A Research on The Views and Proficiency of The Students in The Department of Child Development (Preservice Pre-School Assistant Teacher) About Science Activities in Preschool Education

Çocuk Gelişimi Bölümü Öğrencilerinin (Okul Öncesi Yardımcı Öğretmen Adaylarının) Okul Öncesi Eğitimde Uygulanan Fen Etkinliklerine Bakışlarının ve Yeterliklerinin İncelenmesi

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Abstract

In this study, it is aimed to examine the attitudes and competencies of associate degree child development department students (Preservice Pre-School Assistant Teacher) on science activities applied in pre-school education. The research is a case study from qualitative research designs, and the data of the research were collected from 10 second-year students studying in the associate degree Child Development Department of a university in the Eastern Black Sea Region in the 2017-2018 academic year. A semi-structured interview form and semi-structured observation form were used as data collection tools, and content analysis was used in data analysis. To the result of the research, the preservice preschool assistant teacher acted according to the planning, implementation, and evaluation stages while applying the preschool science activities. However, it was observed that their planning, implementation, and evaluation were not sufficient. They were quite deficient in terms of content knowledge, and they always used the same teaching method. In addition, it was seen that their highest expectations were in the direction of content knowledge, application, and material support.

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Bu makale araştırma ve yayın etiğine uygun hazırlanmıştır. iThenticate intihal incelemesinden geçirilmiştir.

Keywords: *Department of child development, preservice pre-school assistant teacher, science education, qualitative research designs, case study.*

Öz

Bu araştırmada, ön lisans çocuk gelişimi bölümü öğrencilerinin (okul öncesi yardımcı öğretmen adaylarının) okul öncesi eğitimde uygulanan fen etkinliklerine bakışlarının ve yeterliklerinin incelenmesi amaçlanmıştır. Araştırma nitel araştırma desenlerinden durum çalışması olup araştırmanın verileri 2017-2018 eğitim-öğretim yılında Doğu Karadeniz Bölgesinde yer alan bir üniversitenin ön lisans Çocuk Gelişimi Bölümünde öğrenim gören ikinci sınıf öğrencilerinin 10 tanesinden toplanmıştır. Veri toplama aracı olarak yarı yapılandırılmış mülakat formu ve yarı yapılandırılmış gözlem formu kullanılmıştır. Veri toplama araçları fen ve okul öncesi eğitiminde uzman 4 akademisyen tarafından incelenmiş, uzman görüşleri alınarak oluşturulmuştur. Verilerin analizinde içerik analizi kullanılmıştır. Araştırmadan elde edilen verilere göre okul öncesi yardımcı öğretmen adaylarının okul öncesinde fen etkinliklerini uygularken planlama, uygulama ve değerlendirme aşamalarına göre hareket ettikleri görülmüştür. Ancak yaptıkları planlama, uygulama ve değerlendirmenin yeterli olmadığı, alan bilgisi yönünden oldukça eksik kaldıkları, hep aynı yöntemle ders anlattıkları gözlenmiştir. Ayrıca en fazla beklentilerinin alan bilgisi, uygulama ve materyal desteği yönünde olduğu görülmüştür.

Anahtar Kelimeler: Çocuk gelişimi bölümü, okul öncesi yardımcı öğretmen adayı, fen eğitimi, nitel araştırma, durum çalışması

Introduction

Children are naturally curious about understanding their environment. This desire to learn begins at birth and continues until the end of life. Children show rapid development in all areas, especially when they reach the pre-school period. For this reason, they make significant progress in these areas of development until they reach the primary schooling age (Ministry of National Education [MEB], 2013). This period also forms the basis of other periods of human life. During this period, the education given to the child and the behaviors to be gained have a very notable place in their lives (Körükçü, Acun Kapıkıran, & Aral, 2016).

Preschool education aims to ensure that children pass through this period in which forward-looking thoughts are formed without any problems in terms of all developmental areas (Kandır, 2001). In addition, it ensures that the child's unique characteristics, which are formed by the joint effect of the environment and heredity, are prepared for a primary school in an environment and program designed for them (Şahin, 1998). Children graduate from these institutions in this particular period of six years by learning the behaviors that will form the basis for the rest of their lives (Şahin, 2013).

Children start the process of learning scientific knowledge in the preschool period. Since their experiences in this process determine the attitudes they will develop towards science in the future, it is considered vital for adults to support children's natural curiosity by providing a suitable environment (Güler & Akman, 2006). Therefore, preschool education consists of various activities in line with the natural curiosity and needs of children. Perhaps, we may say the most interesting of these activities are the science activities (Eti, 2016). According to Chaille and Britain (1997), science is a process that helps us understand how the world works. Howe and Jones (1998) stated that science is not only about knowledge and understanding the world but also how to reach the knowledge and searching for ways to reach knowledge. Science education applied in the early period has an important place in children's awareness of the concepts and events in the physical world (Campbell & Jobling, 2012). Children come to school with the experiences they bring from their environment, a natural curiosity, and a desire to discover the causes of events and how things work. (Martin, 2001). We cannot say that the scientific concepts learned by the heart contribute much to the mental development of the child, since children use their imaginations, and are inquisitive during these periods. Children's research, examination, and observation skills should be developed in preschool years to establish solid scientific foundations and to ensure scientific thinking (Açıkgöz, 2018). Thus, thanks to these activities, children will both satisfy their curiosity about the environment and begin to realize their scientific process skills (Eti, 2016). It's ensured with the science activities applied in the preschool period that the child learns science subjects through hands-on activities (Alabay, 2013). The child is filled with more questions, more curiosity, desire to learn, and research desire by being at the center of the activity. At this phase, attention should be paid to the use of science process skills by children. Children involved in real-life activities are aware of what is happening in the environment with such activities. Should not be forgotten that the right attitudes and behaviors towards the environment that children notice are the responsibility of teachers (MEB, 2016).

Preschool teachers' attitudes towards science education are considered crucial for effective science education. Teachers' positive attitudes towards science teaching have a great effect on children (Açıkgöz, 2018). If teachers' negative attitudes towards science stemming from their educational qualifications and experiences, they both transfer these negative attitudes to children and cause them to have misconceptions about science (Davies & Howe, 2003). Science is a natural phenomenon such as breathing, walking, and speaking, which are our physiological needs, and it can happen spontaneously, but it is necessary to repeat it constantly to avoid misconceptions and to teach science effectively. In addition, teachers should individually determine what each child is interested in and what they know (Elkind, 1998).

Teachers' subject knowledge, commitment to their profession, and competencies are highly effective in the progress of development of the child (Ford & Trotman, 2001). For this reason, teachers should be equipped with the knowledge and skills to perform their profession in the best way. Here, the most notable task of teachers is to make science practices fun and to make learning attractive with different methods and techniques (Şahin, 1998).

Today, in many public and private schools across Turkey, associate child development program graduates are appointed as responsible teachers instead of being as assistant teachers (Şahin, 2013). When these students graduate, they can work as teachers in private institutions and substitute teachers in pre-school education institutions affiliated with the Ministry of National Education (Tükel & Yıldız, 2018). Considering that teachers are one of the most important factors in the realization of learning (Gökdere, 2004) and the importance of science activities in understanding the environment in which the child lives, it is important to equip the assistant teachers who are given the main responsibility in most of the preschool institutions. Therefore, the attitudes and knowledge of assistant teachers in the learning process affect children's attitudes towards science education. However, no other research has been found in the literature on Preservice Pre-School Assistant Teachers' competencies and their views on science and nature activities applied in pre-school education.

Based on these views, the research aims to examine the perspectives and competencies of Associate Degree Child Development Department students (Preservice Pre-School Assistant Teacher) on science activities applied in preschool education.

Method

Information about the research model, study group, data collection, and data analysis are presented in this section.

Design of the Research

The study, which is designed within the framework of the qualitative research approach, is conducted using the "case study" design. In the "case studies," the factors affecting a situation are handled with a holistic approach, and it is emphasized how these factors affect the current situation and how they are affected by this situation (Yıldırım & Şimşek, 2016).

Participants

The participants of this research consist of 10 students studying in the 2nd year of the Child Development Program of a vocational school affiliated with a university in the Eastern Black Sea Region in the 2017-2018 academic year. The participants are selected by the "criterion sampling" method, one of the purposive sampling methods. The criterion used in this research is that the students have taken the "Science and Technology in Children" course. The students are determined to have different demographic characteristics, and these characteristics are given in **Table 1.**

Table 1. Demographic Characteristics of the Participants

Demographic Characteristics	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10
School type that graduated	General High School	Vocational High School	Vocational High School	Vocational High School	Vocational High School	Vocational High School	General High School	General High School	Vocational High School	Vocational High School
The last time he/she took a science class?	9th Grade	8th Grade	8th Grade	8th Grade	8th Grade	9th Grade	9th Grade	9th Grade	9th Grade	8th Grade
Learning Type	Day Time Education	Day Time Education	Day Time Education	Day Time Education	Evening Education	Evening Education	Evening Education	Evening Education	Evening Education	Evening Education
"Science and Technology in Children" course exam marks"	75	60	75	30	80	70	40	75	80	25
How often does he/ she do science and nature activities?	Once in 3 Weeks	Once a Week	Once a Week	Once in 3 Weeks	Once in 2 Weeks	Once in 2 Weeks	Once in 2 Weeks	Once in 2 Weeks	Once in 2 Weeks	Once a Week

Note. PPT: Preservice Pre-School Assistant Teacher

Data Collection Tools and Analysis of Data

In this study, semi-structured interviews and semi-structured observation techniques were used to collect data. The semi-structured interview technique is advantageous in asking in-depth questions on a specific subject, asking questions again if the answer is incomplete or unclear, making the situation more explanatory, and providing the opportunity to complete the response (Çepni, 2014). The semi-structured observation technique, on the other hand, is advantageous as it provides first-hand experiences with an environment and people in that environment, allowing the researcher to be open, exploratory, and inductive (Paton, 2014).

The interview form consists of two parts. The first part consists of 14 open-ended questions supported by alternative questions and probes to measure the thoughts and proficiency of PPTs in pre-school science activities. The second part was prepared to learn the personal information of PPTs. The questions in the interview form were examined by 4 academicians who experts in science and preschool

education are and were formed by taking expert opinions. The face-to-face interviews of the researcher with the PPTs were recorded with a voice recorder, with the approval of the participants. Interviews were limited to 30 minutes.

The observation form was prepared in four parts, namely, the planning, implementation, evaluation of the activity, and classroom management. The subjects to be observed were examined by 4 academicians who are experts in science and pre-school education and were formed by taking expert opinions. The researcher recorded the observations in a semi-structured observation chart using the unattended observation method. In addition, the process was video recorded with the approval of the participants.

The content analysis method has been used in the analysis of the data. Content analysis is defined as a systematic, repeatable technique in which some words of a text are summarized with smaller content categories with coding based on certain rules (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz & Demirel, 2008). The raw data obtained from the interviews and observations were first converted into text, then coded and sub-themes were formed, and themes were reached from these sub-themes. To increase the validity of the codes and themes, the opinions of an expert academician were taken.

Since the data of the study were collected in the 2017-2018 academic year there is no ethics committee approval form, but a volunteering form was signed by the preservice preschool teachers before the data were collected, and all ethical rules were followed both during data collection and at other stages of the research.

Results

In this section, findings are presented obtained as a result of the interviews about the view of the students of the Child Development Department (Preservice Pre-School Assistant Teacher) to the science education they apply in the preschool and related to the observation results of the science education they implement in the classroom. The following elements were reached by grouping the data with the help of the codes and sub-themes obtained by subjecting the content analysis.

Results Related to the first element

We may say that the Preservice Pre-School Assistant Teacher (PPT) laid some groundwork before starting the lesson (see **Table 2**). These groundworks are gathered under the sub-themes of preparations, namely, the classroom environment, preparing the materials, and preparing the students for the lesson.

Table 2. The Codes Regarding the First Element

Adjusting the classroom environment	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	Explanation
Sitting Order	O	O	O	O				O	O	O	She placed the experiment table so that all students could see it ($PPT8_O$). She seated the students in such a way that they could easily see the projection ($PPT9_O$).
Science and Nature Center	I	I	I	I	I	I	I	I	I	I	I use the science and nature center once a week. ($PPT1_I$). There is a magnifying glass, an organ model, a skeleton, etc. in the center. ($PPT2_I$).
Preparing Materials	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	Explanation
Benefiting from the Science and Nature Center	I	I	I	I	I	I	I	I	I	I	We examine the veins of the leaf with a magnifying glass. ($PPT3_I$). We examined our skeletons and bones. ($PPT5_I$).

Using Self Prepared Materials	I O	I O	I O	I O	I O	I O	I O	I O	 O	I O	I usually prefer to prepare it myself. ($PPT10_I$). She prepared the test materials herself and came to the lesson. ($PPT6_O$).
Using ready-made material			I O			I	I	I O	I O		I usually use ready ones ($PPT7_I$).
Source	I	I	I	I	I	I	I	I	I	I	I usually use the internet. I do it by watching because I don't have much knowledge. ($PPT1_I$). I use material books and the internet. ($PPT7_I$).

Preparing Students	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	Explanation
Check of prior knowledge	O	O		O	O			O	O		At the beginning, he/she asked questions by giving examples from daily life and checked their prior knowledge. ($PPT9_O$).
Draw attention to subject	O	O	O	O			O	O	O	O	Before the experiment, he/she attracted

											the attention of the children to the lesson with finger games, games, and riddle techniques ($PPT2_O$). Nature and its events. Because it attracts more attention of children. They enthusiastically participate in the activity ($PPT3_I$). The hose formation experiment visually appealed to the children ($PPT2_O$).
Choosing appropriate subject for the student	I O	I O	I O	I O	I O	I	I O	I O	I O	I O	

Note. O: Observation, I: Interview, $PPTX_O$: Observation explanation of Preservice Pre-School Assistant Teacher number X, $PPTX_I$: Interview explanation of Preservice Pre-School Assistant Teacher X.

We may say that all PPTs are preparing to use "a science and nature center" while arranging the classroom environment. However, during the presentation of the activity, it was determined, by the data obtained from the observation, that PPT5, PPT6, and PPT7 did not pay attention to this in terms of providing the sitting arrangement of the students. An observation note on this situation is as follows:

PPT6 set up a stationary desk in the corner of the classroom to perform the experiment activity. He allowed the students to watch the activity as much as they could see from the table where they were sitting, without adjusting the seating arrangement according to this table (PPT6-Observation Note).

In the interviews, it was learned that all PPTs created science and nature centers in their classrooms. Some of the relevant interview data are as follows:

PPT1I:

> *"…I use a science and nature center on almost every internship day…"*

PPT9I:

> *"...I use this center twice a month. There is a mouth-tooth model and an organ model...."*

Another preparation made by PPTs is related to materials (see Table 2). All of the PPTs stated that they benefited from some resources before starting the course. They also said that they used the materials in the science and nature center in the classroom in their activities. In addition, all PPTs, except PPT9, mentioned that they prepared their materials themselves, and they sometimes used ready-made materials in PPT3, PPT6, PPT7, PPT8, and PPT9. PPT9's statement about not preparing material is as follows:

PPT9I:

> "...I never prepared. Since I am not a high school graduate in this field, I do not know much about it. ..."

The last preparation that PPTs do before starting the lesson is to prepare the students for the lesson. These preparations were gathered under the headings of "checking preliminary information", "drawing attention to the subject" and "choosing a suitable subject for the student" in line with the interviews and observations. The data obtained as a result of the observation about the control of the students' prior knowledge are as follows:

"Kids, do you know how snow is formed?" she asked. The students answered all together, "No, teacher". (PPT_1-Observation Note).

"Any ideas how the hose is formed?" she asked. The student replied: "it was on the sea the other day, teacher." (PPT_2- Observation Note).

"Kids, do you know why polar bears don't get cold?" she/he asked. Students: "We know it. It has too much body fat" (PPT_8-Observation Note).

When the observation data were examined in terms of drawing attention to the subject, it was observed that except for PPT5 and PPT6, others did some activities. The relevant observation data are as follows:

At the beginning of the lesson, PPT1 tried to draw students' attention to the subject by distributing picture brochures about nature and its events (PPT_1-Observation Note).

PPT2 tried to attract their attention to the lesson by teaching a finger game on the subject at the beginning of the lesson (PPT_2-Observation Note).

He started the lesson by asking riddles about the topic. He tried to attract the attention of the students to the lesson by showing the answers of the riddles to the students with the riddle answer cards that he prepared visually (PPT_3-Observation Note).

At the beginning of the lesson, she tried to attract children's attention to the subject by watching cartoons about gravity (PPT_8-Observation Note)Finally, when we examine in choosing a suitable topic for the student, PPTs choose a topic suitable for children, both according to the interviews and observation results. Only an inconsistency was found between the subject choice of PPT6 and the concept he taught. The relevant observation data is as follows:

PPT6 chose acid-base as the topic. He experimented with the students about acid-base. As a result of this experiment, he tried to teach a mathematical concept instead of grounding it in acids and bases. Purpose and outcome were not compatible with each other. The experiment went beyond its purpose (PPT_6- Observation Note).

Results Related to the Second Element

As a result of the interviews and observations made, it was found that both PPTs and students had some preferences during the implementation of the course (see **Table 3**). These are the method, subject, and material preferences that the teachers apply during the lesson. In addition, the reasons why students prefer science activities are also included.

Table 3 . The Codes Regarding the Second Element

Method Prefer	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT1	Explanation
Drama	I		I				I			I	Drama, experiment and games are the most appropriate methods in my opinion ($PPT3_I$).
Excursion										I	I prefer not only the classroom environment but also travel and observation ($PPT10_I$).
Game	I O	O	I O	O	I	O					I prefer drama and games ($PPT1_I$). She played finger games about the concept to

Experiment	O	O	I O	I O	O	I O	I O	O	O	O	increase the interest in the lesson ($PPT2_O$). Both experiment and observation, they are already a whole ($PPT4_I$). All students experimented as the main activity. (O_G). I let children add the experiment materials by themselves. ($PPT8_I$). After she implemented the experiment herself, she had the volunteers of the students do the experiment ($PPT7_O$) Experiment and observation is the most appropriate method for children ($PPT4_I$). I think demonstration and modeling are appropriate for children ($PPT2_I$).
Demonstration	O	I O	I				O	I O	I O	O	
Observation				I				I		I	
Modeling		I	I								

Subject Preference	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	Explanation
Plants						I					It is easier to see the change in plants ($PPT6_I$).
Living Things					I						It is easier to give examples from living things ($PPT5_I$).
Space					I					I	I like the subject of space the most ($PPT10_I$).
Nature and its Events	I O	 O	I O	I O							I consider myself more competent in this regard ($PPT1_I$). She conducted an experiment showing the formation of rainbows. ($PPT3_O$).
Meet Our Body		I					I				Children are curious about their bodies ($PPT7_I$).
Matter and Its Properties					O		O	I	I O	O	It is easier to explain this subject through a game ($PPT9_I$).
Material Prefer	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	*Explanation*
Magnifying Glass	I	I	I	I				I	I		In general, if we are going to make observations, I

											use a magnifying glass ($PPT8_I$).
Organ Model	I						I				I generally use a magnifying glass, an organ model and a skeleton ($PPT1_I$).
Skeleton	I		I								There is a skeleton and a magnifying glass ($PPT3_I$).
Experiment Materials	O	I O	I O	I O	I O	I O	O	I O	I O	I O	I choose the materials depending on the experiment, accordingly ($PPT6_I$). All participants preferred experimental materials as materials (O_G).

Student's Prefer	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT	Explanation
Material Usage	I O	O	O	O			I O	O	O	O	They like more different materials ($PPT1_I$).
Hands-On Activities	O	I O	I	I	I	I	I O	I O	I O	O	They like to learn by hands-on activities and touch ($PPT2_I$). The children liked that she had the children do the

Being Visual	I O	I O			I O	I O		I O		I O	experiment she did (PPT7O). Actually, they like it when it is visual (YÖ6 M). The visual activities increased the motivation of the children (O_G).

Note. O: Observation, I: Interview, $PPTX_O$: Observation explanation of Preservice Pre-School Assistant Teacher number X, $PPTX_I$: Interview explanation of Preservice Pre-School Assistant Teacher X, OG: General observation explanation.

During the interviews, PPTs stated that they preferred different methods due to many different reasons. Some of the relevant interview data are follows:

PPT1I:

> *"...I use drama and games. They understand better with them and learn more while having fun. ..."*

PPT2I:

> *"...First, I show, then I do. Otherwise, students do not understand, it becomes a problem. After showing beforehand, students do it. Easier. ..."*

PPT6I:

> *"...I usually do the experiment and then the drama. These are better in the classroom environment, since I can't take them anywhere as a trip and observation right now. ..."*

PPT7I:

> *"...Experiment method. Because the experiment is more permanent, because it is more permanent visually. I don't think verbal expression is very permanent. ..."*

PPT9I:

> *"...Just like I said, involving them in the process of observation and experimental materials. Because I think it is more useful and effective. I think they learn better by doing it themselves. ..."*

PPT10I:

> *"...I am mostly observing, which is based on observation, and we do it ourselves, not only in the classroom environment but also outside. Because I don't think that only children will learn anything in the classroom environment. At the same time, I use this method because I think that children will learn through hands-on activities and experiences..."*

However, as a result of the observations, all PPTs used the experimental method. Then they had the students repeat the experiments. They used other methods as a side activity to supplement the main activity.

Another sub-theme is the subject preferences of PPTs (see Table 3). We may say that the most preferred topic during the interviews was Nature and Its Events. They stated that they preferred the subject of "Nature and Its Events" as PPT3 attracted the attention of the children, as PPT4 liked this subject, and as PPT1 considered herself sufficient. The relevant interview data are follows:

PPT1I:

> *"...Nature and events. I see myself more competent on that subject and more experiments on that subject... and the subject is broader. ..."*

PPT2I:

> "...Health, matters related to our body. There are lots of experiments. Because kids like it ..."

PPT3I:

> *"...Nature and its events. Because it attracts more attention of children. They are enthusiastically participating in the activity, and there are experiments they have not seen before. ..."*

PPT4I:

> *"...Nature and its events. Because nature is a miracle, how can I explain? The flow of nature is a miracle, I would like to show it to children. ..."*

PPT5I:

> *"...I also love the subject of space and living things. Because it is easier to give an example from a living thing, since space is an abstract concept, it is more difficult to give an example. But for example, if we are going to give an example from the world, if we are in a world, small balls can be used, or different materials can be used while promoting it...."*

PPT7I:

> *"...Plants are better. I think their change is different. For example, you can change the color of lettuce or something with food coloring, it interests me."*

As a result of the observations, we may say that they preferred the subject of "Matter and Its Properties" as much as the subject of "Nature and Its Events". During the interviews, PPT8 and PPT9 stated that they preferred the subject of "Matter and Its Properties" since there were many experiments. The fact that the most preferred method during the observations is the experiment is consistent with the preference of the subject of "Matter and Its Properties".

Another sub-theme constituting the second element is the material preferences of PPTs. During the interviews, PPT1, PPT2, PPT3, PPT4, PPT8, and PPT9 stated that they preferred the magnifying glass where located in science and nature centers. In addition, except for PPT1 and PPT7, the others said that they used experiment materials.

PPT2I:

> *"...For example, mrs., we usually examine leaves with a magnifying glass, we teach children to brush teeth with teeth. They have their own toothbrushes? ..."*

PPT3I:

> *"...When summer comes, we take the children out to the garden, they examine what's in with a magnifying glass, or you bring a leaf to the classroom with a magnifying glass, and they watch their veins or something. ..."*

As a result of the observations, it was seen that all PPTs preferred experimental materials as materials.

The last sub-theme constituting the second element is the Preservice Pre-School Assistant Teachers' preference. The reasons for Preservice Pre-School Assistant Teachers prefer science activities were expressed as the use of materials in science activities, learning through hands-on activities and experiencing, and the visual nature of science activities. Except for PPT1 and PPT10, the others stated that learning by doing experience increased children's interest in science activities. In addition, 60% of the PPTs stated that being visual is a reason for preference by children. PPT1 and PPT7 also mentioned that the use of materials was effective. The relevant interview data are as follows:

PPT1I:

> *"...They like it better when the materials are different. Visually ..."*

PPT2I:

> *"...Since it is visual, children also learn by hands-on activities and experiencing, they like to touch it..."*

PPT4I:

"...In the experiment, for example, they are happier when they have a contribution. Later, children understand better when they observe from their perspective. They explain better because they observe themselves better. It stays more in their mind when they examine. ..."

PPT5I:

"...I think it's because of being both visual and hands-on activities ..."

PPT6I:

"...Mrs., they like it when they use materials and do something themselves. It's both fun, and they get bored when we tell it, they can continue without getting bored when they do it themselves. ..."

PPT9I:

"...Hands-on activities and seeing visually. Because they see different things. For example, they like the eruption of the volcano in the experiment. ..."

The results of the observation show that the use of materials, especially the visual one, and then learning by hands-on activities increases the children's interest in science activities.

Results Related to the Third Element

Data on whether the application is effective in both practitioner-related and student-related issues have been obtained (see **Table 4**).

Table 4. *The Codes Regarding the Third Element*

Subjects Related to the Practitioner	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	*Explanation*
Carrying Out Activities	I O	I O	I O	I O	I O	I O	I O	I O	I O	I O	I need to know more and need material support ($PPT8_I$). She was not sure about concluding her experiment ($PPT1_O$).

Knowing Science Subjects	I O	O	I O	O	O	O	I O	I O	I O	I O	Not literally ($PPT10_I$) The effect of the fact that all of the candidates did not have full knowledge of science subjects in their practices was felt. (O_G).
Solving the problems, they encounter	I	I O	I	I O	I O	I O	I O	I O	I O	I O	If I cannot conclude the experiment, I do it again ($PPT2_I$).
Benefiting from the course "Science and Technology in Children"	I	I	I	I	I	I	I	I	I	I	I have learned more concepts ($PPT4_I$).
Classroom Management Skill		O			O		O	O	O	O	She was sufficient in terms of using time, providing classroom dominance, and making students active ($PPT8_O$).

Subjects Related to Students	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	*Explanation*
Associating science with daily life	O	O		O				O	O	O	She explained locations where the concept she wanted to teach was seen in our

							country and their reasons ($PPT4_O$). After the activities she did, she got students to watch a video about the concept she wanted to teach and summarized the subject ($PPT8_O$)
Summarizing the lesson	O	O		O	O	O	

Note. O: Observation, I: Interview, PPTXO: Observation explanation of Preservice Pre-School Assistant Teacher number X, PPTXI: Interview explanation of Preservice Pre-School Assistant Teacher X, OG: General observation explanation.

As a result of the interviews, we determined that the PPTs found themselves inadequate during the execution of the activities. PPT1, PPT2, PPT3, PPT4, PPT6, PPT8, and PPT9 stated that they thought this inadequacy was due to a lack of knowledge. Sample statements and observation data are given below:

PPT1I:

> *"...I do not consider myself sufficient. Since I haven't taken those classes for a long time, when I did, you know...it's been a long time. ..."*

PPT2I:

> *"...I feel incompetent. There are experiments that we know, but there are many more experiments that we do not know, and in terms of teaching these to the children, we would teach more things if we knew. Frankly, I don't see it enough in terms of knowledge..."*

PPT1 conducted an experiment showing snow formation. However, he had concerns about not being able to carry out the experiment and not being able to reach the result. While mixing the ingredients, he could not be sure of the amounts (PPT_1-Observation Note).

In addition, PPT5 stated that he was unable to follow the innovations, and PPT10 also stated that he had inadequacy due to the lack of applications. Below is the relevant interview data:

PPT5I:

> *"...I don't really see enough. Because people develop over time and new things are constantly coming out. When you say you are enough, something else can come out. There may be other things you don't know. For example, when giving an abstract concept, it is necessary to visualize that thing in children's mind. You can revive it at an older age, but we try to teach something from scratch..."*

PPT1, PPT3, PPT7, PPT8, PPT9, PPT10 stated that they had some deficiencies in terms of knowing science subjects as well as carrying out activities. Below are examples of interviews:

PPT2I:

> *"...Yes, I think I know science subjects ..."*

PPT5I:

> *"...adequately, though not exactly ..."*

PPT8I:

> *"...Some yes, some no..."*

PPT10I:

> *"...Not very advanced, but I think I'm moderate enough ..."*

As a result of the observations, it was seen that all students were insufficient in terms of knowing science subjects. Below are examples of observations related to this:

PPT4 experimented on the formation of erosion. He experimented with the materials he prepared without any problems. However, it was clear that he confused erosion and landslide in the statements he used during the application (PPT_4- Observation Note).

PPT5 experimented about swimming sinking. He demonstrated items that float and sink during the experiment. At the end of the activity, he wanted to summarize the subject, but could not summarize it because he did not have enough information about the subject (PPT_5-Observation Note).

In the interviews, all PPTs said that they benefited from the "Science and Technology in Children" course. They also stated that they were able to solve the problem when they encountered a problem during the activity. PPT3 could not conclude the experiment as the experiment did not give the desired result in the observations made.

The last code of the third element's practitioner-related sub-theme is classroom management skills. As a result of the observations, we found that PPT1, PPT4, and PPT6 were insufficient in terms of providing classroom dominance and making the class active, and PPT3 could not use time effectively.

The codes that make up the sub-theme of student-related issues are "associating science with daily life" and "summing the lesson". PPT1, PPT2, PPT4, PPT8, PPT9, PPT10 associated their activities with

examples from daily life. PPT4, PPT5, PPT8, PPT9, PPT10 also summarized the lesson. Below are sample data about the observations made:

PPT8 prepared an activity about gravity for the students. After the experiment, he watched a movie about the non-gravity environment on the projection. Next, he made explanations to the students about what kind of problems we would experience if there were no gravity (PPT_8-Observation Note).

PPT10 experimented about swimming-sinking. After the experiment, she asked questions and allowed the children to summarize the subject. Later, she associated it with daily life (PPT_{10}-Observation Note).

Results Related to the Fourth Element

We found that PPTs need some complementary elements. These are grouped under the sub-themes of support for the practitioners and support for the environment (see **Table 5**).

Table 5. The Codes Regarding the Fourth Element

For Practitioners	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	Explanation
Field Knowledge	I O	I O	O	I O	I O	O	I O	I O	O	O	I want to learn about the concepts. Because I am weak at that subject ($PPT7_I$). All students needed support in terms of field knowledge (O_G).
Material										I	I would like help with preparing the material ($PPT10_I$).
Implementation			I	I			I		I	I	I would like to learn the application of all kinds of

											experiments. ($PPT9_I$).
For Environment	PPT1	PPT2	PPT3	PPT4	PPT5	PPT6	PPT7	PPT8	PPT9	PPT10	Explanation
More Opportunity for Children		I	I								For example, more opportunities should be given to children ($PPT1_I$).
More Gardening Activities for Children								I		I	A science center can be built in the garden for children ($PPT8_I$).
Family Involvement					I						It is necessary to ensure more involvement of families ($PPT5_I$).
Material Support	I			I		I	I		I		There is no sufficient material ($PPT7_I$).
Technological Material				I		I	I	I		I	It would be better if there were three-dimensional glasses, smart boards, projectors and computers in the laboratories ($PPT4_I$).

Note. O: Observation, I: Interview, $PPTX_O$: Observation explanation of Preservice Pre-School Assistant Teacher number X, $PPTX_I$: Interview explanation of Preservice Pre-School Assistant Teacher X, OG: General observation explanation.

PPTs stated that they need support in the field of content knowledge, material, and application to be able to apply science activities more efficiently in pre-school.

PPT4 and PPT7 stated that they needed support both in the field of knowledge and in practice. While PPT1, PPT2, PPT5, and PPT8 only needed to support in-field knowledge, PPT3 and PPT9 only needed support in practice. While PPT10 wanted to support both the material and practice, PPT6 did not ask for any support. As a result of the observations, all teachers needed support in their field knowledge. Below is the interview data regarding this:

PPT4I:

> *"...It would be both in practice and in knowledge. ..."*

PPT6I:

> *"...Well, Mrs. is about both the application and the concepts. 'Because I'm weak at it..."*

PPT7I:

> *"...I want to do it more by myself, not by getting help from someone else. Even if it's hard, I want to do it myself. ..."*

PPTI:

> *"...I'd like to know about all kinds of experiments. ..."*

PPT10I:

> *"...I would like to prepare materials, and I would like to be able to explain the subjects effectively to children. ..."*

PPTs stated that they needed some support related to the environment in the implementation of science activities in pre-school education. PPT4, PPT6, and PPT7 stated during the interviews that they needed both materials and technological materials. PPT8 and PPT10 both needed more gardening activities and technological materials, while PPT1 and PPT9 only needed material support. Apart from these, PPT2 and PPT3 requested more opportunities for children and more family participation. Below are examples of interviews related to this:

PPT2I:

"...What would have been better? For example, children should be given more opportunities, children should not be restricted, children should do what they want to do. ..."

PPT4I:

"...For example, if there was a separate section in the kindergartens, such as a laboratory, there would be tables and chairs suitable for children's sizes, magnifying glasses, or three-dimensional glasses for children to hold, three-dimensional mannequins related to our body, skeletons. A telescope would be a projection, a speaker would be like a smartboard. It would be better if children had computers to deliver information immediately..."

PPT5I:

"...Let children be given a concept earlier so that they can understand it when we do it. For example, the child does not know vinegar, but we are trying to experiment with vinegar. But actually, it's about this. It is related to the developmental level of children. It's a little bit about family. Families need to be more involved. Families expect something from us, but they do nothing themselves. We give information, but it is forgotten because it is not repeated at home...."

PPT9I:

"...More space can be given in the classrooms. For example, we do not have plants in my classroom. It could be plants. A science center can be built in the garden only for children. A nice area can be made where children can study..."

PPT10I:

"...Some kindergartens may not have a place; more places can be reserved. For private kindergartens with a garden, there can be a coop outside, a garden can be made, and they can grow plants with children. They can then collect those plants. Because they can experience it by living by doing it themselves. I want children to do one-on-one things outside, not just in the classroom environment...."

Conclusion- Discussion- Suggestions

In this study, the views and competencies of the students of the child development department (Preservice Pre-School Assistant Teacher) on the science activities applied in pre-school education were examined. With the interviews and observations made for this purpose, what the PPTs paid attention to in the process of creating science activities, the problems they experienced, and their proficiency status were determined.

As a result of the analysis of the data obtained from the research, four elements (planning, implementation, evaluation, suggestions) were determined that reveal the perspectives of PPTs on science activities applied in pre-school education. Below are the results of the research and the discussion based on these factors.

PPTs think that planning (1st Element) should be done before starting pre-school science activities.

As a result of the interviews and observations, it was revealed that all PPTs made some preparations. These were gathered under the sub-themes of preparations for the classroom environment, preparing the materials, and preparing the students for the lesson. All these sub-themes enabled the planning theme, which is described as the 1st element, to be reached.

While organizing the classroom environment, all PPTs stated that there was a science and nature center in their classrooms, and they said that they prepared it for use. In a similar study conducted by Simsar, Doğan, and Yalçın (2017), they stated that there are science centers in most of the classrooms. However, in another study, Kubanç (2014) examined the physical conditions of pre-school education institutions and stated that 40% of the institutions have science centers, and only flowers are grown in these centers. Another result reached in the arrangement of the classroom environment is that some PPTs (PPT5, PPT6, PPT7) did not pay attention to this while providing the sitting arrangement of the students during the presentation of the activity. According to observations, PPTs implemented their activities neither a seating arrangement of the classroom nor seating arrangement according to the type of activity. The reason for this situation may be that PPTs are reluctant to change the sitting order of the classroom because they are in the pre-service position.

Another preparation made by PPTs is related to materials. All of the PPTs stated that they used some resources, especially the internet, before starting the lesson. In addition, they said that they had enough materials in the science and nature center in the classroom and that they used the materials in their activities. In a study conducted with teachers in Ültay, Ültay and Çilingir (2018), they concluded that some teachers conduct research using the internet. The reasons why teachers or preservice teachers prefer the internet may be that it is easily accessible, the variety of activities is more, and they benefit from the forums created by the teacher groups. Regarding the use of materials in science and nature centers, many studies have found that the materials in the centers are insufficient (Güler & Bıkmaz, 2002; Karamustafaoğlu & Kandaz, 2006; Kıldan & Pektaş, 2009; Simsar et al., 2017). Dağlı (2014), in his master's study titled "Examination of Teachers' Views on the Content of Science Education Applied in Pre-School Education Institutions", stated that teachers had problems with materials and resources related to science education and that the materials and resources were insufficient in pre-school science education. In addition, except for one PPT (PPT9), all other PPTs mentioned that they prepared their materials themselves, and some (PPT3, PPT6, PPT7, PPT8, PPT9) sometimes also used ready-made materials. Ültay et al. (2018) also described it as pleasing that

teachers try to make the missing materials themselves and ask for support from families or school administration. Although Ayvacı, Devecioğlu, and Yiğit (2002) reached a similar conclusion that the materials were either prepared by the teachers themselves or outsourced, on the other hand, they stated that the teachers were insufficient on their own to develop original materials and that this was not enough for the use of science and nature activities during their undergraduate education. They think that it is because they do not take the courses related to material development. We may say that this difference is since the students of the Child Development Department mostly graduated from the child development department in high school, the number of material preparation courses in both high school and vocational high schools, and therefore they are more practical in preparing materials.

The last preparation that PPTs do before starting the lesson is to prepare the students. These preparations were grouped under the headings of checking prior knowledge, drawing attention to the subject, and choosing a suitable topic for the student, in line with the interviews and observations. Some of the PPTs (PPT1, PPT2, PPT4, PPT5, PPT8, PPT9) asked questions about checking students' prior knowledge, most of them (except PPT5, PPT6) did preliminary activities to draw attention to the subject, and again in choosing a topic, all of them were suitable for children and liked by them.

As a result of the interviews and observations, PPTs prepared their materials and students for the activity before the science activity. Akyol and Birinci Konur (2018) reached similar conclusions in this regard.

PPTs passed on to the implementation (2nd Element) stage after the planning stage in preschool science activities.

As a result of the interviews and observations, we may say that all PPTs were put into practice by choosing a method, subject, and material. In addition, the reasons why Preservice Pre-School Assistant Teachers prefer pre-school science activities were also determined. All these sub-themes enabled the application theme, which is described as the second element, to be reached.

During the interviews, PPTs stated that they preferred methods such as drama, excursions, games, experiments, demonstrations, observations, and models. However, to the observations, we may say that all PPTs used the experimental method. They used the demonstration method when they had students repeat the experiments and used other methods as a side activity to draw attention to the subject. Özbek (2009), in his master's thesis study titled "Examination of Preschool Teachers' Views and Practices on Science Education", stated that the method most frequently used by preschool teachers in science activities is "experiment" in preschool, followed by drama and excursion-observation methods. Karamustafaoğlu and Kandaz (2006), in their study to determine the methods and techniques that preschool teachers use in science and nature activities, and to identify the problems they encounter while carrying out these applications, preferred methods such as narration, dramatization, model use, and experimentation in science and nature activities. They stated that they benefited from these activities and that a laboratory was needed to carry out these activities effectively. Similarly, in many studies, it has been found that the most preferred method is the experimental

method (Akyol & Birinci Konur, 2018; Karamustafaoğlu & Kandaz, 2006; Kıldan & Pektaş, 2009; Özbek, 2009; Simsar et al., 2017). Ayvacı et al. (2002) stated that all of the teachers use traditional teaching methods and techniques as a result of their study. The experiment method is very effective because it appeals to more than one sense, uses materials, and provides an environment for students to learn through hands-on activities. However, the use of this method by all PPTs makes us think that only the experimental method comes to mind when science activity is mentioned, and they do not know how to apply the other methods they mentioned. As Ayvacı et al. (2002) stated, the fact that traditional methods are preferred can be interpreted as they are not aware of contemporary methods, or they do not develop themselves in this direction.

Another sub-theme of the application theme is the subject preferences of PPTs. The most preferred topic during the interviews was "Nature and Its Events". Some PPTs stated that they preferred the subject of "Nature and Its Events" because they liked this subject, some because they saw themselves as sufficient, and some because it attracted the attention of children. As a result of the observations, we found that they preferred the subject of "Matter and Its Properties" as much as the subject of "Nature and Its Events". During the interviews, pre-service teachers stated that they preferred the subject of "Matter and Its Properties" since there are many experiments on this subject. The fact that experiment is the most preferred method during the observations is in line with the preference of the subject of "Matter and Its Properties". Ültay et al. (2018) also concluded that the most preferred subjects of preschool teachers are events in daily life, natural events, and experiments in their study titled "Examination of pre-school teachers' practices in science". Kallery (2004), in the study titled "The Perceived and Delayed Needs and Concerns of Preschool Teachers in Science," determined that preschool teachers had difficulties in choosing appropriate scientific subjects and concepts in the classroom. Ayvacı (2010) states that pre-school education is a critical period for the development of children's scientific process skills, and the education provided in this period will contribute to the active use of scientific process skills by children in the future. Therefore, since this period is a period in which the foundation of knowledge is laid, students need to transition to primary education without having any misconceptions. Keleş and Menevşe (2017) stated that one of the reasons for the formation of misconceptions is the misconceptions that teachers have. For this reason, it is a positive situation that PPTs do not have any misconceptions or carry out activities on subjects they know well. However, the fact that each PPT prefers one or two subjects can also be interpreted as that they do not have enough knowledge about the subjects that should be taught in pre-school. The next sub-theme is the material preferences of PPTs. Although we found in the interviews that PPTs preferred the materials found in the science center and especially used the magnifying glass during the observation, and they used the experimental materials in the observations. Since the method, they use most is experimentation, it is natural that the materials they prefer are also experimenting materials. Unlike this study, Simsar et al. (2017) concluded that the majority of teachers use the human model, tooth model, and world globe since these materials are available in the majority of schools. Likewise, Akyol

and Birinci Konur (2018) stated that the most common materials in the science center are the human body model, magnifying glass, and world model.

The last sub-theme that makes up the application theme is the Preservice Pre-School Assistant Teachers' preference. The reasons for Preservice Pre-School Assistant Teachers prefer science activities were expressed as the use of materials in science activities, learning through hands-on activities, and the visual nature of science activities. To the results of the observation, the use of materials, especially the visual one, and then learning through hands-on activities increase the children's interest in science activities. Ayvacı et al. (2002) also stated that the results of the activities carried out in science and nature activities attract the attention of the students more, and besides these, the students' studies keep their interest for a long time. In another study, active participation of preschool students is necessary for effective learning of science (Hamurcu, 2006).

PPTs pass on to the evaluation (3rd Element) stage after the implementation stage in preschool science activities.

Under the main heading of the evaluation theme, evaluations were made about whether the application was effective in both the practitioner and student-related issues.

We saw that the PPTs found themselves inadequate during the execution of the activities to the result of the interviews. They stated that this inadequacy was due to the lack of knowledge, not being able to follow the innovations, and the lack of applications they made. In addition to carrying out activities, PPTs also experience some deficiencies in terms of knowing science subjects. The observations also support that all students are insufficient in terms of knowing science subjects. Akerson and Buzzelli (2007) examined the relationship between early childhood novice teachers' views on the nature of science and their cognitive development levels and cultural values. As a result of the study, it was found that pre-service teachers had the wrong information about the nature of science. Ültay and Ültay (2015) also concluded in a study they conducted with pre-service teachers that the conceptual knowledge levels of pre-service teachers who have reached the graduation stage are low. Kallery (2004) stated that preschool teachers could not manage children's understanding of science concepts, and this was due to their insufficient knowledge of science. Özbey (2006) conducted a study to emphasize the importance of preschool science education and to reveal the competencies and expectations of teachers working in preschool education institutions in science activities in the daily education program. It was concluded that although teachers are generally competent in preschool science activities, they have problems in planning and applying science activities and they cannot implement science activities regularly. In another study by Ültay et al. (2018), some teachers think that they are competent in explaining science subjects because they research the internet, some of them see themselves as partially sufficient, and teachers who do not see themselves as sufficient in science subjects need to constantly improve themselves and do research, similar to this study. Ayvacı et al. (2002) reached similar conclusions regarding the teachers' lack of sufficient knowledge about science and nature subjects. Ekinci Vural and Hamurcu (2008) found that the reason why some of the pre-service teachers

find themselves less sufficient or insufficient is due to the lack of Pre-school Science Education courses. Those who find themselves sufficient also regard the pre-school science teaching course among the reasons. Similarly, in this study, all PPTs answered about "benefiting from the Science and Technology in Children course" which is one of the sub-themes of the evaluation theme. They stated that this course was especially effective in their practice, but if it was in the first year, it would be more beneficial for them. However, in total, those who feel inadequate are considerably higher than those who feel adequate.

When the sub-themes of the evaluation theme were evaluated in general, although the PPTs thought that the course was beneficial for them, they were insufficient in terms of knowing the subjects of science and nature in pre-school and applying the methods and techniques they would use while carrying out the activities. In general, although the majority of PPTs are high school graduates in child development and have more material courses, they are quite competent in terms of creativity, application skills, and material preparation, even though they took the last science course in secondary school (see demographic information table) and the two students they studied in the vocational school. Due to the inadequacy of science courses throughout the year, they are insufficient in terms of carrying out activities, science subjects, associating science with daily life, and summarizing the lesson.

PPTs make suggestions (4th Element) on the subjects they need support in pre-school science activities.

It has been reached that PPTs need some complementary elements. These are grouped under the sub-themes of supports for the practitioner and supports for the environment.

To be able to implement pre-school science activities more efficiently, PPTs stated that they need support in the field of content knowledge, some materials, and support in the field of practice. As a result of the observations, it was learned that all PPTs need support, especially in-field knowledge. In the study conducted by Ekinci Vural and Hamurcu (2008), it was revealed that pre-service teachers wanted to receive support on learning to do experiment and science teaching methods and techniques. In addition, pre-service teachers stated that they would like to receive support on the content of all science subjects and information on how to teach abstract concepts. Most of the first-year students want to learn about general science subjects and Physics, Chemistry, and Biology. These studies show that, whether preservice teachers or PPTs when they are missing science subjects from high school, the courses they take in undergraduate or associate degree are not enough to fill the gaps. Especially the deficiencies in the field knowledge cause them to stay away from science activities and to be discouraged from applying the activities. PPTs stated that they need some support related to the environment in the implementation of science activities in pre-school education. They expressed these as materials, technological materials, more gardening activities, more opportunities for children, and more family involvement. Çınar (2013) stated that the teachers encountered problems such as the lack of teaching source materials and equipment while carrying out the activities in their study to determine

the teaching activities that pre-school teachers use in teaching science and nature subjects and to identify the problems they encounter while carrying out these activities. In similar studies, teachers stated that they need support to commune with nature, increase the diversity of materials, improve physical conditions, create science classes in institutions, organize seminars to inform teachers, increase resources related to science, have a laboratory environment in schools, and establishing science centers for a more efficient science teaching. They stated that they need support in matters such as enriching the environment and ensuring parent-teacher cooperation (Ültay et al., 2018; Akyol & İlk Konur, 2018).

The suggestions regarding the results of the research are as follows:

- Since most of the students studying in the Child Development Department of Vocational Schools are from vocational high schools and there are many material courses in the curriculum of the Child Development Departments, PPTs are very practical and creative in preparing materials. To put these skills into practice, a separate section on science activities can be created in material lessons.

- As a suggestion, science teaching courses should be reviewed both in terms of content and the period in which they are taught and spread over two semesters of the first grade.

- The teacher can effectively demonstrate the teaching methods and techniques to be used in the practices of preschool science and nature activities, the teaching of science subjects, abstract concepts, and the practices of teaching the concept of science with different activities throughout the day by switching between disciplines.

- Since the study was carried out with a small number of Preservice Pre-School Assistant Teachers, it can be recommended to conduct more comprehensive studies involving a larger sample to determine the current situation.

- Preschool education program can be examined in detail in terms of achievements related to science education and their implementation situation or material suitability.

According to the data obtained in the research, it is beneficial to include descriptive or guiding statements, especially for candidates with inexperience in the preschool science curriculum or a guidebook that can be prepared on this subject.

Author Contributions

1. Author: 50% 2. Author: 20% 3. Author: 20% 4. Author: %10 contributed to the study.

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Conflict of Interest Statement

There is no financial conflict of interest with any institution, organization, person related to our article titled "A Research on The Views and Proficiency of The Students in The Department of Child Development (Preservice Pre-School Assistant Teacher) About Science Activities in Preschool Education" and there is no conflict of interest between the authors.

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Genişletilmiş Özet

Okul öncesi eğitim, çocuğu ilkokula hazırlayan, yaşamın temellerinin atıldığı, öğretimin ilk ve en önemli basamaklarından biridir. Bu dönemde sunulan fen eğitimi, çocukların çevrelerine karşı olan meraklarını gidermede ve çevrelerini daha iyi anlamalarını sağlamada önemli bir yer tutmaktadır. Bu etkinliklerin çocuğa sevdirilmesi ileride onların yönelimlerine de temel oluşturacaktır. Dolayısıyla öğretmenlere büyük sorumluluklar düşmektedir.

Bugün ülkemizde birçok okul öncesi eğitim kurumunda okul öncesi öğretmenlerinin yerine çocuk gelişimi öğrencileri esas öğretmen olarak çalışmaktadır. Öğretmenlerin, çocuğun öğrenmesinde ilk sırada olması ve fen

etkinliklerinin de çocuğun yaşadığı çevreyi anlamadaki önemi göz önünde bulundurulursa okul öncesi kurumların birçoğunda asıl sorumluluğun verildiği yardımcı öğretmenlerin donanımlı olması önemlidir. Ancak, alan yazında okul öncesi yardımcı öğretmen adaylarıyla ilgili ve okul öncesi eğitimde uygulanan fen ve doğa etkinliklerine bakışlarını araştıran başka bir araştırmaya rastlanmamıştır.

Bu görüşlerden hareketle araştırmanın amacı, Çocuk Gelişimi Bölümü öğrencilerinin (okul öncesi yardımcı öğretmen adaylarının- YÖA) okul öncesi eğitimde uygulanan fen etkinliklerine bakışlarının ve yeterliklerinin incelenmesidir.

Nitel araştırma yaklaşımı çerçevesinde tasarlanan bu çalışma "durum çalışması" deseni kullanılarak yapılmıştır. Çalışma grubunu, 2017-2018 eğitim-öğretim yılında Doğu Karadeniz Bölgesinde bulunan bir devlet üniversitesinin Çocuk Gelişimi Programı 2. sınıfında öğrenim gören 10 öğrenci oluşturmaktadır. Çalışma grubu amaçlı örnekleme yöntemlerinden "ölçüt örnekleme" yöntemiyle seçilmiştir. Bu araştırmada kullanılan ölçüt, öğrencilerin "Çocukta Bilim ve Teknoloji" dersini almış olmalarıdır. Verilerin toplanmasında yarı yapılandırılmış mülakat ve yarı yapılandırılmış gözlem tekniği kullanılmıştır. Araştırmacının YÖA'larla yüz yüze gerçekleştirdiği görüşmeler, ses kayıt cihazıyla, katılımcıların onayı alınarak kaydedilmiştir. Görüşmelerden sonra kaydedilen veriler, metne dönüştürülmüştür. Ayrıca araştırmacı katılımsız gözlem yöntemiyle gözlemleri yarı yapılandırılmış gözlem çizelgesine kaydettikten sonra onları da metne dönüştürmüştür.

Verilerin analizinde içerik analizi yöntemi kullanılmıştır. Görüşme ve gözlemlerden elde edilen ham veriler kodlanarak alt temalar oluşturulmuş, ardından temalara ulaşılmıştır.

Okul öncesi yardımcı öğretmen adayları (YÖA) derse başlamadan önce birtakım hazırlıklar yapmaktadırlar. Bu hazırlıklar sınıf ortamıyla ilgili hazırlıklar, materyalleri hazırlama ve öğrencilerin derse hazırlanması alt temaları altında toplanmıştır. Sınıf ortamını düzenlerken bütün YÖA'nın fen ve doğa merkezini kullanmak üzere hazırladıkları görülmektedir. Ancak etkinliğin sunulması sırasında öğrencilerin oturma düzenini sağlama konusunda bazı YÖA'ların buna dikkat etmediklerine gözlemden elde edilen verilerle ulaşılmıştır. YÖA'ların yaptığı bir diğer hazırlık materyallerle ilgilidir. YÖA'ların hepsi derse başlamadan önce bazı kaynaklardan yararlandıklarını ifade ettiler. Ayrıca sınıfta bulunan fen ve doğa merkezindeki materyalleri etkinliklerinde kullandıklarını söylediler. YÖA'ların derse başlamadan önce yaptıkları son hazırlık öğrencileri derse hazırlamaktır. Bu tema altında ön bilgilerin kontrolü, konuya dikkat çekme ve öğrenciye uygun konu seçimi başlıkları yer almaktadır. Öğrenciye uygun konu seçimi bakımından incelediğimizde hem mülakatlara göre hem de gözlem sonuçlarına göre YÖA'lar çocuklara uygun konu seçmektedirler.

Elde edilen verilere göre dersin uygulanması aşamasında hem YÖA'ların hem de öğrencilerin bazı tercihlerinin olduğu tespit edilmiştir. Bunlar öğretmenlerin ders sırasında uyguladıkları yöntem, konu ve materyal tercihidir. Ayrıca öğrencilerin de fen etkinliklerini tercih nedenlerine yer verilmiştir. Yapılan mülakatlar sırasında YÖA'lar birçok farklı sebepten farklı yöntemler tercih ettiklerini ifade ettiler. Ancak yapılan gözlemler sonucunda bütün YÖA'lar deney yöntemini kullandı. Diğer bir alt temayı YÖA'ların konu tercihleri oluşturmaktadır. Mülakatlar sırasında en çok tercih edilen konunun "Doğa ve Olayları" olduğu tespit edilmiştir. Gözlemler sonucunda "Doğa ve Olayları" konusu kadar "Madde ve Özellikleri" konusunu da tercih ettikleri görülmüştür. İkinci unsuru oluşturan alt temalardan bir diğeri YÖA'ların materyal tercihleridir. Gözlemler sonucunda bütün YÖA'ların materyal olarak deney malzemelerini tercih ettikleri görülmüştür. İkinci unsuru oluşturan son alt tema öğrencinin tercihidir. Öğrencilerin fen etkinliklerini tercih etme sebeplerini YÖA'lar fen

etkinliklerinde materyal kullanımı, yaparak-yaşayarak öğrenme ve fen etkinliklerinin görsel olması şeklinde ifade etmişlerdir.

Bunun yanı sıra hem uygulayıcıyla ilgili hem de öğrenciyle ilgili konularda uygulamanın etkili olup olmadığıyla ilgili verilere ulaşılmıştır. Etkinliklerin yürütülmesi sırasında YÖA'ların kendilerini yetersiz bulduklarıyla ilgili ifadelere ulaşılmıştır. Ayrıca fen konularını bilme açısından da YÖA'lar bazı eksiklikleri olduğunu ifade etmişlerdir. Tüm YÖA'lar "Çocukta Bilim ve Teknoloji" dersinden faydalandıklarını söylemişlerdir. Ayrıca etkinlik sırasında bir problemle karşılaştıklarında problemi çözebildiklerini ifade etmişlerdir. Üçüncü unsurun uygulayıcıyla ilgili alt temasının son kodu sınıf yönetim becerisidir. Yapılan gözlemler sonucunda bazı YÖA'ların sınıf hakimiyetini sağlama, sınıfı aktif kılma açısından yetersiz olduğu, bazılarının da zamanı etkili kullanamadığı görülmüştür. Öğrenciyle ilgili konular alt temasını oluşturan kodlar, "günlük yaşamla fenin ilişkilendirilmesini sağlama" ve "dersin özetlenmesi"dir. Bazı YÖA'lar yaptıkları etkinliği günlük yaşamdan örneklerle ilişkilendirmiştir. Bazıları da dersi özetlemiştir.

YÖA' ların birtakım tamamlayıcı unsurlara ihtiyaç duyduklarına dair verilere ulaşılmıştır. Bunlar uygulayıcı için destekler ve ortam için destekler alt temaları adı altında toplanmıştır. YÖA'lar okul öncesinde fen etkinliklerini daha verimli şekilde uygulayabilmek için alan bilgisi, materyal ve uygulama alanında desteğe ihtiyaçları olduklarını belirtmişlerdir. Ayrıca YÖA'lar fen etkinliklerinin uygulanmasında ortamla da ilgili bazı desteklere ihtiyaçları olduklarını belirtmişlerdir. Bunlar materyal, teknolojik malzemeye, daha fazla bahçe etkinlikleri, teknolojik malzemeye yer verilmesi, çocuklara daha fazla fırsat tanınması, daha fazla aile katılımı olması gibi isteklerde bulunmuşlardır.

Sonuç olarak YÖA'ların okul öncesi eğitimde uygulanan fen etkinliklerine bakışlarını ortaya koyan dört unsur (planlama, uygulama, değerlendirme, öneriler) belirlenmiştir. Buna göre bütün YÖA'ların birtakım hazırlıklar yaptıkları ortaya çıkmıştır. Bunlar sınıf ortamıyla ilgili hazırlıklar, materyalleri hazırlama ve öğrencilerin derse hazırlanması alt temaları altında toplanmıştır. Bütün bu alt temalar da 1. unsur olarak nitelendirilen planlama temasına ulaşılmasını sağlamıştır. Bütün YÖA'ların yöntem tercihi, konu tercihi ve materyal tercihi yaparak uygulamaya geçtikleri görülmüştür. Ayrıca öğrencilerin de okul öncesi fen etkinliklerini tercih etme sebepleri de belirlenmiştir. Bütün bu alt temalar da 2. unsur olarak nitelendirilen uygulama temasına ulaşılmasını sağlamıştır. Değerlendirme teması ana başlığı altında hem uygulayıcıyla ilgili hem de öğrenciyle ilgili konularda uygulamanın etkili olup olmadığıyla ilgili değerlendirmelerde bulunulmuştur. YÖA' ların birtakım tamamlayıcı unsurlara ihtiyaç duyduklarına dair verilere ulaşılmıştır. Bunlar uygulayıcı için destekler ve ortam için destekler alt temaları adı altında toplanmıştır. Araştırmanın sonuçlarına ilişkin öneriler şu şekildedir:

- *Meslek Yüksekokullarının Çocuk Gelişimi Bölümünde okuyan öğrencilerin çoğunluğunun meslek lisesi çıkışlı olmaları ve Çocuk Gelişimi Bölümlerinin müfredatında materyal derslerinin fazla olmasından dolayı YÖA'lar materyal hazırlama konusunda oldukça pratik ve yaratıcıdırlar. Bu özelliklerinin işe koşulması adına materyal derslerinde fen etkinlikleriyle ilgili ayrı bir bölüm oluşturulabilir.*

- *Fen öğretimi derslerinin hem içerik açısından hem de okutulduğu dönem açısından yeniden gözden geçirilerek birinci sınıfın iki dönemine yayılması önerilebilir.*

- *Okul öncesi fen ve doğa etkinliklerinin uygulamalarında kullanılacak öğretim yöntem ve tekniklerinin, fen konularının, soyut kavramların öğretilmesinin, disiplinler arası geçiş yaparak gün boyunca farklı etkinliklerle fen kavramını öğretme uygulamalarının öğretmen tarafından etkili bir şekilde gösterilmesi önerilebilir.*

- *Okul öncesi eğitim programı, fen eğitimiyle ilgili kazanımlar açısından ayrıntılı incelenebilir.*