sup>Faculty of Education, Ağrı İbrahim Çeçen University, Ağrı, Turkey

nilokur-7@hotmail.com<sup>1</sup>, turkolog\_25@hotmail.com<sup>2</sup>

Received: 29 April 2020; Accepted: 14 September 2020; Published: 29 September 2020

### **ABSTRACT**

Children start to gain concepts from an early age. They are particularly sensitive to what is happening in their close surroundings. As a result of their daily observations, they can create various conceptual information about the Earth, Sun, and Moon. It is thought that the participation of children in the education process is very important for this information to become basic. The aim of this study is to reveal the variation in knowledge levels about the concepts of the Earth, Sun, and Moon of students who do or do not take preschool education. The research is qualitative, and it was conducted with a total of 40 students aged 6-7. In order to collect the data, we created and used a semi-structured interview form. With this form, students' information about the shapes, movements, colors, and dimensions of the Earth, Sun, and Moon were collected. In the analysis given, content analysis was used, and the answers given were expressed as percentage and frequency. As a result of this study, we concluded that the students who take preschool education were more knowledgeable about the information, expression, explanation, and analogy of the concepts of Earth, Sun, and Moon and their shapes, colors, movements, and dimensions than were the students who did not have a preschool education.

**Keywords:** conceptual knowledge, preschool, earth, sun, moon

### **INTRODUCTION**

Preschool education covers the time from the moment of a child's birth to the day that child begins basic education. This period plays an important role in the child's life. The physical, mental, social-emotional, psychomotor, and language development of the child are mostly completed in the preschool period. According to Pehlivan (2006), the personality structure of the child starts to take shape; their character is formed; and their physical, mental, and emotional development undergo rapid shifts in the preschool period that constitutes the first six years of life. At the same time, basic habits are gained in the preschool period.

Preschool education program in our country are for those aged 3-6 years old. One of the main objectives of educational institutions is to provide a multi-faceted education and training for the child. For this purpose, the child learns what colors and the concepts of size and smallness are; they learn to listen to the teacher and to observe natural events; they learn to hold a pencil and to draw; and they learn to make a decision on a topic (Başal, 1998). The acquisition of these skills in the preschool period enables the individual to be more successful in their progressing life.

Indeed, a study at the University of Minnesota emphasized that children who go to kindergarten are more successful in life. According to the research, the adulthood periods of 900 children who were sent to kindergarten and 500 who were not sent were compared, and

80 percent of those who went to kindergarten but only 75 percent of those who did not go to kindergarten went to high school. In addition, the study found that those who attend kindergarten are more likely to enter the university (Milliyet, 2020). In examining the differences between children who take and do not take preschool, researchers found that those who take have more favorable outcomes in terms of cognitive and social skills, motor skills, attention skills, and mental function skills (Dağlı, 2007; Mohd Tahir & Yunus, 2018). Accordingly, one can surmise that children who do not take preschool may experience difficulties in starting basic education.

### **Concept Development in Children**

Language is the most basic means of agreement between people. Saussure (1987) defines language as a system of signs, and these signs indicate that language occurs with words or other linguistic units. The language indicator consists of two dimensions. The first dimension is the “indicator” which is the audible or visible dimension, and the other is the “shown” which is the size of the content perceived in the mind (Saussure, 1987). The definition expressed here in the form of "shown" is equal to the word "concept" (Köktürk & Eyri, 2003). “Concept” refers to the grouping of things, events, people, and thoughts according to their similarities; once they are grouped, they can be defined by the names given to the groups or by the qualities of the categories belonging to the definitions that reflect the human-world relationship (Yağbasan & Gulcicek, 2003).

Interest and stimuli are of great importance for the development of the human brain. The richer a child’s stimulus environment is, the more their linguistic development will increase. One of the important processes of language development is the concept acquisition of children. With the act of speaking, children begin to learn and use concepts. These created concepts are mostly shaped according to children's experiences. Accordingly, children should be given as many stimuli as possible.

According to Piaget's (1936) cognitive development theory, children need three basic types of knowledge for cognitive development: physical, logical-mathematical, and social. Physical information is the field that includes learning the surrounding objects and their properties, including color, weight, size, shape, texture, and the like. Logical-mathematical information includes numbers, classifications, or comparisons related to the outside world. Social information involves the acquisition of various forms of behavior or attitudes through interactions with others. This is the area that contains information such as learning. Among these types of knowledge, the learning of physical knowledge and logical-mathematical knowledge support each other, and the acquisition of concepts related to these types of knowledge is in a similar process (Charlesworth, 2005; Driscoll, 2001; Lutz & Huitt, 2018).

The process of creating concepts emerges with the birth of the child, and the child begins to become aware of the things in the environment by receiving information from the outside world through the sense organs. Thus, the process of creating concepts begins with the senses (Sucuoğlu et al., 2008). In parallel with the increase in the interest in the environment, the level of gain of the concepts also increases. As children develop their ability to classify certain things around them, they compare this knowledge with what they have previously taught (Lind, 2005). Children begin acquiring concepts around the age of 1-2. The most important stage in terms of concept development of children between the ages of 4-5 is that they are aware that there may be different perspectives on an object. They begin to

discover the concepts of good and bad morally and to make sense of the concept of time. Children continue to gain sense of concepts even after the age of eight, and knowing the meaning of these concepts allows the child to establish relationships between and to classify them (Yılmaz & Çolak, 2011).

The preschool period is when the development of children is the fastest; the basic concepts are acquired quickly. Children, especially around the age of five, gain the ability to classify concepts at various levels such as people, animals, and things (Rhodes & Gelman, 2009). These basic concepts form the foundation for concepts that children will learn in their future lives. In a way, children who have acquired the concepts correctly will not have any difficulty in gaining new concepts when they move on to the next level of education (French and Nelson, 1985). Children are able to think more effectively due to their acquisition of concepts, which allows them to take in new information (Boehm, 2001). Understanding and using these concepts aids the child's cognitive and mental development. Concept acquisition also supports the development of children's literacy skills and speeds up the reading process (Bracken & Panter, 2011; Okur Akçay, 2014).

### **Science Education in Preschool**

Along with the formation of basic concepts in preschool children, skills such as curiosity, research, questioning, and using imagination also develop (Abdul Rahman et al., 2016; Aquino et al., 2019; Eshach & Fried, 2005; Kamay & Kaşker, 2006; Marzuki & Md Yassin, 2015; Mohd Yusop et al., 2018; Nachiappan et al., 2019). Preschool science education is vital to enabling children to develop their curiosity and research, to compare and classify the events and objects around them, and to aid in the development of cognitive and psychomotor skills, all of which are necessary to daily life (Akman et al., 2003; Demiriz, 2000). Thus, providing science education in the preschool period allows children to make observations, develop their problem solving skills, make better observations and comparisons in daily life, and make sense of the events they encounter.

Therefore, in order to provide effective science education to children in the preschool period, learning opportunities must be determined correctly (Kallery, 2004). The children in this period are curious about the events that take place in their environment and ask many questions in an effort to learn more about them. While the experiences that children will gain during this period create environments suitable for the formation of schemes and concepts in their minds, they also play an important role in the acquisition of basic concepts for science education in the preschool period. According to Kallery and Psillos (2001), basic science concepts begin to emerge in early childhood (the first six years of life), when the physical, mental, emotional, and social development of children is rapid.

Children in the preschool period examine the sky and try to learn what they see. Astronomy has an important place in this regard. The basic concepts of astronomy that start to occur in preschool are Sun, Earth, and Moon (Hannust & Kikas, 2007). These subjects are physics subjects that children can encounter in daily life and on which they can easily get information. According to Gür (2011), physics is not difficult or complicated for children to understand. If topics from everyday life are chosen, children will use simple tools to experience them, and physics is both understandable and fun for students when open-ended questions are asked.

For example, in his research, Özsoy (2012) asked first year students whether the world was flat or round, which revealed that the students had different thoughts about the shape of the world. More than 41% of the students depicted the shape of the world as a sphere, while about 21% claimed it was flat, and the remaining about 38% thought of it as a double world. Later, Saçkes and Korkmaz (2015) examined the conceptual understanding of children about the shape of the world and prepared an interview protocol for this purpose. This protocol requires the children to verbally express their understanding of the shape of the world, draw the shape of the world, create a world model from play dough, and choose one of the ready-made world models made from play dough. Their results, too, revealed that the children had different thoughts about the shape of the world. In the literature, the comparison of the levels of knowledge about the Earth, Sun, and Moon concepts in students who had and had not received a preschool education was not included. The purpose of this current research was to compare the knowledge of the students in their first year about the Earth, Sun, and Moon based on whether they attended preschool.

For this purpose, answers to the following questions were sought within the scope of the research:

1. What are the thoughts of the students, who take and do not take preschool education about the shape of the Earth, Sun, and Moon?
2. What are the thoughts of the students who take and do not take preschool education regarding the color of the Earth, Sun, and Moon?
3. What are the thoughts of the students who take and do not take preschool education regarding the movement of the Earth, Sun, and Moon?
4. What are the thoughts of the students who take and do not take preschool education regarding the dimensions of the Earth, Sun, and Moon?

## **METHODOLOGY**

In this research, the knowledge levels of the students in the first year about the Earth, Sun, and Moon concepts were compared according to whether or not the children had undergone preschool education. For this purpose, each student was interviewed individually to determine their knowledge and thoughts about the concepts in question. This section includes information about the model of the research, the sample of the research, the data collection tool and data collection, and the analysis of the data.

### **Model of the Research**

In this research, basic qualitative research technique was used. Qualitative research is a type of research that focuses on difficult-to-measure qualities, such as words or observations, and is based on interpretation and analysis of qualifications (Glesne, 2013). In the research, a semi-structured interview technique, one of the qualitative research methods, was used to collect the data. According to Yıldırım and Şimşek (2008), the interview technique is a powerful method used to determine people's perspectives, experiences, feelings, and perceptions.

## Sample of the Study

The sample of the research consists of first year students in two different branches attending a primary school in Ağrı city centre in the fall semester of the 2018-2019 academic year. The research was carried out with a total of 40 students aged 6-7. Percentage and frequency values of the students participating in the study regarding their preschool education are given in the table below.

Table 1

*Frequency and percentage values of groups that take and do not take preschool education.*

Preschool Education Situation	f	%
Took	22	55
Did Not Take	18	45
Total	40	100

As can be seen in Table 1, 55% of the sampled first year students took preschool education, and 45% did not take preschool education.

## Data Collection Tool and Data Collection

In order to collect data for the purpose of the research, a semi-structured interview form created by the researchers was used. The questions in this form were shared with two experts in the field, and the questions were included in a way that the students could understand. In the application process, information was collected from the classroom teachers to determine which students had preschool education and which did not. Twenty-two of the students in two different classes took preschool education, while 18 did not. The reason behind conducting the research in the fall semester was to get a better and more realistic idea of these first year students' concepts of the Earth, Sun, and Moon, before they had any instruction on them. The semi-structured interview was begun by asking each student the questions about the shape, color, motion, and size of the Earth, Sun, and Moon. The interviews were recorded with a voice recorder, and each interview lasted approximately 15 minutes. In order not to disrupt the students' regular instruction, the teachers provided their preferred hours for the student interviews, which were then carried out outside of the classroom.

## Analysis of the Data

Content analysis was used and the answers given were expressed as percent and frequency. The main purpose in content analysis is to reach concepts and relationships that can explain the collected data. According to Yıldırım and Şimşek (2008), the basic process in content analysis is to gather similar data within the framework of certain concepts and themes and to organize and interpret them in a way that the reader can understand. The data obtained for the validity and reliability of the research were coded separately by the researchers and the percentage of coding between coders was examined. Percentage of fit (p) = (consensus / consensus + divergence) was calculated using the formula  $\times 100$  (Miles & Huberman, 1994). In line with this formula, the audio recordings obtained from the interviews were transcribed, which helped enable the researchers to perform data analysis based on the code compliance rate. The coding done has a high reliability if the agreement between codes is above 80%, and

the calculations of the present research had a reliability rate of 96%. In line with this ratio, the coding has a high reliability.

## FINDINGS

In this section, in line with the general purpose of the research, the findings obtained from the data collection tool and the interpretation of the findings are given in order to determine the knowledge levels about the Earth, Sun, and Moon concepts of the first grade students who have or have not received a preschool education. The thoughts of the students (who received or did not receive a preschool education) about the shape of the Earth, Sun, and Moon are given in Table 2 in percentage and frequency.

Table 2  
*Frequency and percentage values of the views on the shape of the earth, sun and moon.*

Questions	Took Preschool Education		Did Not Take Preschool Education			
	Opinions	f	%	Opinions	f	%
What is the Shape of the World?	Looks like a ball	2	9	Similar to apple	2	11
	It is round	12	54	Similar to grapes	1	~6
	Like the sun	1	~5	Like the ball	6	33
	Like a circle	4	18	Like cloud	2	11
	Similar to bagel	1	~5	I don't know	7	~39
What is the Shape of the Sun?	Similar to the orange	2	9			
	It is like a circle	3	~14	Streaked	5	~28
	It is round	9	~41	Similar to lemon	2	11
	Similar to our world	5	~23	It is round	5	~28
	Similar to the orange	5	~23	Similar to the balloon	1	~6
What is the Shape of the Moon?				I don't know	5	~28
	Like a ball	2	9	Like a banana	3	~17
	Round-like	10	45	Like a square	1	~6
	Circle-like	5	~23	Round	2	11
	Similar to crescent	3	~14	I don't know	9	50
	Sometimes it is half, sometimes it is like a circle	1	~5	It is like a bean	1	~6
	Like a hook	1	~5	Like a triangle	2	11

The findings depicted in Table 2 reveal that the students who took a preschool education and those who did not have different explanations regarding the shape of the Earth, Sun, and Moon. Almost 39% of the students who did not have a preschool education had no idea what the shape of the Earth (world) is, while 54% of the students who did take a preschool education stated that the shape of the world is round. It is also evident that these preschool-educated students liken the shape of the world to objects that are round. One student likened the shape to a bagel, but from the sound recordings, we know that this situation was caused by the round shape of the bagel, not the hollow inside. On the other hand, students who did not have a preschool education compared the shape of the world to a cloud (11%) and to grapes (6%).

The shape of the sun, almost 41% of the students who had a preschool education said that the sun is round, while nearly 23% said it is similar to our world, and almost 23% said it is similar to a portal. Only about 14% said that it is like a circle. Students who did not have a preschool education had no idea what the shape of the sun is (~28%), answered that it is round (~28%), or said that it is streaked (also ~28%). When the sound records of this situation were examined, we concluded that the concepts of sun and rainbow were mixed. In addition, 11% of the students who did not have a preschool education said that the sun resembles a lemon, while others answered that it resembles a balloon (~6%).

As for the shape of the moon, 45% of the students who take preschool education say it is round; 23% say it is like a circle; about 14% say it is like a crescent; 9% say it is like a ball; 5% say it is sometimes a half, sometimes like a circle; and 5% compared it to a hook. On the other hand, students who did not take a preschool education varied in responses: 50% responded that they had no idea about the shape of the moon, while about 23% provided false analogies (square (~6%), bean (~6%), and triangle (11%)). Another nearly 17% compared the moon to a banana in shape, while 11% described it as round.

When Table 2 is examined as a whole, one can see that students who receive a preschool education are more prepared to make valid analogies about the concepts of the Earth, Sun, and Moon.

The thoughts of the students (who took or did not take a preschool education) about the color of the Earth (world), Sun, and Moon are given in Table 3 in percentage and frequency.

Table 3

*Frequency and percentage values of the views on the color of the earth, sun, and moon.*

Questions	Took Preschool Education		Did Not Take Preschool Education			
	Opinions	f	%	Opinions	f	%
What is the Color of the World?	Blue	4	18	Yellow	3	~17
	Blue, Green	9	~41	White, red	5	~28
	Blue, Brown	7	~32	Blue	9	50
	Blue, Green and Yellow	2	9	Pink, purple	1	~6
What is the Color of the Sun?	Yellow	10	45	Yellow	9	50
	Yellow and White	7	~32	Orange	5	~28
	Orange	5	~23	I Do not know	4	22
What is the Color of the Moon?	Yellow	5	~23	Blue	3	~17
	Black, gray	3	~14	White	10	~56
	White	14	~64	Brown	5	~28

The findings in Table 3 reveal that the students who took or did not take a preschool education expressed various explanations regarding the color of the Earth, Sun, and Moon. While nearly 41% of the students who took a preschool education described the color of the world as blue and green, almost 32% stated that it is blue and brown, and 9% stated that it is blue, green, and yellow. 18% described it as only blue. On the other hand, 50% of the students who did not take a preschool education stated the world is blue, almost 28% said it is white and red, nearly 17% described it as yellow, and just 6% expressed that it is pink and purple.

In regard to the color of the sun, 45% of the students who took a preschool education stated that it is yellow, nearly 32% described it as yellow and white, and almost 23% expressed that it is orange. On the other hand, 22% of the students who did not have a preschool education were not able to provide information about the color of the sun, though 50% described it as yellows and almost 28% described it as orange.

As for the color of the moon, almost 64% of the students who took a preschool education described it as white, nearly 23% described it as yellow, and not quite 14% described it as black and gray. From the sound recordings, one can hear that the students who used the yellow and white descriptors for the moon reached their opinions by observing the sky. Those who described the color of the moon as black and gray did so because, as they stated, the moon did not have light and reflected the light of the sun to us. On the other hand, almost 56% of the students who did not take a preschool education stated the color of the moon is white, while a close 28% described it as brown, and nearly 17% described it as blue.

When Table 3 is examined as a whole, one can see that students who took preschool education express more valid concepts and analogies about the concepts of Earth, Sun, and Moon than those students who do not take a preschool education.

The thoughts of the students (who took or did not take a preschool education) about the movements of the Earth, Sun, and Moon are given in Table 4 in *percentage* and frequency.

Table 4  
*Frequency and percentage values of the views on the movement of the earth, sun, and moon.*

Questions	Took Preschool Education			Did Not Take Preschool Education		
	Opinions	f	%	Opinions	f	%
Does the World Move?	Moves	16	~73	Moves	5	~28
	Does not move	4	18	Does not move	7	~39
	I do not know	2	9	I do not know	6	33
Does the Sun Move?	Moves	14	~64	Moves	2	11
	Does not move	6	27	Does not move	9	50
	I do not know	2	9	I do not know	7	~39
Will the Moon Move?	Moves	21	95	Moves	8	44
	Does not move	1	~5	Does not move	5	~28
				I do not know	5	~28

From Table 4, one can see that the students who took a preschool education and those who did not take such expressed different explanations regarding the movement of the Earth, Sun, and Moon. Nearly 73% of the students who took a preschool education for the movement of the world and almost 28% of the students who did not take a preschool education stated that the world moves. 18% of students who took a preschool education and almost 39% of students who did not take stated that the world did not move. While only 9% of students who took a preschool education did not know if the world moves, 33% of students who did not take a preschool education did not know.



Nearly 64% of the students who took a preschool education and 11% of those who did not stated that the sun moves, while 27% of students who took a preschool education and 50% of those who did not take stated that it does not move. Only 9% of those with a preschool education but nearly 39% of those without one said they did not know if the sun moves.

In regard to the moon, 95% of the students with a preschool education and 44% of the students without one said that the moon moves, while about 5% of students with a preschool education and nearly 28% of students without one stated that it did not. A near 28% of students without a preschool education did not know whether the moon moves or not.

When Table 4 is analyzed, one can see that students who took a preschool education have more sufficient information about the movements of the Earth, Sun, and Moon than those who did not take a preschool education.

The thoughts of the students (who took or did not take a preschool education) about the dimensions of the Earth, Sun, and Moon are given in Table 5 in percentage and frequency.

Table 5  
*Frequency and percentage values of the views on the size of the earth, sun, and moon.*

Took Preschool Education			Did Not Take Preschool Education		
Opinions	f	%	Opinions	f	%
The world is greater than the moon	15	68	The world is greater	4	22
The sun is the greatest	14	~64	The moon is the greatest	6	33
The moon is the smallest	17	77	The sun is the smallest	5	~28
The Earth is smaller than the Sun	17	77	The Earth is the smallest	6	33

Note: multiple answers allowed.

In Table 5, when comparing the world according to the dimensions of the sun and the moon, it is seen that more than one answer is given for each expression. 77% of the students who took a preschool education said that the moon is the smallest; 77% also stated that the Earth is smaller than the sun. Another 68% of those with a preschool education said that the world is greater than the moon, and about 64% said that the sun is the greatest of the three. On the other hand, 33% of the students without a preschool education said that the moon is greatest; another 33% said that the Earth is the smallest. About 28% claimed that the sun is the smallest, and 22% described the world as the largest. When Table 5 is examined as a whole, one can see that students who took a preschool education made correct statements about the dimensions of the Earth, Sun, and Moon, but students without a preschool education did not make correct statements at all.

## **DISCUSSION AND CONCLUSION**

In this study, the conceptual knowledge levels about the Earth, Sun, and Moon of first year students who took or did not take a preschool education were compared. We concluded that the students who took a preschool education were in a better position to express thoughts on, explain information about, and give analogies concerning the Earth, Sun, and Moon than those who did not take a preschool education. Various studies support this claim that preschool education develops students in terms of achievement, readiness, and social skills (Akçay, 2016; Anderson, 1994; Atılğan, 2001; Dağlı, 2007; Ergün, 2003; Esaspehlivan, 2006; Kırca, 2007; Özbek, 2003; Rahelly & Ayob, 2016; Taner, 2003; Topçu, 2012; Umek et al., 2008; Üstün & Akman, 2003; Yekta, 2005). The fact that the results of the current research reveal similar findings once again demonstrates the importance of taking a preschool education. Studies on teacher opinions and evaluations reveal similar results, and teachers state that if children take preschool education, they develop themselves from various perspectives and come ready for primary school (Akbuğ, 2018; Dinç & Gültekin, 2003; Dünder Kırık, 2011; Ekinci, 2001; Pehlivan, 2006).

One of the situations examined within the scope of the research is the level of knowledge of first grade students about the shapes of Earth, Moon, and Sun. It is assumed that students know the planet they live on and have information about its shape. However, as a result of the research, we determined that some of the students who did not take a preschool education did not have any idea about the shape or look of the Earth. However, most of the students who took a preschool education stated that the shape of the world is round. In the study conducted by Saçkes and Korkmaz (2015) on preschool children, it was determined that children define the shape of the Earth mostly in round and circle form. The studies of Vosniadou and Brewer (1992) revealed that the information children who attend the first year possess about the shape of the Earth is not scientific. Other studies suggest that the majority of children cannot describe the shape of the Earth (Hayes et al., 2003; Özsoy, 2012; Yıldız et al., 2019). Despite these results, Sharp (1999) conducted a study with 25 children aged 7 and found that most of the children correctly defined the shape of the Earth.

In the study carried out by Schoultz et al. (2001), which supports the current study, the researchers observed that children have scientific perceptions about the shape of the Earth. Similar results were found in studies by Kallery (2004) and Panagiotaki et al. (2006). One might argue that the results are affected by the age range and education received. Children's observations and the answers they receive from adults are the basis of the concepts of the world's functioning (Hannust & Kikas, 2007). Accordingly, if the first sources are not correct in describing the concepts, the child will not perceive the concept correctly. Contrary to informal learning environments, the child who shapes his concepts under the roof of the school will not have any difficulty in perceiving the functioning of the Earth as that child will receive more accurate information. Tools such as model spheres that can be found in the school environment can guide children in understanding the shapes of celestial bodies (Kızılçaoğlu & Taş, 2007; Mukunthan, 2016). From this point of view, one can conclude that there will be variations in terms of conceptual development between the child who receives a preschool education and the child who does not. As a matter of fact, the research of Arı et al. (2000) revealed that the concept development of students who do not attend preschool is low compared to students who benefit from preschool education. Schwarz et al. (1974) also stated that the students who attend preschool are more advanced than their peers who do not attend. Taner and Başal (2005) also stated that preschool education affects language development

positively and that primary school students who received a preschool education are ahead of language development compared to primary school students who did not.

We found that, depending on their attendance or non-attendance of preschool, students made different explanations regarding the movement of the Earth, Sun, and Moon. While the vast majority of students who receive a preschool education indicate that the Earth, Sun, and Moon are moving, the majority of students who did not receive a preschool education stated that the Earth, the Sun, and the Moon did not move. However, studies on primary school students (Bostan, 2008; Dunlop, 2000; Samarapungavan et al., 1996; Vosniadou & Brewer, 1994; Vosniadou et al., 2004) and studies on children in lower age groups (Kallery, 2004; Kampaze, 2006; Küçüközer & Bostan, 2010) reveal that children generally cannot grasp the movements of the Earth and the Sun. In addition, Starakis and Halkia (2010) determined that elementary school students do not have sufficient information, especially about the movements of the Moon. Studies conducted in higher grades show similar results. Bolat et al.'s (2014) study revealed that the majority of 5th grade students could not indicate the movements of the Sun, Earth, and Moon. The study of Babaoğlu and Keleş (2018) revealed that 6th grade students had difficulty in expressing the movements of the Sun, Earth, and Moon. Therefore, it can be stated that the subject of the movement of Earth, Sun, and Moon is one of the difficulties that children perceive conceptually. Siegal et al. (2004) state that conceptual development in children can be affected by culture. For culture, children need to meet under a school roof and be in a social environment. Of course, the answers to the questions they are curious about will be of great importance here. However, it is clear that other people whose children expect answers should be sufficient in this regard. According to the opinions received from mothers and teachers in a study on preschool children, the topics that children are curious about "Space and planets", "Sun", "Moon", "Star", and "Shape and size of the Earth". It was determined that the mothers did not have detailed information about the subjects, and the teachers thought that the children were more interested in the shape and size of the world (Ceylan et al., 2015). In addition, it was determined that the subject that preschool teachers prefer the most in teaching is the shape of the Earth, the Moon, and the Sun. Therefore, the child involved in preschool education will be able to reach more accurate answers regarding the questions they are curious about.

One of the topics covered in the research is to compare the expressions of the students who attended and did not attend preschool regarding the color of the Earth, the Sun, and the Moon and the magnitudes of these three celestial bodies. In the research, the expressions of the majority of the students who attended preschool regarding the color of the Earth, Sun, and Moon were more successful than those who did not attend; likewise, we found that the majority of the students who received a preschool education made correct statements for the dimensions of the Earth, Sun, and Moon, but the statements of students who did not receive such education were unscientific. Similarly, Bryce and Blown (2013) determined that children could not define the size of the Earth, Sun, and Moon, and according to others, the knowledge gained in preschool education will show itself in the later years of school life (Ansari, 2018; Johnson et al., 2019). Bryce & Blown (2013) conducted a study on 686 children asking them about the movements of the Earth, the Sun, and the Moon, and the study conducted by Hannust and Kikas (2012) on elementary school children on issues related to the world concept revealed that children experienced conceptual change in the process. In order for this change to take place successfully, the conceptual foundations of children must be sound. In the study conducted by Ari et al. (1994), it was found that the concept development levels of children who could not attend preschool institutions were low.

In line with the results obtained in the research, we soundly state that preschool education has a great role in the concept acquisition of children. Therefore, we recommend that children attend preschool in order to form the basis for the concepts they will gain in the following years and to acquire the concepts correctly through cultivation.

## REFERENCES

- Abdul Rahman, N., Md Yassin, S., & Mohd Yusop, N. A. (2016). Pembelajaran secara inisiatif kanak-kanak menerusi pendekatan projek: Dari tumbuh - tumbuhan ke sekaki payung. *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan*, 5, 78-95. <https://ejournal.upsi.edu.my/index.php/JPAK/article/view/881>
- Akbuğa, S. (2018). *The evaluation of preparative level of preschool education by preschool and primary school teachers*. (Unpublished Master Thesis). Erciyes University, Kayseri.
- Akçay, A. (2016). The effect of taking preschool education on the development of linguistic skills of the students. *Turkish Studies*, 11(3), 15-28.
- Akman, B., Üstün, E. & Güler, T. (2003). Using science process skills in 6 years old children. *Hacettepe University Journal of Education*, 24, 11-14.
- Anderson, B. (1994). *The effect of preschool education on academic achievement of at risk children*. ERIC database.
- Ansari, A. (2018). The persistence of preschool effects from early childhood through adolescence. *Journal of Educational Psychology*, 110(7), 952-973
- Aquino, L. N., Mamat, N., & Che Mustafa, M. (2019). Levels of competence in the learning domains of kindergarten entrants. *Southeast Asia Early Childhood Journal*, 8(1), 37-45. <https://doi.org/10.37134/saecj.vol8.no1.5.2019>
- Arı M., Üstün E., Akman B., & Etikan İ. (2000). Concept development in children of 4-6 years. *The Journal of Industrial Arts Education Faculty of Gazi University*, 8(8), 1-9.
- Arı, M., Üstün, E. & Akman, B. (1994). Comparison of concept development of 4-6 years children attending and not attending kindergarten. Presented at 10. *Ya-Pa Seminar of Pre-school and Dissemination*, Ankara, 197-214.
- Atılğan, G. (2001). *The Comparison of ist. step ist. period students-who attend preschool and don't attend preschool-social skill characteristics*. (Unpublished Master Thesis). Selçuk University, Konya.
- Babaoğlu, G., & Keleş, Ö. (2018). Determination of 6<sup>th</sup> grade students' perceptions of the concepts of "star", "planet" and "moon, sun and earth. *Karaelmas Journal of Educational Sciences*, 6(1), 127-145.
- Başal, H. A. (1998). *Introduction to preschool education*. Uludağ University Publishing.
- Boehm, A. E. (2001). *Boehm test of basic concepts-3: Preschool*. The Psychological Corporation.
- Bolat, A., Aydoğdu, R. Ü., Sağır, Ş. U., & Değirmenci, S. (2014). 5th grade students' misconceptions related to the subjects of "the sun, the earth and the moon. *Journal of Research in Education and Teaching*, 3(1), 218-229.
- Bostan, A. (2008). *Different age group students' ideas about some basic astronomy concepts*. (Unpublished Master Thesis). Balıkesir University, Balıkesir.
- Bracken, B. A., & Panter, J. E. (2011). Using the bracken basic concept scale and bracken concept development program in the assessment and remediation of young children's concept development. *Psychology in the Schools*, 48(5), 464-475.
- Bryce, T. G. K. & Blown, E. J. (2013). Children's concepts of the Shape and size of the earth, sun and moon. *International Journal of Science Education*, 35(3), 388-446.
- Ceylan, Ş., Kahraman, Ö. G., & Ülker, P. (2015). The views of mothers and teachers towards children's curiosity: Science concept. *Karabük University Journal of Institute of Social Sciences*, 5(1), 1-16.
- Charlesworth, R. (2005). Prekindergarten mathematics: Connecting with national standards. *Early Childhood Education Journal*, 32(4), 229-236.
- Dağlı, A. (2007). *To compare academical success in Turkish and maths lessons of primary school first class students who are trained at preschools and who are not trained at these schools*. (Unpublished Master Thesis). Selçuk University, Konya.
- Demiriz, S. (2000). Okulöncesi eğitim kurumlarındaki fen ve doğa etkinlikleri ile ilgili uygulamaların belirlenmesi. Paper presented at IV. *Congress of Science Education*, 6-8 September, Ankara.
- Dinç, B. & Gültekin, M. (2003). Views of teaching 4-5 years old children on their effects on social development. Paper presented at *OMEP 2003 World Council and Conference*, Kuşadası, Turkey, 5-11.
- Driscoll, M. (2001). *Psychology of learning for assessment (2nd Edition)*. Allyn & Bacon.

- Dündar Kırık, E. (2011). *Views of teachers about related to effect of pre-school education on primary school (the sample of Diyarbakır)*. (Unpublished Master Thesis). Firat University, Elazığ.
- Dunlop, J. (2000). How children observe the Universe. *Publications of the Astronomical Society of Australia*, 17 (2), 194–206.
- Ekinci, O. (2001). *The Impact of preschooling on the success of first year elementary school students (A case study in Gaziantep)*. (Unpublished Master Thesis). Gaziantep University, Gaziantep.
- Ergün, S. (2003). *Comparison of mathematical successes and ability of the first year students who studied in kindergartens in primary school to those who didn't*. (Unpublished Master Thesis). Marmara University, İstanbul.
- Esaspehlivan, M. (2006). *Elementary school readiness of 78 and 68 month old, preschool attendant and non-attendant children*. (Unpublished Master Thesis). Marmara University, İstanbul.
- Eshach, H. & Fried, M. N. (2005). Should science be taught in early childhood? *Journal of Science Education and Technology*, 14(3), 315–336.
- French, L. A. & Nelson, K. (1985). *Young children's knowledge of relational terms: Some ifs, ors, and buts*. Springer-Verlag.
- Glesne, C. (2013). *Nitel araştırmaya giriş*. A. Ersoy & P. Yalçınoğlu (Trans. Edt.). Anı Publication.
- Gur, Ç. (2011). Physics in preschool. *International Journal of the Physical Sciences*, 6(4), 939-943.
- Hannust, T., & Kikas, E. (2007). Children's knowledge of astronomy and its change in the course of learning. *Early Childhood Research Quarterly*, 22(1), 89–104.
- Hannust, T., & Kikas, E. (2012). *Changes in children's answers to open questions about the earth and gravity*. *Child Development Research*, 1–10.
- Hayes, B. K., Goodhew, A., Heit, E., & Gillan, J. (2003). The role of diverse instruction in conceptual change. *Journal of Experimental Child Psychology*, 86(4), 253–276.
- Johnson, A. D., Finch, J. E., & Phillips, D. A. (2019). Associations between publicly funded preschool and low-income children's kindergarten readiness: The moderating role of child temperament. *Developmental Psychology*, 55(3), 623–636.
- Kallery, M. & Psillos, D. (2001). Preschool teachers' content knowledge in science: Their understanding of elementary science concepts and of issues raised by children's questions. *International Journal of Early Years Education*, 9(3), 165-179.
- Kallery, M. (2004). Early-years teachers' late concerns and perceived needs in science: An exploratory study. *European Journal of Teacher Education*, 27(2), 147-165.
- Kamay, P. O. & Kaşker, Ş. Ö. (2006). *İlk fen deneyimlerim*. SMG Publication.
- Kampeza, M. (2006). Preschool children's ideas about the Earth as a cosmic body and the day / night cycle. *Journal of Science Education*, 7(2), 119–122.
- Kırca, M. A. (2007). *Analysis of the preschool educations effect on reading readiness of elementary school children of the first grade*. (Unpublished Master Thesis). Hacettepe University, Ankara.
- Kızılcıaoğlu, A., & Taş, H. İ. (2007). The importance of using model globes in geographic education at primary and secondary schools. *Dumlupınar University Journal of Social Sciences*, 18, 63-82.
- Köktürk, Ş. & Eyri, S. (2003). Linguistics and semiotics: Understanding ferdinand de saussure and semiotics. *Sakarya University Journal of Science & Literature*, 2, 123-136.
- Küçüközer, H., & Bostan, A. (2010). Ideas of kindergarten students on the day-night cycles, the seasons and the Moon phases. *Journal of Theory and Practice in Education*, 6(2), 267-280.
- Lind, K. K. (2005). *Exploring science in early childhood education: A developmental approach* (4th ed.). Thomson Delmar Learning.
- Lutz, S. & Huitt, W. (2018). Connecting cognitive development and constructivism. In W. Huitt (Ed.), *Becoming a Brilliant Star: Twelve core ideas supporting holistic education* (pp. 45-63). IngramSpark. <http://www.edpsycinteractive.org/papers/2018-03-lutz-huitt-brilliant-star-cognitive-development.pdf>
- Marzuki, M. H., & Md Yassin, S. (2015). Project approach in science: An exploratory case study. *Southeast Asia Early Childhood Journal*, 4, 43-52. <https://ejournal.upsi.edu.my/index.php/SAECJ/article/view/970>
- Miles, M. B. & Huberman, A. M. (1994). *Qualitative data analysis: An expanded sourcebook*. (2nd Edition). Thousand Oaks, CA: SAGE Publications.
- Milliyet. (2020). *Anaokuluna giden çocuk hayat boyu daha başarılı*. <https://www.milliyet.com.tr/gundem/anaokuluna-giden-cocuk-hayat-boyu-daha-basarili-1401432>
- Mohd Tahir, A., & Yunus, F. (2018). Penguasaan integrasi visual-motor kanak-kanak prasekolah di SK, SJKC dan SJKT. *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan*, 7, 1-11. <https://ejournal.upsi.edu.my/index.php/JPAK/article/view/906>
- Mohd Yusop, N. A., Abdul Rahman, N., Md Yassin, S., & Mohamed Isa, Z. (2018). Penyiasatan secara inisiatif kanak-kanak menerusi pendekatan projek. *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan*, 7, 30-49. <https://ejournal.upsi.edu.my/index.php/JPAK/article/view/910>

- Mukunthan, T. (2016). A study on Sri Lankan children's conception of space. *Southeast Asia Early Childhood Journal*, 5, 40-49. <https://ejournal.upsi.edu.my/index.php/SAECJ/article/view/989>
- Nachiappan, S., Julia, I. P., Abdullah, N., Sehgar, S. C., Suffian, S., & Sukri, N. A. (2019). Pelaksanaan kemahiran berfikir aras tinggi oleh guru dalam pengajaran dan pembelajaran di tadika. *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan*, 8, 24-32. <https://ejournal.upsi.edu.my/index.php/JPAK/article/view/3154>
- Okur Akçay, N. (2014). The effect of learning together method on teaching contrast concepts. *Journal of Research in Educational and Teaching*, 3(1), 398-405.
- Özbek, A. (2003). *The Comparison of primary school first grade students attended and not attended preschool education in terms of school improvement based on teachers point of view*. (Unpublished Master Thesis). Anadolu cUniversity, Eskişehir.
- Özsoy, S. (2012). Is the Earth flat or round? Primary school children's understandings of the planet earth: The case of Turkish children. *International Electronic Journal of Elementary Education*, 4(2), 407-415.
- Panagiotaki, G., Nobes, G., & Banerjee, R. (2006). Children's representations of the earth: A methodological comparison. *British Journal of Developmental Psychology*, 24(2), 353-372.
- Pehlivan, D. (2006). *Evaluation of transition period of first grade reading and writing of students who attend pre-school and the ones who don't attend in the light of view of teachers and students (a qualitative research)*. (Unpublished master thesis). Çukurova University, Adana.
- Rahelly, Y., & Ayob, A. (2016). Perbandingan proses penggubalan dan kandungan kurikulum pendidikan awal kanak-kanak di antara negara Indonesia dan Malaysia. *Jurnal Pendidikan Awal Kanak-kanak Kebangsaan*, 5, 1-18. <https://ejournal.upsi.edu.my/index.php/JPAK/article/view/853>
- Rhodes, M., Gelman, S.A. (2009). A developmental examination of the conceptual structure of animal, artifact and human social categories across two cultural contexts. *Cognitive Psychology*, 59(3), 244-274.
- Saçkes, M. & Korkmaz, H. İ. (2015). Kindergartners' mental models of the shape of the earth. *Elementary Education Online*, 14(2), 734-743.
- Samarapungavan, A., Vosniadou, S., & Brewer, W. F. (1996). Mental models of the earth, sun, and moon: Indian children's cosmologies. *Cognitive Development*, 11(4), 491-521.
- Saussure, F. (1987). *Cours de linguistique generale*. Payot.
- Schoultz, J., Säljö, R., & Wyndhamn, J. (2001). Heavenly talk: Discourse, artifacts, and children's understanding of elementary astronomy. *Human Development*, 44, 103-118.
- Schwarz, J. C., Strickland, R. G., & Krolick, G. (1974). Infant day care: Behavioral effects at preschool age. *Developmental Psychology*, 10(4), 502-506.
- Sharp, J. G. (1999). Young children's ideas about the earth in space. *International Journal of Early Years Education*, 7(2), 159-172.
- Siegel, M., Butterworth, G., & Newcombe, P. A. (2004). Culture and children's cosmology. *Developmental Science*, 7(3), 308-324.
- Starakis, J. & Halkia, K. (2010). Primary school students' ideas concerning the apparent movement of the moon. *Astronomy Education Review*, 9(1), 100-109.
- Sucuoğlu, B., Büyüköztürk, Ş. & Ünsal, P. (2008). The knowledge of the basic- relational concepts of the Turkish children. *Elementary Education Online*, 7(1), 203-217.
- Taner, M. & Başal H. A. (2005). Compare language development in first grade primary school students from different socioeconomic levels who take and do not take pre-school education according to the gender. *Journal of Uludağ University Faculty of Education*, 18(2), 395-420.
- Taner, M. (2003). *Comparison of language development in 1st class primary school students from different socioeconomic levels who take and do not take preschool education*. (Unpublished Master Thesis). Uludağ University, Bursa.
- Topçu, Z. (2012). *An evaluation of the effect of pre-school education on the school adjustment and Turkish language skills of elementary school first grade students*. (Unpublished Master Thesis). Hacettepe University, Ankara.
- Umek, L. M., Kranjc, S., Fekonja, U., & Bajc, K. (2008). The effect of preschool on children's school readiness. *Early Child Development and Care*, 178(6), 569-588.
- Üstün, E. & Akman, B. (2003). Concept development in three year olds. *Hacettepe University Journal of Education*, 24(24), 137-141.
- Vosniadou, S. & Brewer, W. F. (1992). Mental models of the earth: A study of conceptual change in childhood. *Cognitive Psychology*, 24(4), 535-585.
- Vosniadou, S., & Brewer, W. F. (1994). Mental models of the day/night cycle. *Cognitive Science*, 18(1), 123-183 .
- Vosniadou, S., Skopeliti, I. & Ikospentaki, K. (2004). Modes of knowing and ways of reasoning in elementary astronomy. *Cognitive Development*, 19(2), 203-222.
- Yağbasan, R. & Gulcicek, C. (2003). Describing the characteristics of misconceptions in science teaching. *Pamukkale University Journal of Education*, 13, 102-120.

- Yekta, M. (2005). *Drawing course performance of grade-7 students in the step 2 of primary education, who have received preschool education*. (Unpublished Master Thesis). Uludağ University, Bursa.
- Yıldırım, A. & Şimşek, H. (2008). *Qualitative research methods for the social sciences*. Ankara: Seçkin.
- Yıldız, E., Güçhan Özgül, S., & Saçkes, M. (2019). The effect of integrated science and literacy activities on children's understandings of shape of the earth and day- night concepts. *Balikesir University The Journal of Social Sciences Institute*, 22(41), 155-172.
- Yılmaz, K., & Çolak, R. (2011). A look at concepts: investigation of concepts and concept maps from pedagogical perspective. *Atatürk University Journal of Graduate School of Social Sciences*, 15(1), 185-204.