EXPLORING THE CHANGE IN PRESCHOOL TEACHERS' VIEWS ABOUT AND PRACTICES OF INTEGRATION OF VISUAL ART INTO SCIENCE ACTIVITIES: A CASE STUDY

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ABSTRACT

EXPLORING THE CHANGE IN PRESCHOOL TEACHERS' VIEWS ABOUT AND PRACTICES OF INTEGRATION OF VISUAL ART INTO SCIENCE ACTIVITIES: A CASE STUDY

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The aim of this study is to investigate the changes in early childhood teachers' views about and practices of integration of visual art into science activities that occured after they attended the workshop. In order to explore the changes in five early childhood teachers' views about science teaching, semi-structured interviews, classroom observations, and activity plans were used in this study. The study was conducted in a private preschool located in the Çayyolu district of Ankara.

The first phase of the analysis consisted of portraying all the data related to participant teachers' views about science teaching and the integration of science and visual art on the basis of pre-interviews, observation, and post-interviews. The second phase of the analysis involved finding out whether there was any difference between pre- and post-interviews of participant teachers in terms of their views about science teaching and the integration of early childhood science and art. Meanwhile,

observational fieldnotes and teachers' activity plans were examined based on the themes emerged from the pre- and post-interviews.

The findings of this study indicated that early childhood teachers believed in the importance of science activities in their practices. They provided child-centered activities for children to improve their science experiences. In addition, they used different learning experiences that were naturalistic, informal, and structured in early childhood classrooms. In terms of the place of visual art in early childhood curriculum, all participant teachers stated the importance of visual art in early childhood settings. They also mentioned that visual art could be considered as an effective tool for teaching science because children like attending art activities. They preferred to use art activities after they implemented their science activities. Teachers also mentioned that children could easily express themselves with the help of art activities so they stated that they generally used art activities in their classroom practices.

Keywords: Early childhood science, teachers' views and practices, visual art, integration of visual art with science activities.

ÖZ

OKUL ÖNCESİ ÖĞRETMENLERİNİN FEN VE SANAT ETKİNLİKLERİNİN BÜTÜNLEŞTİRİLMESİ KONUSUNDAKİ BAKIŞ AÇILARI VE DENEYİMLERİNDEKİ DEĞİŞİKLİKLERİN İNCELENMESİ: DURUM ÇALIŞMASI

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Bu çalışmanın amacı, okul öncesi öğretmenlerinin katılmış oldukları "fen ve sanat etkinliklerinin bütünleştirilmesi" konulu seminer sonrasında fen öğretimine karşı sahip oldukları bakış açılarının ve uygulamalarının incelenmesidir. Katılımcı 5 okul öğretmeninin fen öğretimi hakkındaki görüşleri ve uygulamaları, birebir görüşmeler yapılarak, öğretmenlerin sınıf-içi uygulamaları gözlemlenerek, ve etkinlik planları incelenerek araştırılmıştır. Bu çalışma Ankara iline bağlı Çayyolu semtinde bulunan özel bir anaokulunda yapılmıştır.

Bu çalışmanın birinci aşamasında, katılımcı okul öncesi öğretmenlerinin fen öğretimi ve bütünleştirilmiş fen ve sanat etkinlikleri konusundaki görüşleri, ön-görüşmeler, gözlemler, ve son-görüşmeler sonucunda elde edilen bulgular yoluyla

incelenmiştir. İkinci aşama olarak, katılmcı öğretmenlerin ön-görüşmelerde belirtmiş oldukları bakış açıları ile son-görüşmelerde belirtmiş oldukları arasında fark olup olmadığı ortaya çıkarılmıştır. Bu sırada, gözlem notları ve öğretmenlerin etkinlik planları, ön-görüşmeler ve son-görüşmeler sonucunda ortaya çıkan temalar kullanılarak incelenmiştir.

Bu çalışmanın bulguları, katılımcı okul öncesi öğretmenlerinin uygulamalarında fen etkinliklerine çok önem verdiklerini göstermektedir. Uygulamış oldukları fen etkinliklerinde, çocukların fen deneyimlerini desteklemek için çocuk merkezli bir yaklaşım takip ettikleri tespit edilmiştir. Bunlara ek olarak, katılımcı öğretmenler sınıf içi uygulamalarında doğal öğrenme, informal öğrenme, ve yapılandırılmış öğrenme gibi değişik öğrenme deneyimlerini kullanmaktadırlar. Sanatın okul öncesindeki yeri düşünüldüğünde, okul öncesi öğretmenleri sanatın okul öncesi eğitiminde önemli bir yeri olduğunu savunmaktadırlar. Ayrıca, sanatın fen öğretiminde etkili bir araç olarak kullanılabileceğini ifade etmişlerdir. Okul öncesi öğretmenlerinin fen ve sanat etkinliklerinin bütünleştirilmesi konusundaki bakış açıları incelendiğinde, öğretmenlerin fen etkinliklerinin hemen ardından sanat etkinliklerini uygulamayı tercih ettikleri saptanmıştır. Ayrıca, öğretmenler çocukların sanat yolu ile kendilerini rahatça ifade ettiklerini düşünmektedirler. Bu yüzden, sınıf içi uygulamalarında daha çok sanat etkinliklerine yer verdiklerini belirtmişlerdir.

Anahtar Kelimeler: Okul öncesinde fen, öğretmenlerin bakış açıları ve uygulamları, sanat etkinlikleri, bütünleştirilmiş fen ve sanat etkinlikleri.

TO MY FAMILY;

My father, Osman ÖZTÜRK
My mother, Hamide ÖZTÜRK
My brother, Emre ÖZTÜRK

&

My fiancée, İsmail Salih YILMAZTEKİN

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METU: Middle East Technical University

NAEYC: National Association for the Education of Young Children

DAP: Developmentally Appropriate Practice

MONE: Ministry of National Education

DBAE: Discipline-Based Art Education

CHAPTER 1

INTRODUCTION

Teaching is a complex process which includes a person's individual philosophy and beliefs and the ability to reflect those beliefs into their practices. There are various external and internal indicators which affect a teacher's ability to teach. While external factors include standards for curriculum, guides for teaching, school atmosphere, and resources internal factors include personal beliefs and experiences about specific content areas and the teacher's own confidence and knowledge related to teaching (Englehart, 2008).

Teachers are powerful figures because they play an essential role about the teaching process which is important for children's learning. While planning and applying various activities in the classroom, they use their educational backgrounds and their classroom practices. Thus, it can be stated that teachers may directly influence children's different developmental areas. As a result of this, teachers' practices at school may influence the educational process. Several studies have emphasized the teachers' thought processes which influence their teaching styles. According to Charlesworth et al. (1993), teachers' classroom practices are helpful for understanding their beliefs what they think to be important and what they think not to be important which influence their teaching of educational concepts and values. Therefore, the decisions and classroom practices of teachers were affected by their beliefs in the educational process (Spodek, 1988). Similarly, Clark and Peterson (1986) claim that teachers' beliefs and theories reflected their plans and thoughts and teachers' classroom practices would be investigated through their views. In fact, Kagan and Smith (1988) state that teachers' reflections and their behaviors in the classroom are related to each other.

Pre-service teacher education might be the indicator of the relationship between beliefs and practices. When pre-service teachers begin teacher education programs, they already have beliefs about different subjects (Wilson, Konopak & Readence, 1994). On the other hand, some studies stress that pre-service education may not show considerable influence on teachers' beliefs (McDiarmid, 1990; Zeichner & Grant, 1981). Rather the in-service training might influence teachers' views and their classroom practices. For example, Bowman, Donovam, and Burns (2000) mentioned that teachers' professional development was closely related to the quality of early childhood programs. Thus, teachers' perceptions about their practices and their in-service training experiences are good indicators of understanding teachers' views about curriculum issues such as integrated curriculum and science and art integration.

Primary and preschool teachers generally try to teach all subjects in the curriculum, so they do not have a strong focus in one specific subject area such as science (Englehart, 2008). This might be due to teachers' beliefs, practices, or their perceptions about science. Many teachers might have difficulty in understanding about inquiry and science in their classrooms (Abd-El-Khalick, Lederman, Bell & Schwartz, 2001) because they might not have enough background or experience on the basis of inquiry to teach science (Davis, Petish, & Smithey, 2006). Furthermore, Weiss, Banilower, McMahon, and Smith (2001) showed that there was a relationship between teachers' perceptions related to their qualifications about teaching science and the time they spend on teaching science.

There are studies related to the relationship between teachers' beliefs or views and their practices in the literature. However, these studies generally addressed primary or elementary teachers' beliefs. One study was conducted by Brickhouse (1990) in order to show the effects of science teachers' beliefs related to the nature of science on their classroom practices showed that the explicit lessons and the curriculum about the nature of scientific knowledge affected teachers' beliefs about science. Another study conducted by Tsai (2002) explored the relationships among teachers' beliefs about teaching science, learning science, and the nature of science. Considering their beliefs about teaching, learning, and science, three categories emerged as "traditional", "process", and "constructivist". The results of the study

showed that most science teachers had "traditional beliefs" including traditional science teaching practices.

There is limited research on the relationship between early childhood teachers' beliefs about science and their effects on teaching practices. Specifically, many of the early childhood teachers often stated that they felt less prepared to teach science when compared to other subjects (Wenner, 1993). Therefore, they had certain misconceptions such as considering science education as difficult to teach. These misconceptions were constructed because teachers did not feel confident and willing to teach science (Seefeldt & Galper, 2002 cited in Yoon & Onchwari, 2006). Early childhood teachers generally had limited confidence towards science and science teaching (Coulson, 1992). Many of them were not willing to teach science, because they have negative science education experiences (Conezio & French, 2002). On the basis of these studies, Tsitouridou (1999) stressed that in order to improve the early childhood teachers' professional development, there was a need to combine the learning of science and pedagogy for conducting effective programs. Similarly, many early childhood teachers mentioned issues related to teaching science in early years. They claimed that there was a need for integrating science with other activities in the kindergarten level (Watters, Diezmann, Grieshaber, & Davis, 2001). Curriculum areas in early childhood education are literacy, math, science, social studies, the arts, and technology are closely related to each other. Integrating these areas helps children to construct a better understanding about experiences which support their development.

1.1 Integration of Science

Bredekamp and Copple (1997) emphasized that science is an important element of early childhood curriculum, because it is closely related to children's natural interests. It provides various opportunities for children to support thinking skills. According to Bredekamp and Copple (1997), "Science projects are experimental and exploratory and science projects encourage every child's active engagement in the scientific process" (p. 174). According to Eshach and Fried (2005), there are six reasons why science plays an important role on young children's life:

(1) Children like observing and thinking related to natural world.
(2) Children can develop positive attitudes towards science while experiencing.
(3) If children are exposed to science issues in their early ages, this helps them to understand scientific concepts prior to formal schooling.
(4) If children are scientifically literate in their early ages, this affects the improvement of scientific concepts.
(5) Children can learn scientific concepts and understand scientific reason as scientifically.
(6) Science is an influential way to improve scientific thinking (p.319).

Regarding all reasons mentioned above, scientific activity should be conducted in a framework of the scientific system. Moreover, it should be implemented in an appropriate way according to children' developmental levels and their interests. The integrated approach in early childhood education involves components of drama, movement, and art within science which is appropriate for teaching scientific subjects. It supports the combination of scientific subjects with other subjects taught in kindergarten rather than the division of these subjects (Cannon & Scharmann, 1996). Since, children do not always express themselves like adults, children need to show their feelings, rather than talking about them. Therefore, integrated approach helps children to show their understanding in a more meaningful way. In science teaching, children participate in different activities to conduct observation, classification, and measurement, use of time and space relations, communicate, see conclusions, and use of numbers (Cannon & Scharmann, 1996). Regarding these learning experiences, visual art is considered to be a core element of early childhood curriculum because it can be adjusted to teach anything to children. Visual art makes contributions to children's life while enhancing their different developmental areas (Jackman, 2005). With the help of visual art, children can learn some concepts such as color, density, or patterns (Piersol, 1996). The nature of the visual art includes artistic components describing children's works. For example, visual art helps children to learn natural forms such as line, color, shape, space, balance, and texture. It provides opportunities for children in order to understand themselves and others in a more concrete way

(Schirrmacher, 2002). Therefore, practicing visual art activities helps children to improve some skills that are required for other academic areas in the curriculum.

Children can learn certain principles and concepts of science by using visual art activities. For example, they can see colorful liquid forms when they add the color tablet into water. Moreover, they can experience scientific process skills such as developing hypothesis, predictions, observations, questions, discussions, and explanations (Schirrmacher, 2002). In addition to these, animals are interesting topic which encourages children to participate in science experiences. Furthermore, environmental education may be integrated with visual art by studying the basic needs such as water, food, and clean air. Thus, children should know more about their immediate environment such as home, school, and play areas because they need to spend their time in these places (Mayesky, 2002).

Teachers are important figures to plan and apply all of these activities. While implementing these, they generally use their pre-service experiences, in-service experiences, and their classroom practices. For this reason, the aim of this study is to investigate the changes in early childhood teachers' views about and practices of integration of visual art into science activities that occured after they attended the workshop including the integration of art activities into the curriculum.

1.2 Significance of the Study

The main aim of this study is to investigate the impact of the workshop on early childhood teachers' views about science teaching and integrated curriculum and their practices related to art integrated science activities. This study focuses on two aspects: early childhood science and integrated curriculum such as the integration of science and visual art. In-depth investigation of early childhood teachers' views and practices might provide information about how much early childhood teachers know about the integrated curriculum in their teaching practices.

The literature supports the idea that early childhood education and early childhood teachers play a considerable effect on children's whole life (Wylie & Thomson, 2003). In fact, early childhood teachers' views and practices are important indicators of children's learning. In early childhood education, there are different types

of activities applied by teachers in the classroom such as math, science, literacy, visual art, and music. The aim of these activities is not only providing good time for children, but also supporting their developmental areas. Teachers and parents can prioritise certain activities because of their contribution to cognitive development. Science activity is one of the essential content areas in early childhood education. Although children are affected by outer factors in their science learning process, the role of the teachers can be considered as the most important factors (Wylie & Thomson, 2003). Thus, investigating early chilhood teachers' views on science and their actual classroom practices related to science teaching is necessary for better understanding about the importance of science.

According to literature related to early childhood teachers' views about science, studies generally have focused on teachers' attitudes toward science on the basis of some variables such as thinking styles, educational backgrounds, or experience years. With regard to the Turkish context, there are few studies about science in early childhood classrooms in terms of different aspects. The Turkish literature generally focused on the role of science in early childhood and early childhood teachers' attitudes toward science. For example, Ünal and Akman (2006) investigated early childhood teachers' attitudes toward science using an attitudes scale. Adak (2006) studied the relation between early childhood teachers' attitudes toward science and their thinking styles. In addition, Sönmez (2007) explored early childhood teachers' attitudes toward science in terms of affecting factors such as age, educational level, years of experiences, or undergraduate courses. Bilaloğlu, Aslan, & Arnas (2008) investigated early childhood teachers' knowledge levels related to science activities in terms of planning, implementing, and assessing. While one of the studies concentrated on teachers' competence related to science activities (Özbey & Alisinanoğlu, 2009), some others investigated science teaching methods used in early childhood settings (Ayvacı, Devecioglu, & Yigit, 2002; Karamustafaoğlu & Kandaz, 2006). Moreover, Arnas (2002) identified the purposes of early childhood science education and the role of the early childhood teachers in this education. Özbek (2009) studied the opinions of early childhood teachers about teaching science and their classroom practices about science activities. Thus, this study might provide information for other studies

conducted to show the relationship between early childhood teachers' views and practices about science teaching experiences.

Different types of studies including the issues related to visual art and integrated curriculum could be found in the literature. However, there were not many studies examining teachers' views and practices about integration of science and visual art in early childhood level. Hull (2003) investigated teachers' beliefs about integrated art curriculum in Oklahoma K-12 schools. Lai (2000) examined kindergarten teachers' and administrators' beliefs and attitudes related to developmentally art education. Furthermore, Öztürk (2008) investigated on early childhood teachers' self-reported beliefs about integrated art activities based on the year of experience, educational backgrounds, and whether they took a course which was related to visual art or not. Recently, Golan (2009) focused on emergent science curriculum and children's representations through language, art, and symbolic play while engaging science activities. However, studies addressing both teachers' views and their classroom practices related to integration of science and art activities are missing in the literature. In order to understand teachers' views about science and integration of science with art, it is very essential to look at their actual science classroom practices. This study might provide detailed information about the effects of teachers' background on their views about science and science teaching. In addition, the findings of this study is hoped to provide information for early childhood teachers and researchers and to make them better understanding the role of the visual art in early childhood science practices.

Investigating early childhood teachers' views and practices about integrated activities might be useful for understanding their points of view related to the place of it in the National Early Childhood Program (2006). Moreover, this study might provide information to improve and revise the existing early childhood curriculum.

1.3 Research Questions

In-service early childhood teachers' views about and practices about integration of visual art with science will be investigated through the following primary and secondary research questions:

1. What are the views of early childhood teachers about science teaching in early childhood education before the workshop?
    a. What are the views of early childhood teachers about the importance of science in early childhood education?
    b. What are the views of early childhood teachers about how children learn science?
    c. What are the views of early childhood teachers about effective science teaching?
2. How did the workshop affect early childhood teachers' views about teaching science?
    a. How did the workshop affect early childhood teachers' views about the preparation process of teachers in early childhood education?
    b. How did the workshop affect early childhood teachers' views about effective science teaching?
    c. How did the workshop affect early childhood teachers' views about how children learn science?
3. How did the workshop influence early childhood teachers' views related to integrated curriculum?
    a. What are the views of early childhood teachers about types of art activities before the workshop?
    b. What are the views of early childhood teachers about types of art activities used in integrated science activities after the workshop?
4. What are the practices of early childhood teachers about science process skills after the workshop?
5. What are the practices of early childhood teachers about the integration of visual art with science after the workshop?

1.4 My Motivation for the Study

I received my master's degree from the Middle East Technical University (METU) in 2008. In my dissertation, I investigated 255 preschool teachers' beliefs about integration of visual art with other activities in early childhood settings. The results of my study showed that early childhood teachers believed the importance of visual art on children's development and teachers' classroom practices on the basis of integrative ways. After my thesis, a question that came to my mind: "How does early childhood teachers implement integrated curriculum in their teaching practices?" As a result, I decided to plan a workshop including integrated curriculum. Meanwhile, I took different courses related to science in my doctoral education. I gained extensive knowledge about early childhood science including how to teach science to young children and how to get children involved in this process. For this reason, I wanted to work on the integration of visual art and science on the basis of the integrated curriculum. Another major motivation for me was related to the existing National Early Childhood Program (2006). Although this program did not mention any term about the integrated curriculum, the nature of the program was similar to the features of integrated curriculum. Thus, I thought that it might be good to show the relation of integrated curriculum with the existing early childhood program. By depicting the relationship between integrated curriculum and National Early Childhood Program, I hope to help curriculum developers to think the role of the integrated curriculum into Early Childhood Program.

1. 5 Definition of the Important Terms

The following terms need to be defined for the purpose of this study:

Early Childhood Teacher (Preschool teacher): Early childhood teacher is an educator working in kindergartens responsible for applying specific activity plans on the basis of annual plans (Ministry of National Education, Regulations on Early Childhood, 2004).

Integrated Curriculum: Two or more disciplines are combined together (Walker, 1995).

Science: Science in an activity comprised of some basic skills for young children to help their understanding the world around them (Chaille & Britain, 2003).

Visual Art or Art: It included two-dimensional activities such as painting, collage, and three-dimensional activities such as clay and play dough (Jalongo & Stamp, 1997; Mayesky, 2002; & Schirrmacher, 2002).

CHAPTER 2

LITERATURE REVIEW

The purpose of this chapter is to review the theoretical and empirical literature concerning the integrated curriculum and science in early childhood education. The first part of this chapter reveals that the integrated curriculum has an important role in early childhood curriculum. Specifically, Drake's Continuum of Integration and its level of integration are presented. In addition, this part contains an introduction to the theoretical framework of the integrated curriculum which includes the Project Approach, Reggio Emilia Approach, and Multiple Intelligence Theory. In the second part, science in early childhood education is described in terms of the basic scientific skills, fundamental areas of science, science teaching methods, and the role of the teachers in the science teaching process. In the last part, the place of visual art in early childhood curriculum and a literature review related to the integration of science and art in early childhood education are presented.

2.1 Integrated Curriculum

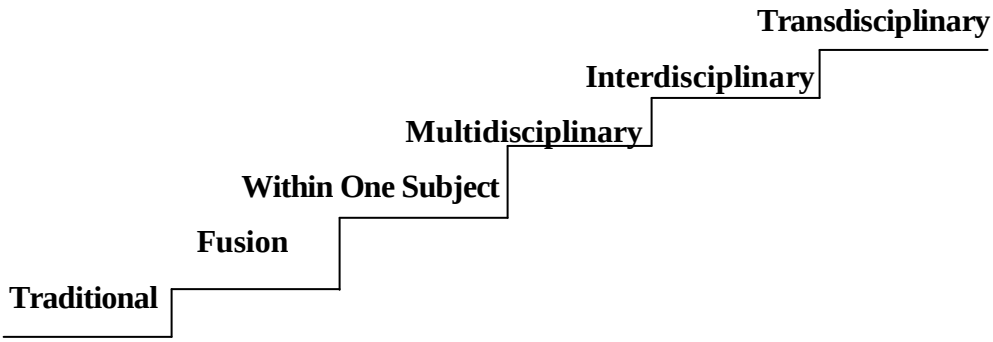
The National Association for the Education of Young Children (NAEYC) presented a position paper related to Developmentally Appropriate Practice (DAP) in early childhood education in the U.S.A. (Bredekamp, 1987). Today, this position paper is essential reading for those involved in early childhood education. The paper includes guidelines for educators to modify their classroom practices, to investigate and to observe the influence of developmentally appropriate and inappropriate practices on young children from birth to 8 years old.

In Turkey, a similar guideline published by the Ministry of National Education (MONE) for teachers working with children between 36-72 months of age. The first version of this guideline was created in 1996, revised in 2002and the current version was published in 2006. According to MONE (2006), the aim is to help children to improve their different developmental areas such as psychomotor, social-emotional, language, cognitive, and self-care skills and support their readiness for the transition to elementary education. Similarly, DAP is presented as a holistic approach which includes different developmental domains (cognitive, social, emotional, physical) of children. In addition, it emphasizes specific issues such as gender, culture, and disabilities in order to meet the needs of the individual and group. According to DAP, there are three important elements; age, individual, and culture. In addition to these dimensions of development, DAP emphasizes the need for an "effective curriculum" which requires the integration of different subjects to assist children in making appropriate links and increase their conceptual development (Haupt & Ostlund, 1997). On the basis of this statement, an integrated curriculum is considered to be an important aspect of developmentally appropriate curriculums.

The idea of curriculum integration developed from the concept of progressivism proposed by John Dewey and Francis Parker in the 1800s (Hinde, 2005). However, it is only recently that educators have started to develop aspects of the integrated curriculum. For example, Beane (1997) stated that the four main dimensions of integrated curriculum were "integration of experiences and knowledge", "social integration, integration of knowledge and "curriculum design integration" (p. 5). The first dimension aimed to help children to incorporate a new experience into a preexisting one. Thus, children use their prior experience when faced with a new problem. Social integration includes "common values" in order to share educational experiences from different backgrounds. In terms of the third dimension integration of knowledge, is considered to be an integrated part of the curriculum in the context of real life problems. The last dimension was directly related to projects and other activities that include the implementation of knowledge (Beane, 1997).

The literature presents different curriculum models which were developed to represent different levels of integration such as Fogarty's ten levels of curriculum

integration, Jacobs' continuum of curriculum and Drake's continuum of integration. Regarding the Fogarty model (1991), he stated that there were ten levels of curriculum integration: nested, shared, threaded, sequenced, immersed, and webbed. The last two levels were generally used in early childhood practices. The immersed model was similar to the "Project Approach" which directed children to participate projects over extended periods of time in early childhood settings (Katz & Chard, 1989). The main aspect of Jacobs' continuum of curriculum (1989), included theme-based content in order to improve the curriculum. She explained that this model was an "umbrella" helping children to make connections between different subject areas. Drake's continuum of integration (1993) comprised six levels of integration from traditional to transdisciplinary as shown in Figure 2.1.



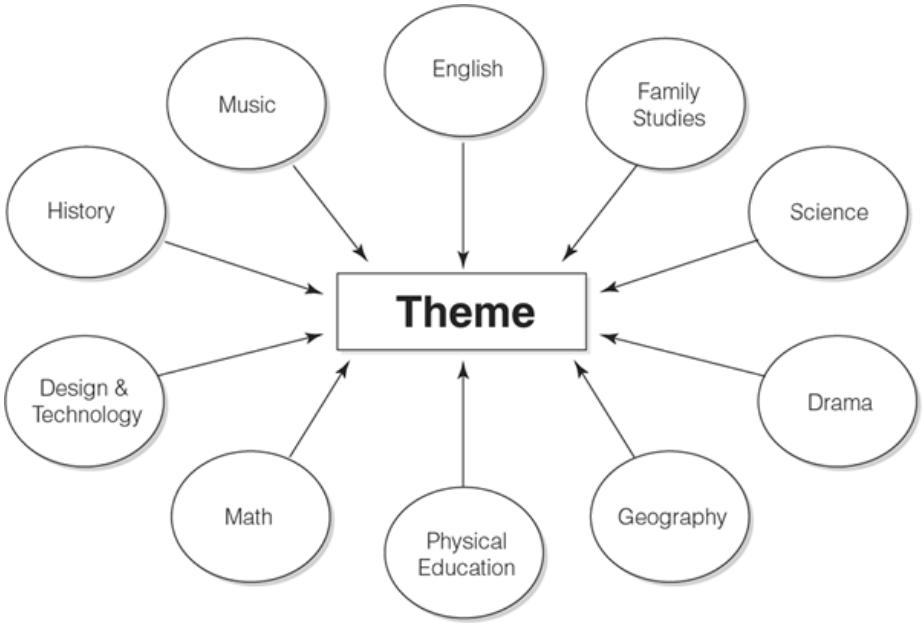
(Source: Drake, 1998. p. 20)

Figure 2.1 Drake's Continuum of Integration

According to Drake and Burns (2004), the last three levels of Drake's continuum of integration (multidisciplinary, interdisciplinary, and transdisciplinary) may use to define curriculum integration and used as a starting point to understand other integration approaches.

2.1.1 Multidisciplinary approach

Mainly related to the subjects in the curriculum the multidisciplinary approach allows teachers to take a theme as the basis of a theme and incorporate different subject areas (Figure 2. 1).



(Source: Drake, 1998. p. 9)

Figure 2.2 Multidisciplinary Approach

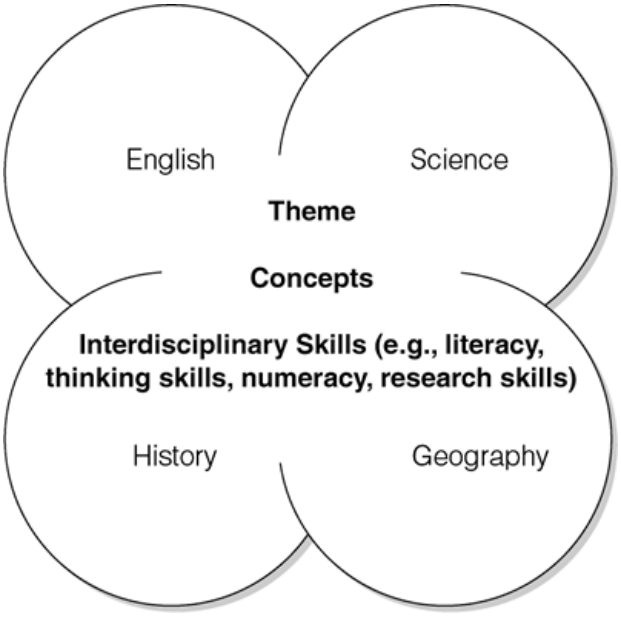
Within the multidisciplinary approach, there are different ways of planning the curriculum including interdisciplinary approach, fusion, service learning, learning centers, and theme-based units (Drake & Burns, 2004, p. 8-10) which are detailed below:

- Interdisciplinary Approach: Curriculum integration combines sub-disciplines into a main subject for example integrating reading, writing, and oral communication in language as one subject area.
- Fusion: This integrates skills, knowledge, and attitudes into the curriculum. For instance, some schools applied this method to teaching children to respect their environment in the content of all subjects.
- Service learning: This involved the participation of school students in community projects.

- Learning centers: This can be considered as a popular way to use integrated curriculum as providing different subject areas on the basis of a theme or topic. Theme-based units: Teachers generally used a thematic approach combining three or more subjects in an extensive piece of work completing the process with an integrated activity.

2.1.2 Interdisciplinary integration

For this approach, common learning from different disciplines is organized as a curriculum. The aim is to combine common learning from different disciplines in order to improve interdisciplinary skills and concepts. When compared to the multidisciplinary approach, the disciplines are considered as a less important (Drake & Burn, 2004). (Figure 2.2).

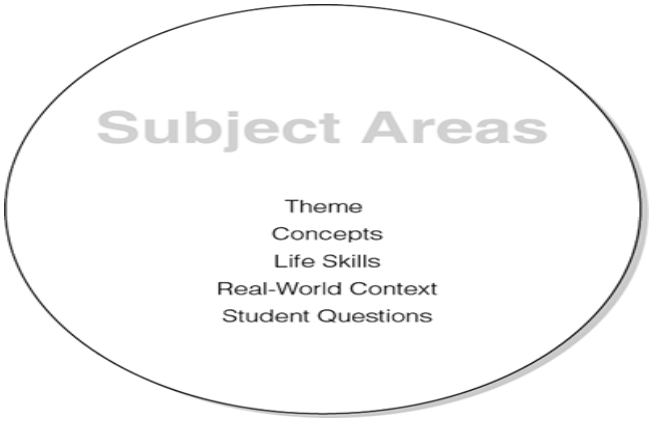


(Source: Drake, 1998. p. 12)

Figure 2.3 The interdisciplinary approach

2.1.3 Transdisciplinary integration

In the transdisciplinary approach, the curriculum is organized on the basis of students' questions and concerns. According to Drake and Burn (2004) this means that "students develop life skills as they apply interdisciplinary and disciplinary skills in a real-life context" (p. 13). This approach includes "project-based learning" and "negotiating the curriculum" (Drake & Burn, 2004, p. 13).



(Source: Drake, 1998. p. 14)

Figure 2.4 Transdisciplinary Approach

- Project-based learning: Children engage with a local problem within the community, this approach is also referred to as "problem-based learning" or "place-based learning". In its stages it is similar to the "Project Approach" developed by Chard (1998). In the first stage teachers and students choose a topic on the basis of children's interests, curriculum, and the school's resources. In the second stage, teachers elicit the children's existing knowledge about the topic and encourage them to ask questions about the topic. Then, the children undertake field work to explore the problem. Finally, the children share their ideas within an activity and the results of their project are displayed and the students review and evaluate their work (Drake & Burn, 2004).
- Negotiating the curriculum: In this type of transdisciplinary approach, the core of the curriculum consisted of students' questions. For example, Springer

developed a program called Soundings which he based on Beane's ideas (1997). 8th grade students create their own curriculum, teaching and assessment methods, related to topics such as Violence in Our Culture, Medical Issues Affecting Our Lives, and Surviving Alien Environments.

Together these three models Jacobs (1998), Fogarty (1998), and Drake (1998) can help researchers understand curriculum integration in a more detailed way. However, it is also necessary to review the theoretical framework on which the concept of an integrated curriculum was constructed

2.2 Theoretical Framework

2.2.1 Project approach

The project approach was introduced by Lilian Katz and Sylvia Chard (1989) in order to provide meaningful learning experiences. In fact, it was not a new idea for teaching young children (DuCharme, 1993). It was a fundamental part of the Progressive Education movement and was implemented in British infant schools in the 1960s and 1970s (Smith, 1997). Subsequently, attention to project work increased and the first edition of the book "*Engaging Children's Minds: The Project Approach*" was published (Katz & Chard, 1989).

The term "project" has different meanings; however, in the project approach it was defined as follows:

> We use the term project to refer to an in-depth study of a particular topic, usually undertaken by a whole class working on subtopics in small groups, sometimes by a small group of children within a class, and occasionally by an individual child (Katz & Chard, 1989, p. 2).

Katz and Chard (1989) described the structure of the project approach in order to inform teachers and decrease their concerns about the process. The project approach consisted of three steps which were beginning, developing and concluding the project. Throughout these three phases, teachers are able to assess the appropriateness of the topic, collect required resources, plan field trips, and select experts to be invited into the classroom to conduct demonstrations and be interviewed by the students (Helm & Katz, 2001). In this way, the children have the opportunity to work on a topic in a more meaningful way. While experiencing project work, children are able to use different

activities in an integrative way (Curtis, 2002). In addition, project work assists in increasing children's curiosity which in turn helps them learn different academic skills such as writing and reading. The teachers' role is to provide opportunities on the basis of various types of activities (Helm & Katz, 2001).

To organize activities many early childhood teachers use themes. This can be an extended topic or concept such as "seasons" or "animals". Teachers also organize the different content areas such as language, math, and science while connecting them to the theme (Helm & Katz, 2001). Koster (2001) commented that the features of project work help the development of children's understanding in a more integrated way providing opportunities to combine different subjects and play areas.

As mentioned above, one of the essential aspects of project work was the idea of integrated curriculum (Katz & Chard, 1989, p. 6). The project included different subjects on the basis of a common theme. For example, drama, music, using building blocks and art can be integrated on the basis of a common understanding.

2.2.2 Reggio Emilia

At the end of World War II Loris Malaguzzi (1920-1994) with the help of parents and educators founded a new approach to the education of preschool children in the Italian city of Reggio Emilia. The roots of this approach were based on a combination of Dewey's philosophy of progressive education, Piaget's cognitive development theory, and Vygotsky' social constructivism (Gandini, 1993).

The Reggio Emilia Approach has attracted interest from educators from many countries (http://www.reggioemiliaapproach.net/projectbasics.php). The essential aspect of this approach is based on the relationships between children, parents, the community, and culture (Wortham, 2006) with children being considered the important partners in planning and evaluating the curriculum. In addition, the children's interests and ideas shape the progress of the project (Rinaldi, 1996). The Reggio Emilia Approach consists of eight principles (Cadwell, 1997, p. 5-6):

- The child as protagonist
- The child as collaborator

- The child as communicator
- The environment as third teacher
- The teacher as partner, nurturer, and guide
- The teacher as researcher
- The documentation as communication
- The parent as partner

All these principles are essential for the implementation of the Reggio Emilia Approach in early childhood classrooms. According to this approach, children's cognitive development is supported using symbolic representations such as words, movement, drawing, sculpture, collage, and music which support children in improving their level of communication, symbolic skills, and creativity (Edwards, Gandini, & Forman, 1996). The role of the teachers in Reggio Emilia approach was to create a child-centered and emergent curriculum in an integrated way together with the monitoring of the children's interests. In many countries, the nature of the emergent curriculum has been accepted by early childhood educators (Gandini, 1993). Specifically, integrated curriculum was considered as one of the main concepts of Reggio Emilia Approach (Edwards et al., 1996; Hendrick, 1997; Stegelin, 2003). For example, the issue of In Reggio Emilia schools the concept of the emergent curriculum was based on project work that improved children's learning through language, mathematical concepts, hypotheses, exploration of new relationships, life cycles, and historical aspects (Stegelin, 2003).

2.2.3 Multiple Intelligences

Howard Gardener outlined his Theory of Multiple Intelligences in his book "*Frames of Mind"* in 1983. He intended that his theory would contribute to the field of psychology; however, later it has been considered to be a learning model in education, teaching and training. Gardner (1983) described seven types of intelligence: verbal, logical-mathematical, linguistic, musical, spatial, interpersonal, and intrapersonal recently, he added Naturalistic Intelligence and considered the addition of Existential intelligence as a ninth category (Gardner, 1999).

Table 2. 1 Multiple Intelligences

Intelligences	Characteristics
Linguistic	Using core operations of language
Mathematical	Understanding a casual system, inductive, and deductive reasoning, patterns, solving complex problems
Spatial	Perceiving the visual world accurately, recreating visual experiences
Bodily Kinesthetic	Controlling body movements, handling objects skillfully
Musical	Thinking in music, hearing recognizing, remembering, and manipulating patterns
Interpersonal	Getting along and working with others
Intrapersonal	Having accurate knowledge of one's own strengths and weaknesses
Naturalistic	Discriminating among living things, classifying

(Gardner, 1997, p. 34)

According to Armstrong (2009) there are four key points which help in the understanding of the descriptions of Gardner's eight intelligences and their theoretical background. The first is that "each person possesses all eight intelligences" (p. 15). However, the levels of the functioning of each of the eight intelligences are different and unique to each individual. The second issue is that "most people can develop each intelligence to an adequate level of competency" (p. 15). According to Gardner (1999), every person has the ability to develop all eight intelligences to a high level when the appropriate conditions such as encouragement, enrichment, and instruction are provided. With regard to the third issue "intelligences usually work together in complex ways" (p. 16), Gardner stated that each intelligence did not operate independently, they are always interrelated. For example, when a child plays football, she uses different intelligences such as bodily-kinesthetic as running, kicking, catching, spatial intelligence to stay within in the area of the football pitch, and linguistic and interpersonal intelligences to communicate with other players during the game (Armstrong, 2009). For the last issue since there are no prescribed standards about the eight attributes "there are many ways to be intelligent within each category" (p. 16). For example, although a person could not read, she might have a rich vocabulary in oral language. Thus, she would be able to communicate effectively.

Gardner (1983, 1997) suggested an approach to education that included a curriculum based on integrating different disciplines. Furthermore, he claimed that this curriculum should be based on real life issues

2.3 National Early Childhood Education Program

In Turkey, early childhood education is not compulsory and involves 3 to 6 years old children's education. It is served from different institutions such as kindergartens, application classrooms, and nursery schools. These institutions offer full-day or half-day educational programs. Recently, all institutions in early childhood level are under the responsibility of MONE. In addition, it is responsible for monitoring and managing national early childhood program. The latest version of National Early Childhood Program was developed in 2006 in order to increase the quality of education for young children in early childhood level. In addition, practice book for early childhood teachers was also published to guide teachers' classroom practices. Teachers follow this practice book for

preparing daily and activity plans. The National Early Childhood Program includes certain characteristics that help educators to understand the program in a more detailed way. Some of them are as follows (The National Early Childhood Program, 2006, p. 11-12-13):

- It is prepared for children between the ages of 36 months and 72 months of age
- It is child-centered
- It is essential to plan activities on the basis of aims and objectives
- Developmental characteristics are separately organized for each age group (between 36-48 months, 48-60 months, and 60-72 months)
- It is a flexible program
- It is required for making educational plans and programs

Early childhood teachers should follow this quideline in their classroom practices. However, the National Program let teachers make creative and original activities for young children. Similarly, the practice book helps them to see different types of developmentally appropriate activities. Thus, early childhood teachers can organize their classroom activities on the basis of the school program because each school organizes its annual plans at the beginning of the school year. After that, teachers plan and implement their classroom activities in terms of preplanned way.

2.4 Science in Early Childhood Education

Science education is essential for young children because it helps them understand the world around them and create answers to their questions by using their cognitive and physical skills (Jones, Lake, & Lin, 2008). Eshach and Fried (2005) listed six points explaining why children should engage with science:

1- Children naturally enjoy observing and thinking about nature.
2- Exposing students to science develops positive attitudes towards science.
3- Early exposure to scientific phenomena leads to better understanding of the scientific concepts studied later in a formal way.
4- The use of scientifically informed language at an early age influences the eventual development of scientific concepts.
5- Children can understand scientific concepts and reason scientifically.

6- Science is an efficient means for developing scientific thinking (p. 319).

Other researchers also pointed out that science is interesting for children because they liked engaging with their environment and tried to give meaning to them (French, Conezio, & Boynton, 2000; National Research Council, 2001).

Science processing skills help children acquire new information by using concrete practices in which a progressive approach is adopted the children This means that from their initial construct the children are then encouraged to develop their ideas and then reconstruct their initial idea . For children in preschool and primary school the basic skills of observing, comparing, classifying, measuring, and communicating are the most suitable (Lind, 2005). These skills are defined as follows:

- Observing: One of the most basic science process skills is observation. When children use this skill, they acquire information on the basis of the senses of sight, smell, sound, touch, and taste. These are helpful to gather information as the first step in problem solving. Thus, it is important to provide opportunities in order to assess objects in terms of size, shape, color, texture, and other observable properties (Charlesworth & Lind, 2003, p. 65).

- Comparing: When children improve their observational skills, they naturally start to make some comparisons and find similarities and differences. Comparing improves children's observation skills and it can be considered to be the first stage of classifying (Charlesworth & Lind, 2003, p. 66).

- Classifying: This skill begins by grouping and sorting real objects. Children can do this with the help of their observation skills to discover the characteristics of objects. First, children can group by one property, for example, they can sort a collection of leaves in terms of color or size or shape. Then, they can progress to sorting objects on the basis of two or more characteristics (Charlesworth & Lind, 2003, p. 66).

- Measuring: This is a way of quantifying observations and includes number, distance, times and volume. Standard and nonstandard units can be used to qualify different items (Charlesworth & Lind, 2003, p. 66).

- Communicating: There are different ways in which human beings communicate used by humans, for example; gestures, body postures, facial expressions, vocal sounds, words in writing and pictures. In their early education, children express their ideas related to science using oral and written forms such as pictures, maps, graphs. It is important for children to understand how to collect, organize, and represent the information to others in order to express their ideas (Charlesworth & Lind, 2003, p. 67).

As children progress through the educational system the intermediate process skills (inferring & predicting) are added to the basic skills. Using these processes, children can begin to understand and work on problems and improve their understanding of scientific inquiry. Thus, children can construct knowledge and concepts (Lind, 2005).

There is no great difference between the content of preschool and primary school science. However, it is necessary to consider children's developmental levels as the indicators of determining the level of difficulty and complexity of the science content and process skills (Lind, 2005). There are four fundamental areas of science which are commonly used at primary education levels:

- Life science; including the characteristics of the organisms and their environment, and the life cycles of organisms such as plants, animals, and ecology.
- Health science; involving being attentive about their bodies and showing a willingness to learn more about themselves.
- Physical science; including the different properties of objects and materials, light, heat and magnetism.
- Earth, space, and environmental science: involving the properties of the earth and sky (Charlesworth & Lind, 2003, p. 71-72).

The issue of how concepts are acquired plays an essential role in the implementation of these science concepts. According to Charlesworth and Lind (2003), there are three types of learning experiences: naturalistic, informal, and structured learning. With regard to naturalistic experiences, children select the activity and action and the role of the adults in this experience is to organize attractive environment for children. In terms of informal learning experiences, adults initiate these experiences on the basis of children's engagement with naturalistic experiences. These experiences are not preplanned instead the adults will scaffold the children's experiences if required. On the other hand, structured learning experiences are planned by adults as lessons or activities. These can include individual, small group or large group activities in predetermined time period (Charlesworth & Lind, 2003).

While implementing these learning experiences, in order to provide rich science experiences for their students early childhood teachers use variety of methods in order to teach science (Tahta & Ivrendi, 2007). Some of these methods are listed below:

- Concept maps: The use of these maps in science education is based on the work of Novak and his research group in the early 1970s (Novak, 1998). They defined concept maps as two-dimensional schemes representing the relationship between specific concepts related to a main topic. Concept maps can be used as a teaching tool to support children's skills in clarification, organization, relation, and group thoughts and understanding about a specific topic (Birbili, 2006).

- Project approach: Katz and Chard (1997) defined this approach as a detailed study about a topic by group of children. The projects can be conducted by group of children or the whole class with the topics selected by children on the basis of their interests. The duration of the projects can be from one day to several months. The theme in the projects is a tool to support children's developmental areas. Active learning is one of the important elements of the project approach (Helm & Katz, 2001; Katz & Chard, 1997).

- Experimentation: This is the repetition of natural situations in a prepared environment. In other words, it is used to show reality in science (Tahta & Ivrendi, 2007). Children can carry out different experiments investigating the effects of one variable on another (Martin, 2001). Experiments help children to understand different natural phenomenon in the world and assist children in making sense about natural environment. In this way the children can also try to solve different problems and make cause-effect relationships (Tahta & Ivrendi, 2007).

- Field-trips and investigation: This is an effective way to provide the opportunity for children to explore their local neighborhood visiting places such as the library, fire station, grocery store, post office and zoo (Campbell, 2007).

- Analogy: This is a process of understanding which includes the use of familiar concept in order to teach new one, thus it is the connection between known and unknown things (Çimen, 1999). In this process the familiar concept is the source and the unfamiliar concept is defined as a target (Gentner & Holyoak, 1997). For example, when children are faced with new problem situations, they use their prior knowledge about similar problems thus, are using analogy in the connection of prior and new knowledge (Stavy, 1991).

- Drama: According to Wortham, 2006) drama is one of the most important experiences in terms of the development of children's expressive language. San (1991) defines drama as an educational process for expressing a word, concept, behavior, or event using different drama techniques such as improvisation and role playing within a group. Through drama, scientific concepts can be taught easily because activities related to drama are enjoyable for young children (Gürdal, Şahin, & Çağlar, 2001).

- Cooperative learning: In early childhood classrooms this is one of the most common teaching methods. It can also be applied to different age groups, grade levels, or subjects. Children start to understand that all group members share a common aim. In this process, teacher encourages the children to share their understanding and ideas with each other (Tahta & Ivrendi, 2007).

- Computer-based instruction: Children experience with their environment on the basis of inquiry. (Wang, Kinzie, McGuire, & Plan, 2010). Computer technology is an essential tool for supporting children's inquiry learning it can improve their motivation, provide information, construct learning process and offer interactive representations (Blumenfeld et al., 1991).

In literature, there were limited studies about the application of science and science process skills in early childhood education (Kallery & Psillos, 2002). However, one of the studies related to the application of science in early childhood classrooms was conducted by French (2004). He described the "Science Start Curriculum" an integrated approach for early childhood classrooms. The aim of this curriculum was to enhance children's different developmental areas such as language, literacy, social, and cognitive. For this study, daily science lessons were implemented with the help of literature, art, and outdoor play. Moreover, additional activities such as math and social studies could be integrated with science. The results showed that "Science Start" helped children to construct knowledge about the world around them, to internalize the understanding of "how the world works" by posing questions and answering them, furthermore it supported their language and literacy development. Similarly, Peterson and French (2008) examined the development of the explanatory language of children used in scientific inquiry. This study focused on two classes of 3 to 4 four year olds in an early childhood center that implemented a science inquiry curriculum and data was collected from videotaped lessons then the ways the early childhood teachers promoted explanatory language of children was analyzed. The results indicated that teachers who apply inquiry science approach in their classrooms were able to supply the essential resources to improve the explanatory language

abilities of children. With adult assistance, the preschool children were able to engage in complicated and collaborative discussions about some scientific process skills: prediction, observation, and explanation. Kallery and Psillos (2002) stated that early childhood science was not only essential for the development of children's scientific concepts, but also crucial for success in other developmental aspects of children. They examined the early childhood teachers' classroom practices introducing science to children. The findings revealed that there was a discrepancy between the curriculum and its implementation in the classroom settings. In addition, the teaching process was not affected by the content of the science activity because early childhood teachers generally tried to follow a standard process in all science activities. As a result, their study showed that while teachers generally use several process skills in science activities, the children were only watching them, they were not actively involved in the activity.

From the literature it can be understood that science is an important activity in early childhood education however, the quality of science activities is closely related to the teachers' performance in the classroom. Some studies showed that teachers generally used science activities in combination with others subjects such as literature, math and art. In this way, children are able to easily internalize concepts about science. A report by the National Research Council (1996) stated that science was a process related to inquiry and in this process, that teachers played an important role in organizing learning experiences in order to support children's ability to undertake scientific inquiry (Jones et al., 2008).

2.5 Research on the Teachers' Role on Science Teaching

In the literature, there were several studies which pointed out specific issues related to the teaching of science in early childhood education, the role of the teachers and their pre-service education on this teaching process. One of the studies by Watters et al. (2001) showed that early childhood teachers had some concerns about their science teaching practices. One was that there should be more appropriate activities in order to incorporate science with other subject areas. Similarly, Fenshman (1991) stated that there were three issues which influenced early childhood science education.

The first was related to the importance of early childhood science in that there should be more awareness of the significance of science in early childhood education. The second issue was related to the fact that early childhood teachers should be better prepared and possess adequate background knowledge of science. The last issue concerned the need for early childhood practitioners to emphasize the importance of science and its function in the intellectual development of young children (Fenshman, 1991).

Teachers have an important role in responding to the three issue raised above. However, most of the studies showed that many early childhood teachers feel less prepared for teaching science when compared to other subjects (Wenner, 1993). Similarly, Oven (1999) indicated that some early childhood teachers did not feel comfortable with their knowledge related to physical sciences. As a result, they were reluctant to implement a variety of science activities in their classrooms. Similar results were found by Bulunuz & Jarrett (2008) their student indicated that teachers who lacked confidence about teaching science to young children showed negative attitudes about the science as a subject. In addition, because of low interest about science, these teachers did not integrate science into their classroom practices. Moreover, Appleton and Kindt (1999) showed that primary and early childhood teachers did not feel confident in teaching science and this affected their topic selection and teaching strategies. In addition, these primary and early childhood teachers rated science as low school priority when compared with other subjects in schools (Appleton & Kindt, 1999). Furthermore, another study showed that even though early childhood teachers presented more positive views about teaching science, many of them felt uncomfortable in their teaching process. In addition, this study claimed that there was a relationship between early childhood teachers' attitudes toward science and participation in in-service training related to science and teaching science courses (Cho, 1997).

In the light of the studies mentioned above, it is clear that there is a relationship between early childhood teachers' attitudes towards science and their science teaching practices. For example, Kelly (2000) stated that early childhood teachers' attitudes are influenced by their practices about how to teach science to young children. In addition,

the teaching methods that these teachers implement not only influenced students' views but also their perceptions and interests about science. Similarly, Bulunuz and Jarrett (2008) expressed that children's interest and attitudes about science was affected by teachers' interest in and enthusiasm for science. If teachers provided high enthusiastic classroom atmosphere, children were more eager to participate science-related activities. However, Fleer and Robbins (2003) found that although some early childhood teachers had a negative attitude toward science teaching, their students were curious about and eager in participating science activities in school. One of the reasons for the teachers' unwillingness to teach science in early childhood education is related to the limited availability of science materials in the classroom. This can increase teachers' anxieties and reduce their confidence levels (Howitt, 2008). A further reason was to the lack of the teachers' science content knowledge and their inability to accurately respond to children's complex questions. This could result in the children having misconceptions about science or support children's inaccurate prior knowledge (Kallery & Psillos, 2001). Undoubtedly, early childhood teachers are not expected to be experts in different content areas. Rather, it is essential that the teacher is a good classroom facilitator in order to plan suitable experiments for children related to their age and developmental levels. In this way the children can actively discover different science ideas and concepts rather than merely memorizing scientific facts (Cho et al., 2003).

As understood from these studies, understanding early childhood teachers' attitudes toward science is an essential to the development of good classroom practice. To accurately assess these attitudes appropriate instruments need to be used. Several researchers have developed various assessment scales. Cho et al. (2003) developed new scale based on "The Revised Science Attitudes Scale" developed by Thomson and Shrigley in 1986. The original scale was used to measure elementary teachers' attitudes toward science teaching. The newer version of this scale was used to assess early childhood teachers' attitudes toward science and administered to 100 teachers working in early childhood settings. The results showed that early childhood teachers lacked sufficient knowledge about scientific concepts. Moreover, three issues that influenced teachers' attitudes towards science teaching practices were comfort or

discomfort about science teaching, the requirement for a preparation process in the classroom, and meaning and place of science education in the education of young children (Cho et al., 2003).

Another instrument was developed by Kallery (2001) to measure Greek early childhood teachers' attitudes about astrology and their awareness about the differences between astrology (science) and astronomy (pseudoscience). The results from 103 teachers showed that there was a problem among early childhood educators since 59% were unable to distinguish between astronomy and astrology. The results of this study support the idea that early childhood educators' content knowledge related to science is very limited. The two studies by Cho et al. (2003) and Kallery (2001) have an important place in the literature concerning early childhood teachers' attitudes toward science and science teaching. From the literature it can be seen that it is essential that teachers have a positive attitude to teaching science to young children but also it is necessary that teachers have the knowledge of science and practical ability to implement scientific activities in the early childhood classroom.

2.5.1 Research on Science Teaching in the Turkish Context

There have been studies that focused on teachers' science teaching practices at the early childhood education level in Turkey. Unal and Akman (2006) conducted a study in Turkey in which 160 early childhood teachers completed an "Early Childhood Teachers' Attitudes toward Science Teaching Scale" (Cho et al., 2003). The results of the study showed that there was a significant relationship between early childhood teachers' attitudes toward science and their educational levels, whether they had participated in-service training, and the cities in which they worked. Similarly, Erden and Sönmez (2010) investigated early childhood teachers' attitudes about teaching science and the effects of these attitudes on their teaching practices. Moreover, they examined the effects of some teacher characteristics such as educational background, teaching experience and school type where teachers work on their science teaching experiences. The results revealed that private school teachers showed more positive attitudes toward science teaching when compared to public school teachers in early childhood settings. Özbey and Alisinanoğlu (2009) studied early childhood teachers'

competencies about science activities. Data were collected from 232 early childhood teachers in Ankara using "A Scale to Determine the Satisfactoriness of the Teachers about the Science Activities" which had been developed by researchers (Özbey and Alisinanoğlu, 2006). The questionnaire consists of four main dimensions: material and method, the teacher's knowledge level about application, their general knowledge about science activities, and their behaviors in the process of application of science activities. The results indicated that there was a significant relationship between teachers' experience years, their age, the type of schools in which they worked, and their competency levels about early childhood science activities. Teachers who worked in private schools had a higher level of competency compared to teachers working in state schools.

Other researchers chose to conduct their studies on the basis of qualitative approach. Ayvacı et al. (2003) conducted a study to investigate the relationship between early childhood teachers' qualifications and their science teaching practices. 15 preschool teachers were randomly selected from 10 private schools. The data concerning the teachers' science practices were collected through semi-structured interviews and classroom observations about teaching practices. The results revealed that teachers had difficulty in providing science materials for the classroom activities. Moreover, they applied their science activities in a more traditional way such as telling and instructing. Furthermore, they found that there was a discrepancy between the teachers' beliefs and practices about implementation of science with young children. Although the participant teachers stated the importance of science in early childhood education, they did not implement science activities at satisfactory level. Another study was conducted by Karaer and Kösterellioğlu (2005) in order to analyze the methods used by early childhood teachers while teaching science concepts. The results showed that teachers did not think their education sufficiently qualified them to teach science. Furthermore, the teachers stated that there was a lack of in-service training related to science teaching in early childhood education and this had a positive impact on their professional development. Karamustafaoğlu and Kandaz (2006) studied the teaching techniques that 50 early childhood teachers used in activities related to science and nature, and difficulties they had in implementing these activities. The

results revealed that teachers generally used “explanation”, “dramatization”, “models”, and “experiments” while applying science and nature activities. In addition, the teachers commented on the need for laboratory facilities in early childhood institutions in order to apply science activities in a more effective way. A study to investigate the correlation between the professional experience of early childhood teachers and their level of knowledge in terms of the planning, applying, and evaluating science activities was conducted by Bilaloğlu et al. (2008). The findings of this study showed that participant early childhood teachers did not feel sufficiently competent to teach science. In addition, they did not plan sufficient number of science activities in their daily plans. Furthermore, there was a difference between participant teachers’ expressions about their science teaching practices and their actual classroom practice. Kıldan and Pektaş (2009) collected the views of 52 early childhood teachers about teaching science practices at the early childhood stage of education. The findings from interviews showed that most of the participant teachers believed in the adequacy of the objectives and outcomes in the current early childhood program in terms of science teaching. In addition, they stated that the current program supported teaching science activities with regard to content of them. They also mentioned the role that science had to play in the development of children’s attitudes such as curiosity, open-mindedness, and skepticism. However, they stated that the available materials were not sufficient to teach science effectively in early childhood classrooms.

All these studies show that there are various issues faced by early childhood teachers in relation to the teaching of science to young children. This situation has a direct influence on children experiences with science in early childhood education. For that reason, it is important to apply science activities in a more meaningful way. As a result, integrated curriculum can be considered as a way to teach science to young children. Early childhood teachers stated that integrated science activities for young children was very helpful for teaching science in early years (Watters et al., 2001). In addition to children’s learning, this approach may offer teachers support in using effective teaching methods, since it is important that teachers feel more competent and confident in combining science with other activities.

2.6 Visual Art in Early Childhood Education

Visual art is closely related to artistic elements such as shape, color, and line which are seen in children's work (Schirrmacher, 2002). Younger children can engage in different types of art activities. For example, some children like two-dimensional activities such as painting while some others like three-dimensional activities such as modeling (Jalongo & Stamp, 1997). This art process helps children to visually express their feelings and ideas (Dewey, 1958; Lowenfeld & Brittain, 1975).

The main aspect of early childhood visual art is related to using hands and minds together in order to explore the visual world. In order to understand this process, it is important to understand discipline-based art education (DBAE). Today, art education theory has shifted from the child-centered approach to the discipline-based subject approach. This framework for curriculum development was developed by the Getty Center for Education in the Arts (Schirrmacher, 2002). According to Dobbs (1998), art was organized in terms of four fundamental art disciplines: art making, art criticism, art history, and aesthetics. These disciplines not only improved children's creativity, understanding and their skills related to art appreciation, but also helped them to understand the role of the art in different cultures. According to Schirrmacher (2002), the art program includes four main components:

- providing sensory experiences
- containing beautiful and creative practices
- using appropriate materials, space, and time
- introducing the terms such as art, artists, and different styles of art.

In early childhood education, art may be considered as a traditional part of the curriculum because it supports children's development. Visual art has a positive influence on children's development. For example, children may express themselves while engaging in visual art activities for example they may learn the names of these materials. In addition, they may understand themselves by expressing their feelings (Jackman, 2005). There are five strategies to incorporate art into the early childhood curriculum:

- as a separate activity
- used to extend or reinforce learning in another curricular area
- as a super activity integrating several curricular areas
- as an integrated part of an extended unit of study
- as a child-directed pursuit (p. 248).

Using these strategies, art may be considered as a natural way to integrate learning into different content areas (Lasky & Mukerji-Bergeson, 2008). For instance, art is helpful for introducing and clarifying the topics related to social studies. In addition, when children deal with art explorations, their language development is also enhanced (Cohen & Gainer, 1976; Seefeldt, 1977). Specifically, though art projects, children may express their reflections about what they are learning. In these projects, children create drawings, paintings, and model constructions related to specific topic (Wortham, 2006). Regarding children's art expressions, it is important to provide opportunities for children in order to improve children's artistic development. There are some important issues about guiding and facilitating children's art expressions such as space, materials, time, arrangement, and evaluation (Lasky & Mukerji-Bergeson, 2008). Materials should be organized on the basis of children's age appropriateness, for example, drawing tools such as crayons, markers, or chalk should be of an appropriate size for young children's hands (Mayesky, 2009). Therefore, the role of the early childhood teachers in this process can be seen as facilitating and supporting children's artistic development (Bae, 2004).

2.7 Integration of Science and Visual Art

John Dewey (1934) stated that "science states meanings; art expresses them" (p. 84). According to this view, art is considered to be "graphic language". In addition to art, young children try to make sense about their environment through play, movement, song, and dramatic play (Gallas, 1991). Since very young children are not able to write and read, they generally express their ideas verbally and visually (Schiller, 1995).

Many early childhood institutions teach science on the basis of an integrated curriculum. Teachers integrate science activities with other disciplines such as reading science books or playing musical instruments and they also focused on emergent ideas based on children's interest and curiosity (Booth Church, 2004). As a result of integrated activities, children's cognitive development is improved because these different types of experiences can activate the various parts of the child's brain that can then be linked and create a more durable memory system. As the children process more information, they create more connections related to the data. Thus, if educators provide meaningful science experiences, children can create different ways to learn abstract concepts in the environment around them (Harlan & Rivkin, 2004). In early childhood education, different activities can be integrated to science in order to enhance children's different developmental areas. For example, math and science can be integrated because both help children in quantifying and making observations. Music can help children understand science in different ways because hearing is a good way to strengthen and reinforce the memory. Furthermore, literature can assist children in the construction of scientific concepts using narratives and metaphors. Thus, children can begin to use scientific concepts or ideas in their daily life. Moreover, art activities help children to explain their own ideas in a more creative way (Harlan & Rivkin, 2004).

There are many benefits of integrating science and art in the learning progress. Specifically, visual art assists children in understanding scientific principles in a more meaningful way. In addition, it encourages them to use skills such as observing, predicting, questioning, discussing while engaging in science activities (Schirrmacher, 2002). There are three types of science experiences which are formal, informal, and incidental (Mayesky, 2002). Formal science includes experiences organized by teachers in order to improve specific skills. On the other hand, informal science includes little or no teacher participation and children can choose some activities on the basis of their interests. The last type is incidental science that is not planned or organized by anyone. It has no strictly defined time span in which to complete activities that can change according to the nature of the concept, children's interest and their needs (Mayesky, 2002). While experiencing these different types of science,

integrating visual art has a potential for enhancing the child's ability to develop and comprehend scientific concepts. For example, experimenting with art materials might lead to other learning such as the cause and effect relationship. Children can observe that the changes when different color paints are mixed and how sponges absorb the liquid in a printing activity. On the other hand, they can become aware of the characteristics of hard materials such as non absorbance (Lasky & Mukerji-Bergeson, 2008).

From the review of the literature to can be seen that the integration of science and art was helpful for children's learning. Stein, McNair, and Butcher (2001) conducted a study on children's drawings about animals. The results showed that children were motivated to learn about animals showing that they could examine animals on the basis of comparing their prior knowledge with the new information they received. Similarly, Dever and Jared (1996) claimed that integrated art activities help children in two ways. First, that it helped children to express their understanding of new concepts by using their representations and creative work. Second, children can easily learn the functions of art materials and decide how they can use them in their activities. In addition to these studies, the integration of art and science is considered to be very important because art can be used as an assessment tool in early childhood settings. In fact, Wright (1997) mentioned that there was no problem working with older children because they were able to express themselves using language, however, younger children were less able to effectively use verbal skills and visual art was important in the assessment of these children. Also children's creative expression in visual art allowed them to express their interpretation of scientific events (Stein et al., 2001). Using art materials in science activities was essential to support children's divergent thinking skills and for them to create new artifacts using these materials (Harlan & Rivkin, 2004). In order for the children to reap the benefits of combining science and visual art according to Wortham (1998), the role of the early childhood teachers should be guide, facilitator, and respondent. In addition, while children were engaging in scientific processes such as observing or predicting, teachers should be monitoring the children during the activity to determine how to provide various opportunities for them.

All the studies referred to in this chapter have demonstrated that science can be effectively integrated with all other activities in early childhood education curricula. Thus, a child's different developmental areas such as cognitive, language, and social-emotional can be supported. Specifically, integration of science with visual art can be helpful for both children and teachers. Not only were children able to express themselves in a more meaningful way and teachers were able to use art as a post activity assessment tool.

2.8 Summary

The literature revealed that integrated activities were considered to be a core part of the early childhood curriculum since it helped children construct meaningful learning. In addition, it was considered as an assistive tool for early childhood teachers in order to plan and implement appropriate activities. Moreover, the literature mentioned above showed that teachers were important in terms of teaching science to young children since the teachers attitudes towards science teaching directly affect children's learning. For this reason, it necessary to continue to carry out research into teachers' understanding of, views about and practice of teaching science practices in early childhood settings. Specifically, this current study aims to collect data from early childhood teachers concerning their attitudes towards the teaching of science and their views on the integration of visual art into the teaching of science.

CHAPTER 3

METHODOLOGY

The aim of this study was to explore the changes in five early childhood teachers' views about and practices of integration of visual art into science activities. Semi-structured interviews and classroom observations were used to explore participant teachers' views. This part will represent the information about research questions, the research context, the design of the study, participants, instruments, data collection procedure, data analysis, trustworthiness of the study, and limitations.

3.1 Research Questions

1. What are the views of early childhood teachers about science teaching in early childhood education before the workshop?
    a. What are the views of early childhood teachers about the importance of science in early childhood education?
    b. What are the views of early childhood teachers about how children learn science?
    c. What are the views of early childhood teachers about effective science teaching?
2. How did the workshop affect early childhood teachers' views about teaching science?
    a. How did the workshop affect early childhood teachers' views about the preparation process of teachers in early childhood education?
    b. How did the workshop affect early childhood teachers' views about effective science teaching?
    c. How did the workshop affect early childhood teachers' views about how children learn science?

3. How did the workshop influence early childhood teachers' views related to integrated curriculum?
    a. What are the views of early childhood teachers about types of art activities before the workshop?
    b. What are the views of early childhood teachers about types of art activities used in integrated science activities after the workshop?
4. What are the practices of early childhood teachers about science process skills after the workshop?
5. What are the practices of early childhood teachers about the integration of visual art with science after the workshop?

3.2 The Research Context

Miles and Huberman (1994) mentioned the importance of "thick descriptions" of a phenomenon and its context providing rich information about the study. In addition, it would be helpful to understand the real life subjects and situations. According to Miles and Huberman (1994), setting and boundries were two important issues in a qualitative study, because the data related to phenomenon might be too limited. Therefore, setting and other detailed information about the study such as participants and data sources would be useful to define the boundaries of this study.

The study was conducted in a private preschool located in the Çayyolu district of Ankara established in 1996. The study took place at a private preschool in four classroom settings over the period of one month. There were six early childhood teachers in this preschool. In addition, a total of 48 children attended this school in the first semester, 2010. The children attended full-day program in this preschool. They started their routine at 9:30 a.m. with pre-planned classroom activity. This preschool included six classrooms serving children from 3 to 6 years under the supervision of MONE. Thus, this preschool implements the National Early Childhood Program which required for educating young children. It includes standards for early childhood activities. In addition, this preschool implemented Project Approach in all classrooms. Before starting the project, the administrator and classroom teachers work on identifying the theme of the project in terms of children's needs, interests, and

annually plans. All teachers attend these regular monthly meetings in order to decide the common issues of the project. After that, each teacher works with their children to carry on the project. Teachers direct them to work on the activities related to the theme of that month. Teachers have flexible to apply their activities to children. However, they should follow common issues decided in the project meetings.

The school consists of classrooms, one conference hall, one dining room, two administrator rooms, and a big playground. The plants and trees in the garden surrounded four sides of the school building. A bulletin board and children's work were located in the entrance. All classrooms had one window looking out into the garden. Child-sized table and chairs were arranged inside the classrooms. In addition, there was a big floor space in the middle of the school for gathering as a whole group.

3.3 The Design of the Study

The present study was conducted as a case study. According to Creswell (2007), case study is a type of qualitative research in which the researcher creates a case or cases in over time by using detailed data collection which includes multiple sources of information (e.g., observations, interviews, audiovisuals, documents, and reports). In addition, Merriam (1998) mentioned that case studies mainly concentrate on a particular situation, event, program, or phenomenon. The current study showed a case (including five early childhood teachers who attended in the workshop related to the integration of science and art in the same school) within a particular context (a private preschool) and time (over a period of one month). For that reason, case study stated by Merriam (1998) was appropriate for this study, because case studies were helpful for us to understand both the issue of events or programs and the context of them. In addition, it was more suitable for conducting a case study because the nature of the subject required in depth investigations related to in-service early childhood teachers' opinions or views.

3.4 Participants

The participants included five in-service early childhood teachers who have been working in a private early childhood institution. For this study, purposive sampling method was used to select participants because purposeful sampling investigates "information-rich cases" which can be studied deeply (Patton, 1990). The researcher has certain criteria for selecting the participants for the study. The first one was related to accessibility of the participants because the researcher should spend time with them while collecting the data. The second one was participant teachers' experience years. The participants' experience years ranged from 1 to 10 years suggesting that there might be different types of experiences and practices in their professional life. The last one is related to participants' institutions where they have been working. Early childhood teachers who had been working in a private setting should be recruited for the study because teachers would be more flexible while applying activities in private schools as these schools would provide more opportunities for science activities. For these reasons, a private school in Ankara was selected as a participant school in order to investigate teachers' views and practices about teaching science. Table 3.1 shows the demographic information about participant teachers.

Table 3. 1 Participant Teachers' Demographic Characteristics

Participants	Year of Experience	Experience in the School	Graduation Level & Department	Science Courses They Attend	Educational Training
Ayse	2 years	2 years	-*Hacettepe University* Radio, television and cinema	No	Yes/In school
Emel	3 months	3 months	-*Hacettepe University* Elementary Education	Yes	No
Seda	8 years	1 year	-*Vocational High School* Child Development	No	Yes/In school
Secil	10 years	8 years	- *Vocational High School* Child Development	No	Yes/In school
Bahar	7 years	7 years	-*Two-year vocational training school* Child Development	Yes	Yes/Institution

All of the participants interviewed were female. While three of them had been teaching seven years or more, two of them had been working two years or less as early childhood teacher. Only two participants had a bachelor's degree. However, their departments were unrelated to early childhood education. While two of them graduated from Vocational High School in the department of "child development", one of them graduated from a two-year vocational school.

3.5 Instruments

Two sets of semi-structured interview protocols were used for this study (Appendix A & B). Table 3. 2 showed the interview and observation protocols of main research questions. These protocols were used to gain information about early childhood teachers' views about science teaching and integration of science and art in their classroom practices. The interview protocols were developed by the researcher through the related literature and feedbacks from three academicians in the field of early childhood curriculum, early childhood science, and qualitative research in education. Before the last version of the interview protocol was constructed, two pilot interviews were conducted to evaluate the usability and clarity of the questions.

Table 3.2 Data Sources Used in Relation to the Main Research Questions

1. What are the views of early childhood teachers about science teaching in early childhood education?	Semi-structured pre-interview protocol for early childhood teachers
2. How did the workshop affect early childhood teachers' views about teaching science?	-Semi-structured pre-interview protocol for in-service teachers -Observation protocol for early childhood teachers
3. How did the workshop influence early childhood teachers' views related to integrated curriculum?	-Semi-structured post-interview protocol for early childhood teachers

Table 3.2 (Continued)

Research Questions	Data Sources
4. What are the practices of early childhood teachers about science process skills after the workshop?	- Observation protocol for early childhood teachers
5. What are the practices of early childhood teachers about the integration of visual art with science after the workshop?	

3.5.1 Semi-structured pre-interview protocol for early childhood teachers

The first part of the interview protocol included seven questions that addressed participant teachers' background information: gender, year of experience, graduated school, academic major, attendance in science related courses, and attended seminars or conferences related to science (Appendix A).

This interview protocol was designed to investigate early childhood teachers' views about science teaching and the place of integrated activities into the early childhood curriculum. The participanting early childhood teachers were asked about their views on the implementation of science activities, the usage of science teaching methods in early childhood classrooms, the implementation of science process skills, and scientific concepts. In addition, they were asked to elaborate on their views about their prior experiences ranging over such topics as their knowledge about science, their perceptions of different science topics, their views about the integrated curriculum, and their opinions about science and art integration. By this way, participanting early childhood teachers' retrospective recollections emerged. The pre-interview included 24 main questions with sub-questions. During the pre-interviews, there were also more issues emerged from the answers of the participant teachers such as the role of the parents in the children's science learning process. Pre-interviews were conducted in a 30-minute, face-to-face setting a week before the workshop. Table 3.3 showed the interview questions related to main issues.

Table 3.3 The examples of main issues in relation to pre-interview questions

Main issues	Example Questions (Pre-interview)
Views about science activities	-What do you think about the place of the science in early childhood education when compared to other activities? -What do you think about how children acquire science?
Implementation of science activities	-How do you teach science in early childhood level? - What types of teaching methods do you use in your science teaching practices?
Integrated curriculum	- What do you think about the place of integrated curriculum in early childhood level? - How do you implement integrated activities in your teaching practices? - Can you give examples about your practices related to integrated activities?

The researcher prepared pre-interview questions in order to gain detailed information about in-service teachers' views about science teaching practices and activities about integration of science and art. For that reason, the researcher asked an early childhood education and science academician in order to decide the face validity of the interview questions. Therefore, the confirmation of the interview questions with the research questions could be evaluated. In addition, the researcher asked these questions to two in-service teachers in order to see the applicability of the interview questions. Therefore, the researcher formed the latest version of the interview protocol. In addition, the researcher prepared the latest version of the observation protocol while attending the pilot observation practices with three participant teachers in order to see and understand their practices about science teaching. Thus, the researcher could see the views and practices of participant teachers before attending workshop (Appendix C).

3.5.2 Observation protocol for early childhood teachers

The main aim of the study was to see early childhood teachers' actual classroom practices and whether there was any effect of workshop on them. The observational data were collected through field notes of five participant observations in the classroom setting. In qualitative studies, observation is considered as a main and essential method for collecting data. In addition, it is helpful for analyzing complex relations in natural settings (Bogdan & Biklen, 2007). In observation, taking fieldnotes is one of the main methods for gaining data. Field notes were taken during observations of early childhood teachers while implemented their art-based science activities. Each observation conducted for this study lasted approximately one and half hour. The duration of observations was depending on teachers' activities. Fieldnotes were independently written on the paper by two-person team for each observation. The researcher trained another person who participated in the observation process. She was a research assistant in the field of early childhood education and her area of interest was early childhood science. After that, observations were conducted during science activity sessions.

The time of the observations were changed according to the implementation of science activities. It was determined by asking each teacher which class period during they implemented the art-based science activities. Thus, the observations were scheduled within that class period for each of the classes. The observations included descriptive information about duration, types of integrated activity, number of children, place, and the activity. In addition, participanting teachers' and children' behaviours, questions, body movements, and interactions during the science activities were documented in detail. The participant teachers' classroom practices were observed in a manner that the observers did not disrupt the normal classroom routine. The observers placed themselves in one corner of the classroom where they could see and hear the interactions between children and teachers. An example of fieldnotes for each participant is given in Appendix D.

An observation guide was prepared to give direction to observers including certain criteria such as place of the activitiy applied, number of children, and topic of the activity (Appendix C). Each teacher was observed in terms of these criteria. The

findings of the observations played an important role on comparing participant teachers' views with their actual practices

3.5.3 Semi-structured post-interview protocol for early childhood teachers

After field observations were completed, post-interviews were conducted to see early childhood teachers' views about science teaching practices related to integration of science and the effects of workshop on teachers' views about these issues. The interview protocol addressed 20 main questions and two specific questions related to individual teachers' classroom practices. The questions in post-interviews were similar to pre-interview questions. However, some additional questions related to observation data were asked to understand participant teachers' views about implementation process of science teaching. Table 3.4 showed the main issues related to main interview questions in post-interview protocol see Appendix B.

Table 3.4 The examples of main issues in relation to post-interview questions

Main issues	Example Questions (Post-interview)
Implementation of science activities	-What do you think about the place of the science in early childhood education when compared to other activities? -What do you think about how children acquire science?
Implementation of teaching methods	-How do you teach science in early childhood level? - What types of teaching methods do you use in your science teaching practices?
Integrated curriculum	- What do you think about the place of integrated curriculum in early childhood level? - How do you implement integrated activities in your teaching practices? - Can you give examples about your practices related to integrated activities?

3.6 Data Collection Procedure

Different data collection methods were used to meet the needs of the study. These were interviews, observations, documents and classroom artifacts, and informal notes. By this way, multiple sources of data were used to ensure triangulation to support findings (Merriam, 1998; Stake, 1995; Yin, 2003).

The data of the study was collected through extensive multiple sources of information such as interviews with in-service early childhood teachers and observations in their teaching practices in the classroom. Table 3.5 shows the steps and timeline of the data collection.

Table 3.5 The Steps and Timeline of the Data Collection

	Data Collection Type	Date	The Number of Participant teachers
1	Pilot Observation	April 26-30, 2010	3
2	Pilot Interviews	May 3-7, 2010	2
3	Pre-Interviews	May 10-14, 2010	5
4	Workshop	May 26, 2010	5
5	Observations	May 31-June 4, 2010	5
6	Post-Interviews	June 14-18, 2010	5

The researcher conducted pilot observations with 3 participant teachers about their science-related practices. The pilot observation of the participant teachers' classroom practices was conducted to see provide additional information before conducting main observations. Two observers typed the teachers' behaviors noting the time periodically during pilot observations. They noted how teachers implemented the

activity, what science materials were used, and what science activity occurred. This was helpful for constructing the last version of observation protocol.

The researcher conducted pilot interviews to examine the semi-structured interview protocol for format and content. The pilot interviews were held with 2 teachers in this study. After pilot interviews, two questions were rewritten to a more clear understanding.

The researcher also conducted pre-interviews prior to the workshop and a post-interview after the science-related activities with each participant. Both the interview protocols and the workshop about integration of science with art were designed and conducted by the researcher.

As previously mentioned, the researcher conducted a 30-minute pre-interview with each participant teacher before implementing the workshop. The interviews were conducted out of the working hours so that participants would feel more confident and follow their daily schedules with any interruption. Each interview began with an explanation of the purpose of the study and the ethical considerations for this research including confidentiality, informed consent, information and voluntary participation. The pre-interviews were conducted by early childhood teachers in order to see their opinions and views about science teaching, importance of art, and integration of visual art with science in their teaching practices. After pre-interviews were conducted, the researcher applied a workshop related to early childhood science, science process skills, science teaching methods, and integrated science and art activities. After this workshop, the researcher observed the teachers in their classroom practices related to art-based science activity. The researcher attended the classroom practices as an observer. In addition, the researcher analyzed the teachers' activity plans including integrated science activities prepared by the participant teachers. Then, the researcher conducted a post-interview with each participant that lasted approximately 30 minutes.

3.6.1 The Workshop

The workshop provided opportunities for participating teachers with discussion and examples related to science teaching and science and art integration. The content of the workshop were developed by reviewing the related literature focusing on early childhood science, the place of art in early childhood education, the integrated curriculum, National Early Childhood Program (2006), and professionals in early childhood field. After the workshop was developed, the first step was to review and discuss the content of the workshop with the researcher's doctoral committee. The committee members are professionals in the field of education. After presenting the workshop to committee members, they provided valuable feedbacks related to the wording and the content of the workshop. After this step was completed, the researcher prepared a booklet including the some issues related to science and art in early childhood education (Appendix E). On the basis of this booklet, the researcher talked about specific issues such as science process skills, science teaching methods, art-based activities. The workshop was designed to improve teachers' point of views about integration of science and art and provide opportunity for them to remember some specific concerns such as the place where the activity would be conducted, variety of materials, parent involvement, assessment of children's participation to the activity, and the exhibition of the art works.

The workshop was organized into one afternoon session with presentations and examples. It lasted one and half hour. While the researcher was applying the workshop, the second coder took notes about the details of the workshop. It included participant teachers' ideas, experiences, and recommendations. The researcher gave information about early childhood science and art, what the integrated curriculum is, and detailed information about art-based science activities. The researcher encouraged them to participate into the workshop through their experiences. In addition, the researcher directed them to give examples about their prior teaching practices.

At the end of the workshop, three art-based science activities were designed by participant teachers. In addition, participant teachers recommended different versions of these activities by adding different materials or changing the place where the activity applied. During the workshop, they had opportunity to see or organize

different types of science activities on the basis of different art methods such as two-dimensional and three-dimensional methods. The main aim of this workshop was to guide participant teachers to be aware of the importance of art in early childhood settings. In addition, the workshop was helpful for teachers to apply science activities on the basis of early childhood art.

3.7 Data Analysis

In this study, early childhood teacher' views about science and integration of science and art in their teaching practices were analyzed in order to produce a detailed descriptions about their views and practices.

The first phase of the analysis consisted of portraying all the data related to participant teachers' views about science teaching and integration of science and art in early childhood education on the basis of pre-interviews, observation, and post-interviews. The second phase of the analysis involved finding out whether there was any difference between pre- and post-interviews of participant teachers in terms of their views about science and integration of science and art in early childhood education. Meanwhile, observational fieldnotes and teachers' activity plans were examined based on the themes emerged from the pre- and post-interview data.

Pre and post interviews' data were analyzed through Creswell's (2009) data analysis steps as shown Table 3.5. He claimed six steps as follows: (a) organizing and preparing the data, (b) making general sense of information, (c) coding, (d) describing, (e) representing, and (f) interpreting.

Table 3.6 Data Analysis Process of Creswell (2009)

Process	Description
Step 1: Organizing and preparing the data	- To transcribe pre and post interviews - To type fieldnotes - To sort and arrange the data on the basis of sources of information
Step 2: Making general sense of information	- Participants' general ideas - Tone of participants - The impression of the overall depth and credibility - The use of information
Step 3: Coding	- To take written data or pictures - To divide sentences into parts or images into categories
Step 4: Describing	- To make description about setting, people, school or classroom - To use codes in order to generates categories
Step 5: Representing	- To make deep discussion using figures or tables - To correlate themes to discussion
Step 6: Interpreting	- To interpret the data using the literature or theory

The observations of teachers' actual practices included the setting, people, and science activity applied on the basis of integration. The researcher read through all observation notes and coded themes emerged from the pre-interviews. Preliminary codes were applied to all observations. The codes from all observations were reviewed to see if there was any themes emerged from them. Observations, pre- and post-interviews, and teachers' classroom activities provided the opportunity for emerging patterns from these sources of data.

3.8 Trustworthiness of the Study

According to Creswell and Miller (2000), there are certain strategies that are used by qualitative researchers in order to strengthen the quality of the studies. For this study, the first strategy is triangulation. Patton (1999) stated that there are different kinds of triangulation which help researcher to provide verification and validation of qualitative analysis. In this study, methods triangulation was used to provide validation. In fact, there were different data collection sources such as interview, observations, and document analysis used to analyze the data. In addition to this, peer review was used to increase the credibility of the findings and interpretations (Creswell, 2007). Multiple coders analyzed the data in order to conduct "intercoder agreement". Since, reliability could be conducted by examining the categories or themes of the multiple coders (Creswell, 2007).

3.8.1 Validity

There is a common understanding about the need for credibility aspects of qualitative studies. In order to conduct valid studies, it is expected from researchers to establish the credibility of their studies (Creswell & Miller, 2000). There were eight strategies conducted by Creswell (2007) to ensure the validity of the findings: prolonged engagement, triangulation, peer review or debriefing, negative case analysis, researcher bias, member checking, rich, thick descriptions, and external audits. With regard to these strategies, Creswell (2007) recommended to use at least two of them in order to ensure validity. For this study, triangulation and peer review or debriefing were selected to ensure validity.

3.8.1.1 Triangulation

As a validation strategy, triangulation mentioned by Creswell (2007) was used to verify the findings of this study. Denzin (1978) and Patton (1999) stated four basic types of triangulation: (a) data triangulation such as using a variety of data sources, (b) theory triangulation such as using multiple theoretical perspectives (c) methodological triangulation such as using interviews, observations, and documents, (d) investigator triangulation such as including several different investigators. For this

study, methodological triangulation was used to establish validity through pre- and post-interviews, field observations, and participant teachers' activity plans. It included a combination of field notes taken on the teachers' classroom practices related to art-based science activities with transcribes from pre- and post-interviews of teachers about science teaching and science and art integration, and teachers' activity plans.

3.8.1.2 Peer review, or debriefing

The peer review was used to ensure validity in which another person's reviews of the study aspects such as methods, meanings, or interpretations were gathered (Creswell, 2006). This study was conducted through the suggestions of the thesis committee members who are academicians in the field of education. In addition, each phase of the study was monitored by a researcher who was experienced in qualitative study.

3.8.2 Reliability

According to (Merriam, 1998), one of the ways to ensure reliability is to make thick descriptions about the data so that the readers can easily make connection between researchers' situation and the study. Similarly, Creswell (2007) suggested that the issue of reliability can be improved by the detailed fieldnotes to employ and transcribe the tape. For both interviews and observation, intercoder agreement was sought in order to ensure the reliability.

3.8.2.1 Intercoding agreement

Intercoder aggrement can be stated as the aggrement among the multiple coders who are analyzing the data (Creswell, 2007; Silverman, 2005). Data in this study was analyzed by two coders. The first coder was the researcher and the second coder was a research assistant with experience in early childhood science. The researcher trained the second coder in terms of qualitative data coding before the data analysis. As a first step, both coders individually read the interviews and underlined the segments and the codes associated with the segments. Then, the codes from the two coders were compared to each other to see if there was a huge difference between

them. After that, two coders discussed the possible themes emerged from the coding process. This data coding process was completed after agreeing on all codes and themes.

The observations were conducted by two observers. One of the observers was the researcher and the other was the second interview coder. Both observers individually took notes in the same classroom activities. After that, both observers read the notes to each other and compared the similarities of these notes for each observation. The agreement rate was approximately 90% in observation fieldnotes.

3.8.2.2 Ethics

Certain ethical measures were taken in this study in order not to cause harm to participants. Before collecting the data, the approval from the school director was taken. A consent form was given to each participant and they were told that their voluntariness is essential. They were told that they did not have to participate if they were not volunteer. All teachers voluntarily participated in the study. Confidentiality was maintained at any times while noticing participants to withdraw from the study whenever they want. In addition, it is important to ensure the anonymity of the participants so that pseudonyms were used in all parts of this study.

3.9 The Role of the Researcher

In a qualitative study, the researchers play an essential role on collecting data from different sources such as interviews, observations, and document analysis while emphasizing on validity and reliability issues (Merriam, 1998). The researcher can be considered as an instrument of the study. Therefore, they should include information about their role in the study (Patton, 1999). For that reason, the researcher tried to explain her position in this study. There was no relationship between the researcher and the participants of the study prior to the research. The researcher met all of them for the first time before the study was conducted. However, the researcher knew the director of the school as we have studied in the same department and the researcher was able to reach participants through her. This motivated the teachers to participant in the study.

The participants did not react negatively to be observed for the study. They were familiar with someone who observed their practices because the director and the founder of the school were conducting observations at least once a week in their classrooms. Both the teachers and the children ignored my and second coders' existence. However, since early childhood contexts are relatively relaxed and flexible, the children wanted to communicate us a few times during the observations. the researchers smiled and continued taking notes.

The participating teachers were also familiar with the interview process since they were involved in two research before. Yet, the researcher tried to comfort participant teachers stating the importance of their views. They exhibited comfortable manner while expressing their views and they did not have any difficulty in sharing their views and showing their classroom practices.

The researcher tried to explain questions in an explicit way while conducting interviews with participant teachers. If required, the researcher tried to ask the question again in a different way or direct them to sub-questions so that they would have a better understanding of the question. The researcher guided them to give examples about the situation to make sure that participant teachers' answers addressed the question asked.

3.10 Limitations

There were some limitations in data collection and data analysis processes. First, case studies involve only a single individual or just a few which might not be representative of the general group or population. For this study, it was difficult to generalize the findings in similar case groups or settings. Therefore, the context, participants, and the nature of the study were described in detail so that the scope of the study could be understood better in employing the findings for similar contexts or participants. In addition, the duration of the workshop might be too short to investigate the effects of it on teachers' views and classroom practices. Moreover, the participants might have respond based on researcher's expectations rather than stating their actual views. That is, the presence of the researcher might have influence their expressions.

Therefore, certain validity issues such as conducting observations and employing peer review were ensured to increase the credibility of the findings.

3.11 Summary

This chapter described the detailed information about the methodology of this study. The main issues were research questions, the research setting/context, the design of the study, participants, instruments, data collection procedure, data analysis, trustworthiness of the study, and limitations. The data were collected from the interviews and direct classroom observations of participant teachers. In addition, participant teachers' activity plans were used to compare their planning with actual classroom practices. Interviews and observations provided a detaied record of the perceptions of early childhood teachers about science teaching and integration of science and art in early childhood setting.

CHAPTER 4

FINDINGS

THE DESCRIPTION OF EARLY CHILDHOOD TEACHERS' VIEWS AND PRACTICES ABOUT TEACHING SCIENCE AND INTEGRATED CURRICULUM

This qualitative case study focused on in-service early childhood teachers' views and practices about science teaching on the basis of art integration in a small private early childhood institution. It was designed to see teachers' science teaching practices and their views about it. The study also investigated teachers' views related to the integration of science with art and identified their practices as a result of being in the study.

This chapter represents the findings of the study using a number of data sources including pre-interviews, observations, post-interviews, and teachers' written lesson plans. The findings will be presented on the basis of themes and sub-themes that have emerged from the data. With regard to pre-interviews, the results were grouped under three main themes. These themes are (1) in-service early childhood teachers' views about general science teaching, (2) in-service early childhood teachers' views about specific science teaching experiences, and (3) in-service early childhood teachers' views about integration of science with art. In the first theme, in-service early childhood teachers' views about science teaching were categorized under the science activities, the importance of science in early childhood curriculum, and the role of teachers and parents on science teaching process sub-themes. In the second theme, in-service early childhood teachers' views about specific science teaching experiences were grouped under science teaching methods, science process skills, and scientific

concepts sub-themes. In the last theme, in-service early childhood teachers' views about integration of science with art were identified by integrated activities/curriculum, the place of art into early childhood curriculum, and science and art integration.

4.1 Pre-Interview Findings

4.1.1 Teachers' views about science teaching

4.1.1.1 Science activities

In early childhood education, science activities were organized through different ways: teachers' plans, children's interests, or the nature of the projects. Considering all of these, science corners play an important role on improving learning process. Three of the participants expressed that there was no science corner in their classrooms. Two of the participants claimed the reasons for not having science corner in the classrooms as follows:

> There is no science corner in my classroom because my children (students) are too young. We can only make observations in the garden. Then, we only talk about the general issues such as the weather (Emel).

> There is no science corner in the classroom yet. I am responsible for a younger group of children. Last year, when they started school as a play group, they did not participate in any classroom activities. This year, we start to observe environment as a science activity (Aysun).

Two of the participant teachers who teach an elder group expressed that science corners were located in their classrooms on the basis of projects applied in that month.

All of the participant teachers claimed that they applied science activities at least once a week in their classes. While one of them stated that she generally used science activities twice or three times a week, two of them explained that they planned to include science twice a week. Two of the participants pointed that they preferred to use science activities once a week in their practices. While implementing science activities, all of the participants stated that they preferred to use different types of

science materials in their classroom practices. They pointed out that different types of materials could be used in science activities.

> Children like playing in the garden and use magnifiers. They like investigating different things with magnifiers. In addition, they like playing with buckets, shovels, and sand (Aysun).

> I believe that everything in the environment can be used in science activities. For example, it may be a book or a piece of wood. All of these can be helpful for us to apply science with young children (Sibel).

In addition to science materials, in-service early childhood teachers mentioned that they used different types of science activities in their practices. They addressed their science teaching practices as field-trips, observations, experiments, and play-based science activities:

> Even though there are various science activities for different projects, I also organize the science activities on the basis of children's interest. For example, our school has a big garden. When we play in the garden, children generally focus on something related to nature. At that point, they start to ask different scientific questions. I choose one of the interesting ones and prepare a science activity for children (Bahar).

> My children (students) like playing in the garden. When we played in the garden, we have an opportunity to investigate the environment. While observing, they start to investigate everything around them (Aysun).

> For example, we conducted an experiment related to tastes. We selected a lemon as a material. At first, we investigated the skin of the lemon. Every child touched it and tried to feel it. Then, we cut the lemon into two. In order to understand how it felt, we tasted it and decided that the taste of the lemon was very sour (Emel).

All of the participant teachers agreed that the school environment was appropriate for implementing science activities. Three participant teachers mentioned that they generally organized science activities in both the classroom and the school garden. The explanations of in-service early childhood teachers were as follows:

> The place where science activities are applied depends on the nature of the activity. If the activity is more appropriate for classroom environment, I organize it in the classroom. However, if the activity includes investigation of insects, trees, flowers, I plan to do science activity in the garden (Sibel).

> I prefer to apply science activities in the garden where children are able to do observations. As well as the garden, I sometimes implement some activities in the classroom. For example, we look out of the window to check the weather (Bahar).

> For example, we had an activity related to nests. We made a nest and put it on the garden. Then, we fed the birds by giving small pieces of bread. We generally spent time in the garden. On the contrary, if we did not feel comfortable in the garden, we carried out our activities in the classroom. That is, we collected materials from outside, and put them on the science corner. In the end, we investigate these in the classroom (Aysun).

One of the participant teachers claimed that she generally applied science activities in the garden. She emphasized on the application of nature-related activities in the garden. For example:

> We collect leaves in the garden. We compare some characteristics of these leaves such as colours or texture. Moreover, we investigate some trees by observing their changes (Emel).

On the contrary, another participant teacher stated that she mostly implemented science-related activities in the classroom. She pointed out that *"there is no specific place where we work with children about science"* (Seda).

In-service early childhood teachers' views about ideal environment for implementing science-related activities were varied. While two of them believed that specific/separate place was helpful for applying science activities for young children, two of them stated that *"science could be applied everywhere"* (Seda). Only one participant teacher claimed that *"it depended on the nature of the activity* (Sibel).

In summary, all of the participant teachers preferred to apply science activities at least once in their weekly plans. They believed that the school provided good opportunity for them to implement their science activities in a more meaningful way.

However, some participants claimed that it was required to organize a special class to apply science activities. Although some participants believed that science activities can be implemented everywhere in school, some others clearly stated that only the classroom or the garden is enough to work on science with children.

4.1.1.2 The importance of science in early childhood curriculum

In-service early childhood teachers' science teaching experiences were related to their views about science. All of the teachers believed that science played an important role on children's life. While some of the participants clearly stated that science was a good way to improve children's scientific skills such as investigation, others mainly concentrated on the role of science in developing children's curiosity:

> I think that science activities are so fun for children. In addition, they are helpful for making wonder children about life, so that they can try to understand the reasons of some phenomenon and the process of how the phenomenon occurs (Emel).

> At first, science develops children's curiosity. That is, children's age is too small in early childhood education, for that reason, curiosity is important for their development. Moreover, children like investigating things in their environment (Aysun).

> I believe that children can learn something meaningfully when they see (the phenomenon). In this way, they also remember related things about it. For that reason, I give importance to science activities in my weekly plans. I believe that children can learn easily by seeing and doing things. So, they start to discover lots of new things in their lives (Sibel).

All of the participants believed that science concepts can be acquired through active involvement in the environment. Two participants expressed science learning as "*learning by doing, learning by trying and learning by living*" (Emel). Parallel to this view, the following were expressed:

> Children can learn science by doing. As a teacher, you can only direct them to experience with real things. For example, children collect barks from the garden because they know that these (barks) damage the soil. Children reached this conclusion according to their prior experiences (Sibel).

> I think that children learn science through small research and investigations. By this way, it is good start to improve children's sense of curiosity about science (Aysun).

In addition, two participants stated that observations and investigations were crucial to be able to acquire scientific concepts:

> I believe that children can learn something related to science when they observe it. Moreover, making experiments are good ways to support children's learning. Especially in small ages, it is better to make one or two small experiments for improving children's experiences (Bahar).

> Children can learn science by playing. In addition, observations are essential for their learning process. For example, if we want to grow flowers, we can go to a place where flowers are grown. So, children can easily see the growing process of flowers. This shows that it is better to do basic and deep investigation with children (Seda).

All of the teachers stated a number of ways to teach science to young children. They described different ways based on their prior experiences. Three of them had a common understanding of science teaching. They believed that science can be taught through experience:

> In early childhood education, I believe that children can learn science by getting involved in the overall process. In our educational system, teachers generally conduct experiments and want children to watch the process of the experiment. This is totally wrong because children can learn through experiencing it. For that reason, it is good to provide opportunity for them to participate in the overall process (Bahar).

> Teachers can teach science by using different ways. For example, field-trips are good examples for teaching scientific concepts. In this way, children can learn by observing the characteristics of the concepts (Sibel)

On the other hand, one participant teacher claimed that planning a special science day was one of the ways to teach science to young children:

> I think that one day can be arranged as a science day. On that day, the teacher and children work on selected science concepts on the

> basis of children's interests. For example, the teacher can organize an experiment related to scientific issues. The important thing is to give importance to the process of the experiment: pre-experiment information, experiment, and post-experiment (Seda).

Nearly all participants emphasized the importance of science activities on children's lives. Some of them focused on children's interests while some others mentioned the requirement of planning a special day.

4.1.1.3 The role of teachers and parents on the science teaching process

Teachers have a crucial role in the process of children's learning by creating an environment where the children can learn most effectively. In early childhood science education, the task of a teacher is also to create opportunities to support children's science learning experiences. All participant teachers believed that teachers have an essential role on science learning. Three participant teachers mainly pointed out that teachers should be guides in order to provide authentic science learning experiences. One of them stated that:

> Our role (as a teacher) is to prepare attractive things about science while guiding children to make meaningful learning. Moreover, we try to provide opportunities for children to improve their skills related to investigation and analysis (Aysun).

Another one pointed out the importance of children's involvement into science activities:

> I think that this is a very important issue in teaching process. We try to guide children to participate in the preparation process related to science activities. For example, I prefer to prepare clay with children. Firstly, we talk about the raw material of clay. Then, we talk about the ingredients of it. That is, it includes flour, salt, water, oil. After that, we combine these materials together. As a result, children can see clay as a final product and they know what clay is (Emel).

On the other hand, one of the teachers described the role of teachers in early childhood science in a professional perspective. According to her, teachers' knowledge about science had an importance in order to provide exciting science

experiences for young children. She also stated that teachers should work on the scientific phenomena and concepts before planning and applying a science activity.

In addition to teachers' roles on science learning process, the participation of parents in their children's learning was important for their children's interest toward science. For example, one of the participant teachers stated that *"kitchen can be considered as a good science laboratory for children"* (Emel). Four participant teachers had positive views about parental participation on children's science learning at home:

> It is important to involve parents in the science learning process. I try to involve parents in science activities in different ways. For example, we can ask parents to investigate some issues with their children. For example, I ask parents to do research about why clouds are blue. They work on this question with their children (Seda).

> We ask parents to guide their children in their home environment. For example, we want some materials from parents in order to make some activities. At this point, we advise parents to ask their children to find these materials in their home. Thus, children learn by searching, finding, and comparing different things (Sibel).

> I can give an example about parental participation. We generally ask parents to bring some materials into the classroom. For example, we ask them to bring magnifiers to school. We expect that parents and children have a discussion about the use of the magnifiers. In this way, we can involve parents in science activities (Aysun).

On the other hand, one participant teacher stated the unwillingness of parents to be involved in the science learning process of their children:

> I believe that most of the parents are not concerned about children's science learning because they are generally interested in their children's academic success. They ask about their children's attention span rather than classroom experiences about science. They also want us to plan some activities to help their literacy skills for primary school (Bahar).

In summary, based on participant teachers' views about parental participation on their children's science learning, they believed that parents play an essential role on the science learning process and they would be valuable partners with teachers in

supporting science learning skills. On the other hand, one participant thought that the attitudes of parents toward this issue was not adequate because most of the parents did not give importance to science learning when compared to the academic success in areas such as reading, writing, and mathematics.

4.1.2 Teachers' views about science teaching experiences

4.1.2.1 Science teaching methods

Good preparation helps teachers to carry on science activities in a more effective understanding of science. It is also helpful for providing varied experiences related to science concepts and natural phenomenon. Moreover, this helps teachers to guide children in developing to their maximum potentials by involving well-prepared science activities. Most of the participant teachers stated the importance of the preparation process for science activities. Four of them thought that teachers should spend more time on preparing science activities.

For instance:

> I try to organize science activities on the basis of project theme. I should combine the science activity with the nature of the theme. For that reason, I try to emphasize the transition part (Aysun).

> Preliminary preparation is required for science activities. For example, if you want to conduct an experiment; you should practise it before applying in the classroom. Moreover, it is required to collect all materials for the experiment prior to doing it with children (Bahar).

> We make preparation about all activities before applying them in early childhood classrooms. All of these activities are important for us. However, science activities take more time when compared to other activities in the daily plan (Sibel).

On the other hand, only one of them claimed that there was no need to spend too much time for the preparation of science activities. She explained that *"the age of my children is too small*" (Emel). Thus, she did not think any requirement for extra preparation of science activities.

In-service early childhood teachers would need to use different teaching methods in order to reach all children's potential while planning and implementing science

activities. These methods can be considered highly effective when applied correctly. Four of the participant teachers claimed that they used certain methods in their science teaching practices. One of them used observation method [field-trip and investigation], technological tools, and visual assistance for the science project:

> I used observation [field-trip and investigation] method in my science activities because my children are too young. For example, we had observed birds last year. For two months, we examined the life of birds and tried to prepare documents about them including where they live, where they come from, what they eat. In this project, children watched a video related to birds and they investigated different bird pictures (Bahar).

Another participant teacher mentioned the use of books related to experiments. She mentioned that *"there is a variety of books related to experiments, so I used these in my science teaching practices"* (Seda). Other one used investigation, observation method, and practices related to senses:

> In science activities, we carry out investigations and observations. Moreover, we taste different foods and try to feel things we touch. As I said before we had a lemon activity. In this activity, children started to distinguish the different things such as senses and dimensions (Aysun).

Similar to other participants, one teacher also preferred to use the observation method in science activities. In addition, she claimed that it was good to use drawing after observing something with children. She also stressed the importance of book reading about scientific concepts. On the contrary, only one participant teacher mentioned that *"I do not use any prescribed teaching method in my classroom"* (Sibel).

An overview of teachers' preferences about science teaching methods was given in Table 4.1. In-service early childhood teachers were asked to list their third most important preferences: concept maps, project approach, experimentation, field-trips and investigation, analogy, drama, cooperative work, and computer-based instruction.

Table 4.1 Teachers' preferences about teaching methods in stating order of significance

	Participants					
Teaching Methods	Aysun	Emel	Seda	Sibel	Bahar	Total
Concept maps	X		X	X		3
Project Approach		X	X	X		3
Experimentation	X	X				2
Field-Trip & Investigation	X	X	X	X	X	5
Analogy						0
Drama					X	1
Cooperative Work						0
Computer-based Instruction					X	1

"Field-trips and investigation" was the most used technique by all participant early childhood teachers in their activities. The second most preferred method was both concept maps and project approach stated by three participant teachers. As a third most used category, experimentation was used by two participant teachers. On the contrary, Table 4.1 shows that analogy and cooperative work were not rated by any participant teacher.

4.1.2.2 Teachers' confidence in teaching science

Good science teaching in early childhood education is closely related to teachers' level of confidence in the teaching process. Their level of confidence influences their classroom practices by supporting teacher effectiveness in the classroom. Participant teachers generally stated that they felt confident about using science teaching methods in their classroom practices. Three of them stated that:

> I feel qualified to teach science. Before I start to apply one method, I plan the flow of the activity. So, the aim of the activity is parallel to your plans (Bahar).

> Three teaching methods (concept maps, experimentation, and field-Trip & investigation) are different from each other. All of these are so fun for me. Moreover, I feel confident in applying these in my classroom. However, the most qualified method I feel is experimentation because children have a good time conducting experiments (Aysun).

> Among three teaching methods (project work, experimentation, and field-trip & investigation), I feel qualified to apply field-trip and investigation. That is, I plan an activity which is implemented in the garden. However, life goes on in the natural life. So, there are lots of unexpected situations which I can notice. Then, I guide children to that situation in the garden (Emel).

Although all of the participant teachers considered themselves qualified for science teaching, they expressed some problems they faced in their science teaching practices. Two participant teachers mentioned their problems in terms of children's attention and their developmental characteristics:

> Of course, I have some problems while implementing science activities. Especially, it is difficult to increase children's attention on science activities because of their young age [2, 5-3 year olds]. […] So, I have difficulty in keeping children together because they want to do different things in the classroom (Aysun).

> Children may fear unfamiliar situations occurring in the classroom. In science, there are some unexpected issues within the observation process. Sometimes, they do not like these unfamiliar issues in science activities. In such cases, I have difficulty in involving them into science activities (Emel).

On the other hand, three of them mentioned the difficulty in answering children's questions:

> We do not have big problems in our practices. […] However, there is only one thing that happens in my classroom. Sometimes, children ask some questions which cannot be answered. You cannot decide whether you should explain them or not. That is, the main problem can be stated as children's questions (Sibel).

> It is important to explain situations to children on the basis of their levels. In small age groups, children can be easily distracted. For that reason, we say some attractive statements in transition [part of an activity] in order to increase their attention. At this point, children start to ask different questions related to our attractive sentences. So, children can be distracted (Seda).

> In early childhood education, science activities lead to making more observations. [...] So, science activities include some

> unknown situations and too many questions. I can state that dealing with too many questions [from children] creates problems while practicing science activities (Bahar).

In terms of children's questions, all participant teachers mentioned that when children asked unrelated scientific questions during the science activity, they preferred to answer these questions. Four of them stated that they answered children's questions immediately after they asked during the activity:

> I am sure that I should answer that unrelated scientific question at that moment. If I do not know what the answer is, I prefer to say that I do not know the answer of that question, but I can investigate [this] for you. So, I bring the resources into classroom and we can work on this issue (Bahar).

> I try to answer a child's unrelated question in a simple way because other children may be distracted by this question. In other words, if I try to answer that question in a detailed way, other children may direct their attention to that question. So, I prefer to carry on my planned activity. Later, I try to organize one activity to answer that question in order to make it clear (Seda).

> I prefer to select a simple answer related to that [unrelated scientific] question at that moment. I tell children to reconsider this issue at a later time. I try to select short statements while answering that unrelated question (Sibel).

> If I know the answer of that [unrelated] scientific question, I try to answer it at that moment. If I do not know the answer, I ask for more time to do research about how to make a clear explanation.

All of these participants preferred to answer a child's unrelated scientific question at that moment. However, one of the participant teachers wanted to answer only the question of the child who asked:

> If I apply another science activity at that moment [one of the children asks unrelated questions about one of the scientific issues], I pick up that child and I try to explain it to him only because other children sometimes can be distracted by this situation. Then, I have difficulty in drawing their attention to the planned science activity (Aysun).

4.1.2.3 Science process skills

The concept of doing science is closely related to science process skills. In early childhood education, teachers generally focus on the basic skills because of the nature of young children's thinking. These are observing, comparing, classifying, measuring, and communicating. When teachers were asked the science process skills, they stated that they planned to use in their classroom practices. Table 4.2 showed that all participant teachers applied some of the basic science process skills in their practices. All of them used "observation" in their classroom science activities. However, three of them applied "comparing" while only two of them preferred to use "classifying" in their practices. No one stated any preference about both measuring and communicating.

Table 4.2 Teachers' application of basic science process skills

	Participants				
Basic Science Process Skills	Aysun	Emel	Seda	Sibel	Bahar
Observing	X	X	X	X	X
Comparing	X		X		X
Classifying			X		X
Measuring					
Communicating					
Total	2	1	3	1	3

Some of the participant teachers gave some examples about their application of basic science process skills. One of them stated that:

> We generally use comparison and observation in our science activities. For example, we conducted an experiment related to salty water and ordinary water. Firstly, we filled two glasses with water. Then, we added some salt to one of the glasses of water and placed an egg in each of the glasses. It can be observed that the egg floats in salty water while it sinks in the ordinary water. In this experiment, children tried to make a comparison between salty water and ordinary water. Moreover, they observed the result of the experiment as whether the egg would be float or sink (Seda).

Another participant teacher claimed that:

> I can say that I prefer to use observation, comparison, and classification in science activities applied in my classroom. As I said before, we had a project related to the life of the birds. Firstly, we observed the different birds that come to the garden. We tried to investigate what they eat, where they live. They start to make a comparison between small and big birds in terms of their eating habits. They classified a variety of foods eaten by birds and they realized that not all birds eat the same things (Bahar).

Application of these basic skills depended on the performance of the early childhood teachers in terms of their science practices. When the participant teachers were asked to rate their confidence levels from uncomfortable to very comfortable for teaching science, they stated that they generally felt confident in their science teaching experiences. Table 4.3 indicated participant teachers' comfort levels from very comfortable to uncomfortable.

Table 4.3 Teachers' confidence in their science teaching practices

	Participants				
Teachers' comfort levels	Aysun	Emel	Seda	Sibel	Bahar
uncomfortable					
somewhat uncomfortable					
undecided					
somewhat comfortable	X	X	X		X
very comfortable				X	

Four participant teachers rated their comfort level as "somewhat comfortable" while implementing science activities. On the other hand, only one of them stated their comfort level as "very comfortable".

4.1.2.4 Scientific concepts

In early childhood, children may not readily understand some of the scientific concepts and some problems may arise from these difficult science concepts. It is important to help children's understanding of these scientific concepts. Participant

teachers mentioned different concepts that were most difficult for children to learn early childhood science:

> Children have difficulty in understanding the concept of "sky". However, you can easily teach them the general characteristics of sky. That is, you can organize a simple science activity including the terms related to sky such as the planet. Teaching sky to children is also difficult for me because the nature of this concept is too complicated. However, as I said before, if we organize the activity according to children's developmental level, there is no problem in the classroom (Sibel).

> I do not know whether this is an example of science concept or not. As an art activity, we glued sugar on the paper, and then we painted it using watercolor. At that point, we warned children to wait for a while after gluing the sugar. However, children want to apply watercolor immediately after gluing. So, the sugar has melted. They do not understand the nature of sugar (Emel).

> We applied a science activity related to animals' life. In that activity, the characteristics of flying animals could be difficult for young children because they did not distinguish birds from other flying animals. They said that all flying animals can be birds (Aysun).

> Children have difficulty in understanding some issues such as how babies come to this world, where babies come from, and who created us. I believe that children do not understand these complex issues. In addition, death is another complex phenomenon for young children (Seda).

Teachers' expressions showed that children had difficulty in some scientific concepts. Some of the participants suggested some solutions about teaching these difficult concepts. For example, one of the participants stated that it was better to explain this difficult concept [sky] in simple words.

4.1.3 Teachers' views about integration of science with art

4.1.3.1 Integrated activities/curriculum

Integrated curriculum provides different opportunities for children to see their world as a whole picture rather than separate parts. In addition, it helps teachers to

apply classroom activities in a more meaningful way. Participant teachers stated its importance from different points of view. For instance:

> Some of the activities can be integrated into each other. We can combine two activities such as different thinking activities and science experiments or problem solving activities and literacy activities. There can be also some integrated activities organized by teachers in order to create correlation between them (Seda).

They also addressed the use of projects:

> We prefer to use integrated activities in our classrooms. I prefer to organize interrelated activities in my daily plans. It is important that we combine different types of activities to help children's development. For example, we apply monthly projects in our school. According to these projects, we select one theme and organize activities on the basis of that theme (Sibel).

> Integrated activities can be helpful in drawing children's attention to the activity. […] Moreover, it really allows children to learn different things. Different children learn in different ways. That is, some children can learn easily by instructing, others can easily understand with the help of the music or visual art. For that reason, I always try to combine different subjects with each other (Aysun).

> I believe that activities can be integrated into each other. I also say that it should be applied in early childhood classrooms. Especially, small age groups need a connection between everything in the classroom. When we combine them, learning can be more meaningful (Bahar).

The application of integrated activities provided some opportunities for teachers. Participant teachers mentioned the importance of it in early childhood curriculum in different aspects. For example, one of the participant teachers stated that:

> There are different intelligence types among children. That is, children may not learn the same things in the same way. It is good to prepare integrated activities to support different intelligences. So, it can be helpful for promoting deep and permanent learning (Emel).

> I think that children make connections between activities so meaningful learning can be constructed. Moreover, the issue of

> individual differences is essential to learn about children's different learning styles. With the help of integrated activities, we can provide opportunities for children to complete their unfinished learning process (Bahar).

On the other hand, two of the participant teachers stated that there were some negative aspects as a result of the implementation process. As stated below:

> It [the application of integrated activities] gets too boring when children work on same theme over a period of time. For example, "apple" as a theme can be boring when children attend all of the activities related to it. For that reason, teachers should give importance to this issue while planning integrated activities (Bahar).

> Some children can get bored easily. For example, when we apply too many theme-based activities, these children do not like attending these activities because it is boring for them (Aysun).

4.1.3.2 The place of art in early childhood curriculum

Art in early childhood education can be considered as an important element of teachers' plans because it can be helpful in analyzing children's understanding about their world. All participant teachers stated that art has been an essential part of early childhood curriculum. One of the participant teachers mentioned that:

> We do different art activities as a group work. Children like doing something with their friends. So, it is good to apply art activities. […] With the help of art activities, children learn to both share and work as a group (Aysun).

> We apply art materials in our classrooms. For example, the use of junk materials provides the opportunity to create something as a product. This is important for them because they make it on their own (Sibel).

> Art activities play an essential role on children's development. While drawing pictures, children feel good about themselves. In addition, they have a good time while engaging in art (Emel).

> Art is one of the popular activities in early childhood curriculum. For example, children can work on junk materials and they create lots of creative things using their imaginations (Bahar).

Participant teachers generally used different art activities in their practices. One of the teachers stated that *"we prefer to use watercolor, finger paint, tear and paste, paint with colourful pens"* (Emel). Similarly, another one mentioned that:

> We apply different art activities in our classrooms. I generally provide the opportunity for children to make choices about materials which are used for art activities. Children's choices are important for me because they can do whatever they want. For example, children can work in a more effective way when they choose their own materials (Bahar).
>
> We use different materials in our art activities. For example, we start to work with junk material by decorating boxes or picture frames. In addition, we play with play dough in order to make different shapes and figures. Then, we paint and hang them on the wall (Aysun).
>
> In art activities, children use junk materials in order to create new things. It is important for them because they design their products using their own imagination. For example, one child used a hair clip as a microphone in her play. She also decorated it using a variety of materials. It was seen that she was happy to use it because she made her own toy (Sibel).

4.1.3.3 Science and art integration

All participant teachers stated that they generally used "art" in their classroom practices. Considering science and art integration, all teachers stated that science and art can be integrated into each other. One of the participant teachers pointed out that *"I prefer to use this integration (science and art), but I always mentioned the importance of these activities separately"* (Sibel). Another participant teacher stated the importance of integration as *"when we use science and art integration, it is more attractive for children"* (Seda). Other participant teacher stressed that:

> I believe that the integration of science and art should be used because of its positive outcomes. For example, after the bird observation activity, it is good to combine science with art in classroom practices. […] This shows that the integration can be helpful for children to make connections between different learning outcomes (Bahar).

Participant teachers gave similar examples about their practices related to science and art integration. One of the participants mentioned:

> For example, I prefer to use science and art integration after doing an observation. After observing nature in the garden, we (children) drew pictures about what we saw outside. Then, we discussed our observations and drawings (Emel).

> After doing observations in the garden, we came back to the classroom and drew pictures about what they saw such as trees. When I analyzed children's drawings about trees, I saw how children interested the concept of tree. It was helpful for me to see children's progress (Sibel).

> For example, we observed a skeleton system on the model. Then, we investigated different animals' skeleton systems and tried to find out the differences between them. After completing all of these, we drew pictures about them. Thus, I could see children's perceptions of this topic (Bahar).

As a summary, in terms of participant teachers' views about integrated curriculum, all participant teachers believed in the importance of integrated activities in early childhood settings. They generally preferred to use integrated activities in their classrooms. Regarding the place of art in early childhood, teachers generally organized their activities using watercolor, finger paint, tear and paste, paint with colorful and junk materials. Most of them stressed the importance of junk materials on children's creativity. Considering their views about science and art integration, most of them stated observation and drawings as an integrated activity.

4.2 Observations

The two observers observed each of the five early childhood teachers during the implementation of art-based science activities in their classrooms. They took notes in three phases: before (as a transition), during, and after the activity. Both teachers and children were observed because of interactive nature of the classroom environment. Before observing each participant teacher, at the beginning of the study, the researcher observed some of the activities in order to be familiar with classroom environment.

4.2.1 Aysun

The teacher preferred to start the activity by making physical movements in the classroom. After that, she wanted children to be butterflies. She guided them to observe their environment such as flowers, trees, and leaves in the garden. Then, the teacher gave magnifiers to all children in order to carry out their investigations. She wanted them to observe whatever they wanted. She asked children to collect natural materials in the garden. After that, children and the teacher came back to the classroom. Teacher took a magnifier and asked children what it was. She directed children to think about the magnifier. Teacher gave two magnifiers to children to identify the difference. Each child touched them and decided which one was empty. After that, the teacher gave the magnifier [with glass] to children one by one. She wanted them to investigate the collected materials from the garden. Generally, children chose cones for investigation. They tried to feel the touch while engaging with cones. Then, the teacher wanted children to select one of the leaves on the table. Children put these leaves on white paper and glued them on it. The teacher asked them to hang these on the classroom tree. All children took their leaves and stuck them on the classroom tree (Figure 4.1).

Figure 4.1 Classroom tree with children's works

4.2.2 Emel

The teacher started an activity with nursery rhymes [Oo piti piti] in the classroom. Then, she wanted children to sit in the chairs. The teacher showed field glasses to children. She asked the name of it. Then, the teacher explained to the children what field glasses are and how to use them. After that, children looked at the trees up close through their field glasses. The teacher gave field glasses to all children in order to look out the window. She asked some questions to gain children's attention. Then, the teacher distributed two plastic cups and helped children to glue them to each other. After that, she said that children could paint whichever colour they wanted. However, she realized that children could not paint on the plastic cups. She provided alternative materials for children. These are junk materials including ornament and folios. Then, the children started to decorate their plastic cups with these materials by using tear and paste technique. At last, she distributed glues to children to stick two cups to each other (Figure 4.2).

Figure 4.2 Field Glasses

The children and the teacher took their own field glasses and went to the garden. Teacher reminded children how to use the field glasses. She also directed children to realize different things in the garden. They came back to the classroom. While the teacher summarized what they did so far, she distributed white papers to children. She wanted them to draw pictures of what they saw using their field glasses (Figure 4.3). She gave the opportunity to all the children to describe their pictures to all their friends.

Figure 4.3 Children's drawings

4.2.3 Seda

The teacher brought a box into the classroom. She asked them to guess what types of materials were in the box. After the estimating part, the teacher wanted them to try these materials and decide whether they could be eyeglasses or not. The children tried to put different materials as eyeglasses. The teacher provided different materials for children's attempts such as plates, boxes, books. Lastly, the teacher picked a magnifier from the box and asked children what it was. The teacher directed children to try out whether they can be eyeglasses or not. The teacher distributed small magnifiers to children.

After that, the teacher wanted them to investigate whatever they saw in the classroom by using their magnifiers. The teacher wanted children to put magnifiers into the box while sitting in the circle. After the explanation of the activity, the teacher asked the children what they wanted to see with these eyeglasses. Children answered

"wolf, fish, horse, monster, car, and lion". The teacher wanted them to draw these on their white papers.

4.2.4 Sibel

Teacher put a chair in the middle of the classroom in front of the mirror on the wall. She wanted children to get out of a chair on foot. Then, she asked the children what they saw looking back. After children's answers, the teacher prepared another activity related to darkness. She put four chairs in the middle of the classroom. Thus, she built a frame of tent for this experiment. Then, she covered it in plenty of dark material such as curtains and blankets. She invited children to make a prediction about what they will be able to see in the dark room. She wanted children to go into the darkroom. She asked them to say what they saw there (dark room). Children answered as *"dark", "too dark",* and "*completely dark*". After that, the teacher asked again *"How can we see in the dark at night?"* Teachers asked them again: *"How can we see in the dark at night?" and "What do you think helps us to see at night?"* After these questions, the teacher answered the question as "moon". Then, children said that *"moon and stars help us to see at night".*

After that, the teacher explained the activity to children. She wanted them to draw a picture of day and night. She also asked children: *"How can we draw night on the paper?"* One of the children answered that *"we can paint a paper plate with black paint. Thus, it can be dark".* Then, she distributed white papers to children in order to carry out that activity. Children painted one side of the white paper with black paint. After that, they started to draw pictures of daytime and night. While drawing their pictures, children spontaneously started to tell their pictures to each other. After all children finished their paintings, the teacher wanted them to describe their pictures to their friends. So, all children described their pictures in order.

4.2.5 Bahar

The teacher distributed magnifiers to all children in the classroom. She wanted them to investigate their hands, fingers, and the surface of table. The teacher directed children to go on a field-trip in the garden. They wanted them to do observations about

natural life. In addition, she asked them to collect natural materials from the garden. Firstly, she indicated how children used the magnifier in the garden. After that, she wanted them to observe different things using magnifier and to collect these materials in the box. This time, the children started to observe their environment using magnifiers. She also helped some children who could not use magnifiers there. One of the children called the teacher and other friends in order to show an insect. All of them observed the insects and observed its movements.

After collecting materials, the teacher and children came back to the classroom. The teacher wanted them to sit in a circle while putting magnifiers. She placed collected natural materials in the circle. Then, she asked children to investigate which material they wanted. Children observed collected natural materials such as leaves, small stone, and cones. After the separate investigation process was completed, the teacher helped children to investigate a piece of leaf on a big magnifier. This time, she introduced a bigger magnifier to children and how to use it. Then, each child worked on the parts of the leaf with the help of the teacher. This time, the teacher set up the balance scale into the classroom. She wanted them to measure "*leaf*" and *"stone"* using a balance scale. She explained the concept of heavy and light by using a stone on one side of the scale and a leaf on the other side. She also encouraged children to weight these items after putting more leaves on one side. She wanted them to make a comparison between these two items. After that, the teacher encouraged children to weigh stones and cones. She also added more cones on one side of the balance scale. The children realized that stones were heavier than cones.

After completing the measurement part, the teacher asked children to separate natural objects putting different plastic bags. So, children grouped these objects as leaves, stones, and cones. Then, they put these items into bags. After that, the teacher wanted them to sit at the table and asked them what types of materials they collected from the garden. The children said the names of the three groups including natural materials. Then, the teacher distributed blank papers to children and wanted them to select one group of natural material collected from the garden. After investigating this object with magnifier, she wanted them to draw pictures of these objects.

As a summary, in terms of participant teachers' classroom practices about art-based science activities, while three of them preferred to apply their science activities in the garden, two of them planned to apply them in the classroom. The theme of that month was "magnifier" so that all teachers prepared their activities on the basis of it. Three participant teachers designed their activities using magnifiers. They directed children to investigate natural materials such as leaves, cones using magnifiers so that these experiences were helpful for children to understand the function of the magnifier. However, other teachers implemented different types of activities such as making field glasses and experiencing with the day and night concepts. With regard to "art activities", all participant teachers used art activities after the science activity. Only one participant teacher preferred to use three-dimensional art work in her activity while others organized the art activity as two-dimentional art work. Participant teachers also used other activities such as music and physical movements in their science activities. The duration of the activities was varied from 30 to 45 minutes including preparation, application, and evaluation processes.

4.3 Post-Interview Findings

4.3.1 Teachers' views about general science teaching

4.3.1.1 Science activities

In early childhood education, teachers' planning is important to show balance among different activities. It was shown that most of the participant teachers preferred to organize science activities at least two times a week. On the other hand, one of them mentioned that:

> I could not give any definite number about my science practices because it depends on the nature of the project. As I said before, we used monthly projects in our school. So, some projects allow us to implement more science activities. On the contrary, some others were not closely related to science. We can decide how many science activities can be implemented in a week according to the nature of the topic (Emel)

Similarly, another participant teacher stressed the importance of projects on organizing science activities in their practices. She mentioned that

> The number of science activities can be changed on the basis of projects. However, we generally try to apply science activities in relation to projects. I prefer to use at least two or three science activities a week. In addition, it depends on the children's age. We gave more emphasis on children's age and developmental characteristics (Aysun).

In addition, participant teachers preferred to use different science activities in their classrooms. While all of the participant teachers used "observation" as a science activity, they also organized different science activities in their practices. For instance:

> We carried out different experiments in our science activities. Moreover, I organized an activity that children can observe different things and draw on their understanding. Furthermore, we use make-believe play in our science activities. That is, after we conduct experiments in our classroom, children start to pretend what they see and learn in that experiment. We also collect different materials in order to make a collection such as a stone collection (Sibel).

> We generally use observation in our science activities. We look after and observe animals such as fish, and turtle in our classroom. After that, we draw what they are observing in that activity. We also make literacy activity about how we can help that animal (Seda).

Another participant teacher mentioned that:

> We generally do observations in our garden. That is, we observe all the animals such as birds, small insects, and what other creatures we may find. We also observe the plants as they grow during the various experiments. In addition, I organize an activity to help children explore the sense of taste with salty or sweet food. While implementing these small experiments, I provide the opportunity for children to learn by doing (Emel)

While planning these science activities, early childhood teachers provided materials for children in order to promote children's learning. According to them, various materials could be used in the science activities regardless of whether they were related to science or not. One of the participant teachers stated that:

> It is good to have a garden because I do not experience any difficulty in finding materials. Children like observing natural life. For example, magnifiers play an important role on this process. In

addition, children use diggers, shovels while engaging with sand and water activity in the garden (Emel)

We generally provide big materials to children such as big plastic cups. In addition, we prefer to use various materials to improve children's sense of touch. For example, I choose a material for each type of touch we learned such as hard versus soft and rough versus smooth (Aysun).

Science includes wide a range of activities in early childhood education. So, we generally select a variety of scientific materials to stimulate children's interest. For example, magnifiers and telescopes are good examples of scientific materials (Seda).

Regarding participant teachers' actual classroom practices, three of the participants stated that they could apply their science activity as they planned in terms of materials.

The materials for the activity were sufficient because I prepared the materials before implementing. In addition, children's feedback was very good. So, it is good to prepare the materials prior to the activity (Sibel).

In my activity, I plan to use different science materials such as magnifiers and weighing scale. These are our classroom materials. For that reason, I could use these materials for whatever I plan (Bahar).

On the other hand, two of the participants expressed that they wanted to change their activity according to the place and materials. One of them expressed that:

I could apply that activity using different materials. If there was a science room in our school, it would be better to implement that science activity improving children's learning. My classroom needs more materials to attract children's attention in terms of science learning (Seda).

While implementing my science activity, I realized that materials were not appropriate for children's age. I chose plastic cups to make field glasses. I wanted them to paint these with pastels. However, they could not paint because of their fine-motor skills. So, I immediately changed pastels with junk materials. I guided them to glue junk materials on plastic cups (Emel).

As a summary, all participant teachers preferred to apply science activities at least once a week. They stated the importance of projects in their science teaching practices because Project Approach was used as a curriculum approach in this preschool. The projects were planned on a monthly basis so that teachers organized their science activities in terms of the project themes. In addition, they stressed the importance of natural objects in children's science learning experiences.

4.3.1.2 The importance of science in early childhood curriculum

Science can be considered as an important subject area to improve children's development and learning. The effective use of science in classroom environment is closely related to early childhood teachers' views and practices. Most of the participant teachers stated the importance of science in early childhood curriculum in terms of different aspects. For example:

> Science activities play an important role on children's life because they are attractive for them. While engaging with science, children have a lot of fun. In this way, they learn various science concepts easily (Aysun).

> Regarding science activities, children can learn by living and observing. Moreover, they can understand different scientific concepts by making experiments. I believe that mathematics and science are similar to each other. We generally use the same methods in these subjects (Sibel).

> I think that science activities are helpful for children to observe, apply, try and experience with new things. So, children actively participate in learning. I have a positive view on implementation of science with young children (Bahar).

> I think that science prepare children for life. Regarding science activities, children become actively involved in the process. For example, we investigate a flower in one of the science activities. Children can observe flowers in their garden or home environment. So, I know that children can make connections between the science activity conducted in the classroom and related experiences (Seda).

Regarding the implementation of science activities, the preparation part is so important to achieve defined goals. Participant teachers stated that they should pay

more attention while planning science activities. One of the participant teachers mentioned that "*the preparation of the science activities is related to the topic of the project*" (Aysun). Another one expressed the importance of providing different materials:

> I try to collect different materials in order to gain children's attention. I also put more emphasis on the coherence between materials and the nature of the projects (Sibel).

> I try to organize science activities using other subjects. In this way, I can provide various integrated activities for children. For example, I use art activities while teaching science to my children [my students]. In addition, I use the Internet to provide different science activities for young children (Emel).

> It is required to do preparation for science activities. Teachers should provide materials before the activity. Thus, the activity can be implemented in an effective way (Bahar).

Considering teachers' actual classroom practices, all participant teachers did preparation for their activities implemented in the classroom. They stressed the importance of material selection for their science activities. Four of the participant teachers described their preparation as preparing materials before the science activity, while one of them mentioned the issue of planning for science activities. One of the teachers stated that *"the materials selected to teach science are essential for successful implementation"* (Bahar). Another participant also mentioned *"the importance of preparation for time management"* (Emel). The others stated their preparation process on the basis of supplying materials:

> I prepared different materials before implementation. In my activity, I brought eyeglasses in the classroom. I tried to draw children's attention to the eyeglass. In addition, I provided a big cartoon box including different materials. I chose those materials from the school because I wanted children to be familiar with those objects (Seda).

> I selected materials that are attractive for children. I generally try to find materials that children have not seen before. In my activity, I try to use a magnifier as an attractive part of the implementation. Children like playing with these scientific materials in the

> classroom. So, I realized that I chose appropriate materials for them (Aysun).

Participant teachers focused on the aspects of how children learn on the basis of similar views. All participant teachers believed that children learned science by doing. They mentioned that children learned different scientific concepts while observing and engaging with scientific experiments. Regarding participant teachers' actual classroom science practices, Bahar stated that her science activity was organized on the basis of this principle. She expressed that:

> I organized that science activity addressed on the children's active participation. I gave them magnifiers in order to investigate leaves, cones, and stones. Then, I wanted them to measure the weight of these objects. I also allowed them to put these items and guess which one is heavier. All of these showed that children learn by doing in my activity (Bahar).

Similarly, Aysun believed that the process of her activity required children's active participation. She explained that:

> In my activity, children started to use magnifiers. They initially learned how to use them. Then, they realized that they could use magnifiers on their own. So, they wanted to use them in the other activities. I saw that children learned more easily, when they used it (Aysun).

Parallel to this view, Emel also expressed that her science activity was organized for children's involvement. She explained that:

> In my activity, they started to look through their field glasses in the classroom. After they learned what the field glasses were, they made their own field glasses in order to make their own investigations in the garden. At the end of the activity, they learned how to use field glasses and how to do investigation using them (Emel).

In addition, although two participant teachers expressed the importance of getting children actively involved in science activities, they did not mention anything about this issue in their actual classroom practices. In fact, Seda and Sibel evaluated their actual science practices in terms of different points of view. According to Seda:

> In my activity, I concentrated on imagination. I wanted them to express their feelings by using imaginary eyeglasses. So, they expressed their actual feelings […] in this way, I saw children's developmental progress (Seda).

Similarly, Sibel pointed out that *"it was important for children's active participation in their science-related experiences*". She did not address this issue in their views about actual classroom practice. She expressed that children learned different concepts such as characteristics of glass in her activity. She also pointed out the transition of scientific concepts into children's play. However, she did not give any example about children's learning process.

4.3.2 Teachers' views about science teaching experiences

4.3.2.1 Science teaching methods

In early childhood education, different teaching methods can be used to improve the learning process. In science teaching, there are eight commonly used teaching methods to represent teachers' preferences about their practices: concept maps, project approach, experimentation, field-trips and investigation, analogy, drama, cooperative work, and computer-based instruction. All participant teachers preferred to use the project approach because of the curriculum of the school. In addition, concept maps were considered as a beginning phase of the project work. Thus, all participant teachers rated most used teaching methods as projects and concept mapping.

Table 4.4 Teachers' preferences about teaching methods in science teachings

	Participants					
Teaching Methods	Aysun	Emel	Seda	Sibel	Bahar	Total
Concept maps	X	X	X		X	4
Project Approach				X		1
Experimentation		X		X		2
Field-Trip & Investigation	X	X	X	X	X	5
Analogy						0
Drama	X		X		X	3
Cooperative Work						0
Computer-based Instruction						0

Table 4.4 showed the teachers' preferences about science teaching methods. The most preferred method of science teaching can be stated as "*Field-Trip & Investigation"*. The second most preferred method was rated as *"Concept maps"* by four participant teachers. In addition, three participant teacher addressed *"Drama"* as the third most preferred method in their science teaching practices. On the other hand, none of the participants mentioned "Analogy", "Cooperative Work", and "Computer-based Instruction" for teaching methods.

The application of these teaching methods mentioned above was closely related to early childhood teachers' practices and their confidence levels. Some of the participant teachers described their confidence level as high. For example:

> I feel confident in my ability to teach science in my age group [small age group]. I think that science activities that I implemented in my classroom were helpful for children to understand science in a meaningful way. In addition, children had a good time while attending science activities (Emel).

> I feel confident about teaching science to my children [students]. When I apply science activities in the class, I am excited about seeing children's reflection on science (Aysun).

> I feel confident about science in my classroom practices. I believe that this can be changed according to the nature of the activity. That is, while some activities require more preparation, some others do not need any further information (Seda).

On the other hand, one of the participant teachers described their confidence level as low because of her educational background:

> I am not confident about teaching science. Firstly, I should examine the concepts in a detailed way. Then, I can apply them to my children [students]. In addition, I try to apply science activities similar to other early childhood activities. I do not know whether I should do something more while organizing science activities. I believe that my educational background is not enough to apply good science activities because I do not remember anything about science teaching (Bahar).

When asking children's confidence levels from uncomfortable to very comfortable about their actual classroom science practices observed in the classroom, most participant teachers rated themselves as "somewhat comfortable" (Table 4.5).

Only one of them stated her confidence level as "very comfortable". She mentioned that *"if you know the concept very well, you should feel confident about the activity"* (Sibel).

Table 4.5 Teachers' comfort levels about their actual classroom science practices

	Participants				
	Aysun	Emel	Seda	Sibel	Bahar
uncomfortable					
somewhat uncomfortable					
undecided					
somewhat comfortable	X	X	X		X
very comfortable				X	

4.3.2.2 Science Process Skills

It is essential to improve science process skills of observation, comparison, classification, measurement, and communication in early childhood settings. Participant early childhood teachers viewed all of these skills as requirements of doing science. One of the participants stated *"I generally use these [science] process skills in the science activities"* (Emel). Similarly, another participant showed her general view about science process skills that *"I should plan to use all of them because some of the science activities require to apply all these skills"* (Aysun). Also, another one believed in the positive impact of these skills on children's learning. She stated that:

> I prefer to use all of these skills because I should follow the process of the science activity. While implementing it, I try to give importance to the different learning styles of my children [students]. So, I believe that if one child could not learn one concept using "observation", s/he might learn it as using "measurement". So, it is helpful to plan science activities on the basis of science process skills. Of course, it is important to use all of them (Bahar).

While other two participants also mentioned the importance of using science process skills, they preferred to use some of them if required. Sibel stated that the usage of these skills is changed according to the nature of the science activity. Sometimes, she plans to use only one skill or two of them. Similarly, Seda expressed

that these processes are related to each other. So, if the activity includes one or two of these skills, she plans to use them.

When the participant teachers were asked about their actual science practices, they evaluated their own implementation of science process skills in the following table.

Table 4.6 Teachers' rates about their actual practices related to science process skills

	Participants				
Basic Science Process Skills	Aysun	Emel	Seda	Sibel	Bahar
Observing	X	X	X	X	X
Comparing	X	X	X	X	X
Classifying	X				X
Measuring					X
Communicating	X				X
Total	4	2	2	2	5

All participant teachers expressed their actual practices about science process skills in detail. For example:

> I applied a science activity related to magnifiers. I plan to use communication in order to understand children's thinking about what they observed. In addition, they used classification to separate leaves collected from the garden. As a main skill, observation was used because children firstly observed leaves, then they classified them according to different characteristics. Lastly, comparison was used while comparing two magnifiers whether they had a glass or not (Aysun).

> I try to use science process skills in my activities. Similarly, I plan to use these skills by observing leaves, stones and cones, comparing these, classifying them according to their characteristics, measuring them with a balance scale, and communicating about children's experiences (Bahar).

> Children used two science process skills in my activity: observation and comparison. They observed their environment using field glasses. They also look through the field glasses to see the short and long distance. Then, they compared these two situations with each other (Emel).

In addition, another participant teacher described her activity on the basis of observation and comparison:

> In my activity, I planned to use observation and comparison. Children observed how their environment appears during the day. Then, they tried to compare two concepts: day and night. […] I think that there can be more skills in this activity (Sibel).

As a summary, all participant teachers thought that science process skills were essential for children's science learning experiences. One participant claimed that science process skills were helpful for children with different learning styles so that they could easily understand the scientific conceps. All participants generally planned to use "observing and comparing" as science process skills in their science teaching practices.

4.3.2.3 Effective science teaching

There have been many approaches related to effective science teaching. The ways to apply effective science activities are influenced by teachers' views about science teaching. Participant teachers proposed some suggestions in order to plan and apply effective science activities in early childhood education from different points of view. For example, one of them addressed the planning process:

> It is important to plan science activities in order to help children to discover the joy of science. For example, I organized a "cooking pasta" activity including lots of scientific issues. If I had not let children discover what was happening there, they could not have learned anything about those concepts. So, if I want to have an effective science activity, I should allow children to engage in the activity. In addition, it is effective to use other subjects while implementing science. The activity that I mentioned above also included drama to help children express their understanding about concepts using their body language (Sibel).

Similarly, another participant teacher addressed the organization of field-trips in the planning part:

> We can provide the opportunity for children to learn the concepts meaningfully. For example, if we work on the concept of flower,

> we can organize a field-trip to a greenhouse in order to help them to see where flowers grow and how they grow. With the help of this trip, they can observe the actual settings related to flowers. I believe that it is important to guide children to use this information in their daily life experiences (Seda).

Another one emphasized the importance of parent involvement into science teaching process:

> I believe that we should not limit science in school environment. Children can learn lots of things related to scientific concepts in their homes. For example, parents can conduct experiments related to the physical state of water because they always boil something in their homes such as tea or soup. In this way, children can observe matter [water] change from liquid to solid and then to gas. So, children can experience with these with their parents (Emel).

In addition, while one of the participant teachers stated the place of children's interests on effective science teaching, the other one claimed that a variety of different materials is crucial. They explained their views as follows:

> I think that while implementing a science activity, it is essential to keep children's attention. For that reason, I plan the science activities on the basis of their interests, so they want to participate willingly. This is helpful for implementing science activities in a more effective way (Aysun).

> It is essential to provide various scientific materials to children. We should not store them in the storage room. With the help of these materials, children can discover new things (Bahar).

When asked about their actual classroom science practices, only two of the participant teachers did not want to change their classroom activity in order to make them more effective. On the other hand, three of them made some suggestions to improve them. For example:

> We made field glasses in my activity. It was better to put lenses into their field glasses. In this way, they could easily see the actual view of field glasses using their own products. In addition, children could make hanger for their field glasses, so they could easily use them in the garden (Emel).

> I applied my activity in two places: the classroom and the garden. It is better to stay in the garden during the activity because children could observe different aspects of the natural environment such as small insects, or soil (Aysun).

As a summary, participant teachers suggested certain ways to apply effective science activities in their science teaching practices. While some of them addressed the role of parents in their children's science experiences, some others claimed the importance of teaching methods such as field trips.

4.3.3 Teachers' views about the integration of science with art

4.3.3.1 Integrated activities/curriculum

Integrated curriculum can be considered as an important approach to create more exciting learning experiences. In addition, it helps teachers to make connections between different subjects. It also helps them to plan different early childhood activities in a balanced way. All participant teachers mentioned the issue of integrated curriculum in different perspectives. Two of the participants stressed the importance of transition activities as follows:

> It is helpful to combine different subjects to each other. In this way, children are not easily distracted because these are compatible activities. I believe that transitions between activities are essential part of daily program. For that reason, integrated approach help us to become more involved in the activities. Moreover, children have the opportunity to transform their learning from one area to others (Aysun).

> I believe that integrated curriculum helps children's progress. […] I think that the transition part of an activity can be considered as the most important part of my practice because children easily make connections between different activities. With the help of integrated activities, children can understand cause and effect relationship. In addition, they can see activities as a whole rather than separate parts. I realized that children can observe the relationship and understand the whole picture of the situation. As a result, they learn different concepts meaningfully (Seda).

In addition, one of them described the positive side of integrated curriculum as improving children's progress:

> With the help of integrated curriculum, activities follow each other according to the daily plan. As a result of this, you take the children from one level and put them in a higher one. In this way, children learn a concept in a more detailed way. In addition, they can easily remember their previous experiences (Sibel).

Furthermore, two participant teachers mentioned their views on the role of integrated curriculum on children's different learning styles as follows:

> I believe that integrated activities help children to learn different things meaningfully. If I plan the activities in an integrative way, I observe that it promotes deep and long lasting learning. In addition, children have different learning styles because of individual differences. I try to give more importance to this issue. For example, some children can learn by participating in physical activities while some others can learn by doing experiments. I believe that this process [integration of activities] is good for children's development (Bahar).

> I think that children have different learning styles. One child does not learn anything from one activity but, s/he can easily learn something from another activity. It is closely related to multiple intelligence types. So, children who have different learning styles can practice and learn new things with the help of integrated activities (Emel).

As a summary, participant teachers thought that integrated activities were helpful for making transitions between different activities. It was important to make connections between them. In addition, participant teachers also stressed the impact of integrated curriculum on children's development.

4.3.3.2 Science and art integration

Art plays an important role on both children's learning and teachers' classroom practices related to scientific principles. By experiencing with science and art, children can discover different learning experiences. Participant teachers

emphasized the importance of integrated science and art activities from different perspectives. For example, two of the participant teachers described its place as:

> Science and art can be easily combined to each other. We generally want children to draw pictures after working on science activities. So, children can form their understanding in their minds and reflect them on paper. In this way, we can see children's reflections on that scientific concept (Emel).

> I think that this [integration of science and art] is a good idea to implement. We can attempt to integrate different activities to each other. I used it in my classroom practice observed by you. As a result of this practice, I believe that it is better to apply different activities on the basis of one main topic (Seda).

> During integrated science and art activity, children learn different scientific concepts when they actively participate in activities. In addition, children spend enjoy their learning progress (Sibel).

Some others pointed out the importance of transitions among the activities:

> It is important to integrate science with good transitions. So, children can understand the nature of the learning progress. In addition, children can make their products in a correct way. […] I mean that meaningful learning can occur as a result of good integration (Bahar).

Another one mentioned the usage of integrated science and art activity with small age children:

> I could not apply science activities alone with my group of children because of their young age. They get easily distracted in the science activities. It is good to combine science and art because the younger children like painting. When I plan the science activities with art, they are willing to attend this activity because they know that they will make drawing at the end of the activity (Aysun).

While implementing integrated activities in early childhood classrooms, there are some benefits of them for early childhood teachers. These benefits were explained by teachers on the basis of their actual science practices. For example:

> Children generally like attending art activities. So, we can guide children's attention toward different scientific concepts. In addition, they make their own products. So, they show willingness to go outside and do research (Emel)

> With the help of art, we can understand children's understanding of science. Art helps us to see children's communication with others because they use art to express their feelings. For example, after analyzing children's pictures related to science activities, I can see their points of view about their performance or what they understand from that science activity (Bahar).

Another participant also mentioned the importance of children's experiences:

> Art can be considered as a way to understand children's thinking. In addition, it is helpful for us to see children's development (Seda).

Regarding participant teachers' actual classroom practices, teachers described their previous experiences about whether there was a difference between their practices related to science activities and integrated science and art activities as follows:

> If I implement science activities alone, without art, it can be "unfinished" for me. I think that integrated science and art activity provides opportunities for children to reexamine the subject again and again. In my activity, children wanted to look at their leaves on the classroom tree. I believe that children can remember details about science concepts when they are applied with art (Aysun).

> Firstly, I want to say that every science activity can be considered as an art activity because different techniques are used in science activities. For example, teachers use junk materials in order to make a product related to one of the science concepts or they conduct an experiment including different art materials. Keeping all of these in mind, we should combine these two activities (Sibel).

> I think that children could not understand the scientific concepts which I aimed to teach when I implemented science activities alone. However, integrated science and art activities help children to make a comparison between different things by making pictures. So, they learn scientific concepts easily and meaningfully (Seda).

> I think that there is a big difference between science activities alone and integrated science and art activities. I can understand children's interests about scientific concepts with the help of science

> activities. On the other hand, I can easily see children's progress related to what they learn by looking at their art works. We cannot assess these children's understandings because they do not know how to write and read. So, I can evaluate children's learning using their art products (Bahar).

4.4 Summary

This chapter represented the descriptions of participant teachers' pre-interview and post-interview findings and the classroom observations of teachers' actual classroom practices. Throughout this chapter, general views of the participant teachers about science and art-based science activities have been displayed. In terms of science, participant teachers believed that observation was one of the essential tools to teach science. They also expressed the importance of child-centered science activities. In which children were able to learn science by doing. With regard to art, participant teachers were familiar with using art in their practices because the school curriculum requires doing projects with children. In this study, participant teachers generally defined art as a drawing or three dimensional works. In their actual classroom practices related to science, they tried to teach concepts using art activities. Most of them used art at the end of the activity to assess children's understanding of scientific concepts.

4.5 The Effects of Workshop on Early Childhood Teachers' Views and Practices in terms of Science Teaching and Integration of Science and Art

Participant early childhood teachers, who have been working in one of the private school in Ankara, were interviewed and observed about their teaching practices related to science and integrated science and art activities. The data was investigated in order to understand in-service early childhood teachers' views and practices of science and art integrated curriculum. The detailed analysis were based on data that came primarily from the pre-interviews and observations, while post-interviews helped me make the connection between their views before and after workshop in which participants were trained on teaching science and implementing integrated science and art activities. Although each participant teacher had different educational backgrounds, several

common themes emerged. These themes provided information about teachers' attempts to implement integrated curriculum. This chapter shows how a group of early childhood teachers working in the same preschool reflect their science teaching practices and how they use integrated approach in their classroom practices as well as how the workshop affected their views and practices about integrated science and art activities. Findings from post-interviews and other sources; pre-interviews and observations are represented based on themes and patterns that have emerged following the data analysis.

The last research question in this study was, "How do early childhood teachers view and practice visual art activities and science concepts after the workshop was conducted?" This research question had three parts, the first relating to early childhood teachers' science practices, the second relating to teachers' applications about visual art activities in teaching science after the workshop, and the last relating to teachers' views about integration of visual art with science after the workshop was conducted. Three major themes were identified related to teachers' views about several sub-themes. The themes were (1) importance of science, (2) the preparation process of teachers, (3) how children acquire science, (4) science teaching methods, (5) science process skills, and (6) science and art integration. These themes were described in relation to participants' views and practices about their perceptions.

4.5.1 The Importance of Science

Participant teachers' views about positive outcomes of science on children's development were similar in both pre-interview and post-interview results. All participant teachers addressed the same issues in their pre and post-interview findings. They stated the importance of science in terms of different perspectives. Two participant teachers stressed the positive effect of science on children's daily life in their both pre- and post-results:

Table 4.7 Teachers' views about importance of science in both pre- and post-interviews

Participants	Pre-Interview	Post-Interview
Emel	Science is a part of human's life. Children can experience science in their daily life. In addition, they can easily learn how things work or why things occur in their life.	Science is located in our life. For example, children may observe steam coming out of a boiling teapot in refectory. So, they wonder how it occurs in nature.
Seda	Science can be considered as helping children to gain different experiences which are simple versions of their later lives. They can use their science-related knowledge in their future lives.	Science plays an important role on preparing children for their later life. For example, children may learn how to grow flowers. That is, they understand what the flowers need in order to grow. So, they can use this information when they want to grow a flower in their older ages.

On the other hand, one participant teacher mentioned science as a tool to increase children's curiosity. Her pre-interview and post-interview findings showed that "science improves children's sense of wonder" (Aysun). In the post-interviews, she also added that "*children have a good time while engaging with science*" (Aysun) and explained that "*this occurs as a result of the nature of science because children are interested in scientific concepts when compared to other activities*" (Aysun).

Two participant teachers claimed that science directed children to learn by doing. The findings of pre- and post-interviews were parallel as both of them stressed the importance of science as guiding children to actively be involved in the process:

Table 4.8 Teachers' views about the effects of science on children in both pre- and post-interviews

Participants	Pre-Interview	Post-Interview
Sibel	Children learn science by doing and observing different things.	Children can learn science by doing and conducting experiments. So, they can observe different things and start to learn.
Bahar	It is useful to provide opportunities for children to learn by doing instead of instructing them.	Children learn science meaningfully while actively involving in the process of learning.

The findings revealed that participant teachers add more elaboration about their views about the effects of science on children's development in their post-interview findings. This might be reason of the content of the workshop because it included the role of science, science teaching methods, and sciece teaching practices.

4.5.2 The Preparation Process of Teachers

Most of the participant teachers stated that preparation for activities is essential in teaching science. However, there were some differences between some of the teachers' views stated in pre-interview and post-interview findings. The main expression they used was *"the detailed preparation process is required for science*." In pre-interview findings, while three of the participant teachers mentioned the requirement of extra time and effort in preparation process of science activities, only two of them stated the requirement of the equal time and effort for preparing science activities compared to other activities. Two participants changed their views about the preparation process of science activities in the post-interviews. Table 4.9 shows their expressions.

Table 4.9 Teachers' changed views about the preparation process of science in both pre- and post-interviews

Participants	Pre-Interview	Post-Interview
Aysun	We apply project approach in our school. Before implementing the project, we plan different activities on the basis of selected themes. In the preparation process, we prepare all activities in the same manner.	I believe that we should make extra effort in science activities. Before implementing the science activity, I plan to make connections between science activities and other activities applied in the classroom.
Emel	I think that the process of the activities is similar to each other in early childhood education. So, there is no need to make extra effort for science activities.	I try to plan different science activities in my classroom. So, I generally do an Internet search to provide various science activities. In addition, I prepare some art activities in order to support science teaching.

They also emphasized the importance of preparing materials for science teaching:

> I select materials that are attractive for children. I generally try to find materials that children have not seen before. In my activity, I try to use magnifier as an attractive part of the implementation. Children like playing with these scientific materials in the classroom. So, I realized that I chose appropriate materials for them (Aysun).

> In my activity, I prepared materials before applying that science activity. So, I could use time in an effective way. This is my preparation process (Emel).

The findings revealed that science activities required participants to make preparation for effective science teaching. Parallel to this, findings from observations showed that all participant teachers prepared their activities before starting them. While some of them collected different materials for their activities, some others provided environment in order to apply science activities.

4.5.3 How Children Acquire Science

All five teachers explained how children acquire science as "learning by doing", "learning by experimenting", and "learning by observing". They stated the importance of child-centered science activities in their classroom practices both in their interviews and observations. For instance:

Table 4.10 Teachers' changed views about how children acquire science

Participants	Pre-Interview	Post-Interview
Bahar	I believe that children can learn something related to science when they observe it. Moreover, conducting experiments are good ways to support children's learning. Especially, in young ages, it is better to do one or two small experiments to improve children's experiences.	Children acquire science by doing and observing. I believe that we should provide the opportunity for children to explore their environments.
Seda	Children can learn science by playing. In addition, observations are essential for their learning process. For example, if we want to grow flowers, we can go to a place where flowers are grown. So, children can easily see the growing process of flowers. This shows that it is better to make basic and deep investigation with children.	Children can learn science by observing. I think that the main requirement of science activities is doing observations in the learning process.

Table 4.10 showed that one of the teachers changed her views about children's science learning by adding more dimensions. For example, in the pre interviews, Sibel stated that *"it is better to organize field trips because of children's active participation".* During the post interviews, she mainly expressed the importance of observation skills. Specifically, she stated that *"children learn science by experiencing, doing and observing as well as experimenting"* (Sibel).

Interviews and observational data showed similar findings about teachers' views about science teaching. All participants believed in the importance of active

participation of children in the learning process. The observational data revealed that teachers planned their activities on the basis of children's involvement. For example, Aysun preferred to guide children to make their own field glasses instead of giving field glasses to each child. Similarly, Bahar organized an experiment including the measurement of different materials collected from the garden. She directed children to work on materials as to which one is heavier or lighter. It was also observed that participant teachers were interested in guiding children in order to explore different things on their own.

Participants' preference for child centered activities was rated to the participants' views about the types of experiences. Participant teachers expressed their understanding about how children learn in terms of "*naturalistic", "informal", and "structured"* learning experiences. They showed different examples for these experiences. For example, one of the participants claimed the issue of "*naturalistic experiences":*

> I think that while implementing a science activity, it is essential to keep children's attention. For that reason, I plan the science activities on the basis of their interests. So, they want to participate willingly. This process is helpful for implementing science activities in an effective way (Post interview-Aysun).

Another participant teacher addressed the use of *"informal learning experiences"* as:

> [...] I also organize the science activities on the basis of children's interest. For example, our school has a big garden. When we play in the garden, children generally focus on something related to nature. At that point, they start to ask different scientific questions. I choose one of the interesting one and prepare a science activity for children (Pre interview-Bahar).

In addition, during the pre- and post-interviews, one of the participants explained the usage of *"structured learning experiences"* as follows:

> Children can learn science by playing. In addition, observations are essential for their learning process. For example, if we want to grow flowers, we can go to a place where flowers are grown. So, children can easily see the growing process of flowers. This

> shows that it is better to make basic and deep investigation with children (Pre interview-Seda).
>
> We can provide the opportunity for children to learn the concepts meaningfully. For example, if we work on the concept of flower, we can organize a field-trip to a greenhouse in order to help them to see where they grow and how they grow. With the help of this trip, they can observe the actual settings related to flowers. I believe that it is important to guide children to use this information in their daily life experiences (Post-interview-Seda).

Participant teachers use two frames for the explanation of how children acquire science. The fisrt one was related to children's experiences. For example, they stated that children learn by doing, experimenting, and observing. The second frame was about the types of science activities. Participant teachers expressed their understanding about children's science learning in terms of naturalistic, informal, and structured learning experiences.

4.5.4 Science Teaching Methods

In early childhood education, teachers generally prefer to use different teaching methods while implementing their science activities. The following table shows all five participant teachers' order of preferences about different teaching methods in science activities in the pre-interview and post-interview findings.

Table 4.11 Teachers' order of preferences about teaching methods from pre-interviews and post-interviews

	Pre-interviews						*Post-interviews*					
Teaching Methods	A	E	S	Si	B	Total	A	E	S	Si	B	Total
Concept maps	1		1	3		3	2	3	2		1	4
Project Approach		2	2	2		3				1		1
Experimentation	2	1				2		1		3		2
Field-Trip & Investigation	3	3	3	1	1	5	1	2	3	2	3	5
Analogy						-						-
Drama					2	1	3		1		2	3
Cooperative Work						-						-
Computer-based Instruction					3	1						-

Table 4.11 showed that “Field-trips and investigation” was the most frequently used technique by all participant early childhood teachers in their activities. Both their interviews and observations revealed that participants used their school garden as an investigation area. So, they frequently applied their science activities there. While they expressed the importance of “field trip and investigation” in science teaching, the second most preferred method was “concept maps” chosen seven times. While three participant teachers reported their usage of concept maps in their classroom practices in the pre-interviews, four of them stated their preferences ranged from one to three in post-interviews. This finding was supported by observational records. In classroom observations, four teachers made concept maps related to eye-glasses with their own age group (Figure 4.4). They emphasized the essential role of concept maps on their teaching practices.

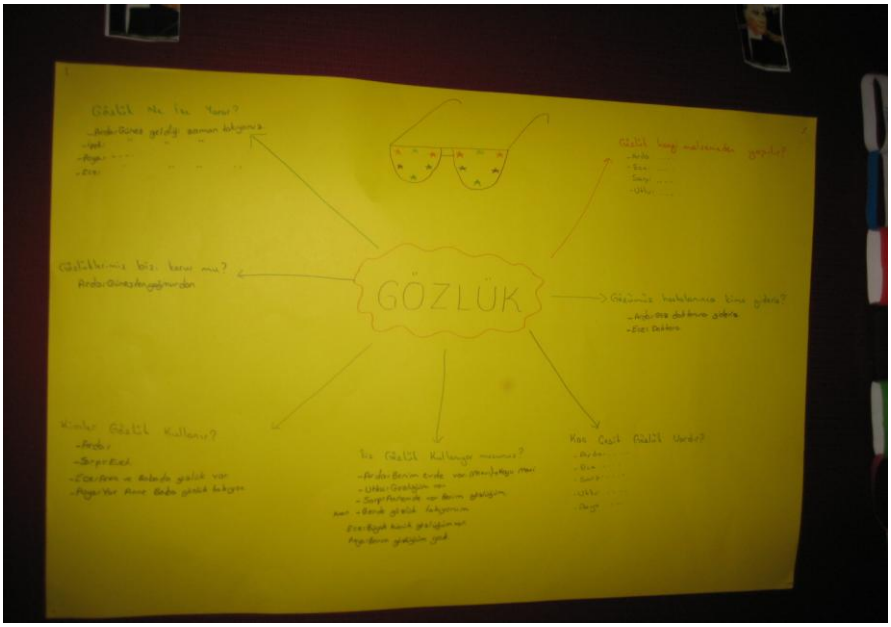


Figure 4.4 Concept Map

Regarding the third most frequently used category, three teaching methods were rated by teachers: “project approach”, “experimentation” and “drama”. Each of them

was reported by four participant teachers. With respect to differences between pre and post interviews, participant teachers changed their views about two teaching methods. The first one was "project approach". While three of them selected it as the frequently used category in pre interviews, only one of them rated it as the most frequently used category. The second one was "drama" preferred by only one participant teacher in pre interviews. However, during the post interviews, three of them addressed the frequent use of "drama" in their classroom science practices. Table 4.11 shows that "analogy" and "cooperative work" were not rated by any participant teacher in either pre-interview or post-interview. Interestingly, one of the participant teachers generally used "analogy" in her classroom practices although she did not mention in the interviews. According to the observational field notes from pilot observation, Sibel explained the structure of tree by giving an example related to human body. She helped children to make connection between tree vessels and blood vessels. She explained:

> Tree vessels are similar to our blood vessels. You can remember how our blood vessels carry blood away from or to heart. Similarly, tree vessels carry water and minerals into the plant. Both of them play an important role in terms of their functions (Sibel).

Regardless of science teaching methods, all participant teachers indicated that if science activities were to be effective, they would need to include different teaching methods in terms of children's characteristics such as their ages, developmental levels, or interests. The use of these methods was validated through pre and post interviews and observing teachers using these methods in their actual classroom practices.

4.5.5 Science Process Skills

Regarding early childhood level, basic science process skills [observing, comparing, classifying, measuring, and communicating] can be considered as appropriate for young children. According to participant teachers, these skills were those that help children to process new information on the basis of real life experiences.

Table 4.12 Teachers' self evaluation about their actual practices related to science process skills

	Pre-interviews					*Post-interviews*				
Basic Science Process Skills	A	E	S	Si	B	A	E	S	Si	B
Observing	X	X	X	X	X	X	X	X	X	X
Comparing	X		X		X	X	X	X	X	X
Classifying			X		X	X				X
Measuring										X
Communicating						X				X
Total	2	1	3	1	3	4	2	2	2	5

Table 4.12 indicated participant teachers' views about the application of basic science process skills. During the pre interviews, all participants claimed that planned to use "observation" in their classroom science activities. Similarly, they also mentioned the usage of "observation" in their actual classroom practices in the post interviews. In addition, this finding was supported by observational field notes. All participant teachers organized "observation" as a part of their classroom practices. For example, Aysun organized her science activity to include an observation on natural life with magnifiers. Similarly, Emel guided children to observe their environments with field glasses made by them. In addition, other participant teachers used observation at the beginning of their classroom practices. According to participant teachers' activity plans, four of them mentioned the use of observation in their activities. However, another participant teacher did not mention any information in her activity plan, although she used observation in her actual classroom practices.

With regard to "comparing", in pre interviews, only three participant teachers stated that they used "comparing" in their science teaching practices. However, when asked about their actual practices in post interviews, all of them expressed that they used "comparing" in their observed science activities. Similarly, observations indicated that all participant teachers provided the opportunity for children to compare different things. For example, while Bahar helped children to compare different

natural materials such as cones, leaves, and stones, Aysun provided two magnifiers with and without glass for children to make comparisons.

In terms of "classifying", Seda and Bahar stated that they generally used "classifying" in their classroom practices in pre interviews. On the other hand, considering post interviews, Aysun and Bahar mentioned the use of classification in their actual classroom practices such as grouping leaves. Teachers' views about their actual practices related to classification were parallel with observation notes. Both teachers planned their activities that allowed children to experience with real natural objects and grouped them on the basis of some characteristics.

Regarding "measuring" and "communicating", in the pre interviews, none of the participants stated any preference about both measuring and communicating. However, during post interviews, Bahar stated that she used measurement in her actual classroom practice. Similarly, the observational field notes pointed that she directed children to measure different materials such as leaves, cones, and stones. She also encouraged them to use balance scale in order to measure these materials.

Two of the participant teachers addressed the usage of "communicating" in their actual classroom practices. It was observed in their practices that all teachers guided children to communicate to each other. As a result of this, children shared their understanding of scientific issues in the activities with the rest of the class. Moreover, teachers generally used questioning method to help children express their experiences. Pictures could be also considered as a way of communication. Many teachers wanted children to draw pictures related to specific issues in their science activities.

Teachers' activity plans showed that three participant teachers explicitly planned the use of discussion in their activities. For example, one of the participant teachers stated that *"Teacher asks questions related to the sky and guides children to answer these questions. The conversation will continue on the basis of children's answers"* (Bahar). Another participant teacher also mentioned the use of discussions in her plan. She planned some discussions after distributing junk materials. She wanted them to think about what the materials would be and what they were made of. It seemed that they tried to start communication in their science activities through discussion and pictures.

4.5.6 Science and Art Integration

All participant teachers expressed that art plays an important role in early childhood curriculum. While art would be used as a separate activity, participant teachers preferred to use it as an integrated activity. All participant teachers viewed art as a key element in science teaching because they pointed that science activities were more attractive when combined with art activities. During pre interviews, participant teachers stressed two important points. The first one is related to children's learning experiences. They claimed that integrated science and art activities helped children's learning while making connections between these activities and their learning. The second one is related to the role of art in science activities. Some participant teachers claimed the importance of integrated art activities as an assessment tool. They mentioned that they easily understood what children know and learned from the science activities with the help of art. Analyzing children's art works, they also helped them determine the next stage of the activity. They stated that they could change or reorganize the activity according to children's expressions with art.

Similar findings could be drawn from post-interviews. All participant teachers had positive views about using art in science activities. While some participant teachers preferred to use art activity at the end of the science activity, some of them used it in the middle of the activity. They stressed the importance of children's science learning with art. Bahar emphasized the importance of good transitions. Integration of science with art was helpful for not only teachers but also children in terms of familiarity of the learning process. The following views were related to benefits of integrated activities for early childhood teachers:

> We can draw children's attention toward different scientific concepts (Emel).
>
> Art helps us to see children's communication with others because they use art to express their feelings (Bahar).
>
> Art can be considered as a way to understand children's thinking (Seda).

Participant teachers also expressed the benefits of integrated activities on young children's development as follows:

> Children can see different activities in a holistic way rather than separate parts. They can easily make connections between science and art activities. In addition, children understand cause-effect relationship (Seda).

> Children like doing art activities. It is good to prepare art in order to encourage children to attend science activities. So, they willingly participate in science activities (Aysun).

Parallel to these findings, observational field notes also showed similar findings. All participant teachers used integrated science and art activities in different ways. Two teachers used it in the process of science activity in order to create science materials. While Aysun planned to make magnifiers with children, Emel organized the materials in order to create filed glasses. Both teachers preferred to encourage children to make their own materials. They provided the opportunity for children to experience real scientific materials before doing the art activity so that children could easily make a connection between real materials and created ones. Some others preferred to use art at the end of the science activity. Three participants used art activities in order to help children to express themselves in terms of feelings and learning experiences. For example, Seda wanted children to make drawings about what they wanted to see by using magical glasses. According to this activity, she claimed *"I guide them to show their feelings by using art. So, I can see their inner world about what they want to think"* (Seda). In addition, two participants emphasized the impact of art in evaluation process. In terms of observational field notes, they organized the art activity after completing the science activity. Bahar wanted children to draw what they saw about cones. She also provided time to express their drawings in the classroom. Sibel planned an art activity for children to draw what they understood about the concept of day and night. Children drew their pictures using both sides of the paper. While showing their understanding about the concept of day on the one side of the paper, they made their drawings about the concept of night on the other side of the paper. At the end, the teacher guided them to explain their drawings to their friends.

With regard to art materials used in the actual science classroom practices, while one of the participant teachers preferred to use three-dimensional collage in her activity, four of them organized the art activity as two-dimensional such as drawing. In three-dimensional collage, Emel organized an art activity to make field glasses. She provided different junk materials such as plastic cubs and glossy paper to make them. Then, she wanted children to use these glasses when they investigated the nature in the garden. Other participants planned to use different two-dimensional art activities that supported different science concepts. While Aysun and Bahar provided art activities as nature collage related to their activities, Emel, Seda, and Sibel preferred to use only drawings in their activities. In terms of natural collage, teachers wanted children to glue nature specimens onto paper. After that, children painted these papers using pastels. Two teachers organized art activities on the basis of drawings. After they completed the implementation process of art materials, they guided children to draw what they saw in the activity or what they learned from the activity. According to the participant teachers' activity plans, only Sibel reported an alternative art activity in the process of her activity. She wrote "*after investigating natural materials, children construct their collage work using these materials*". However, she added some recommendations at the end of the activity plan. She stated that "*if we had not faced a time-management problem, the children would have made three dimensional art works".* As her actual classroom practices, she used drawing as an art activity to support children's learning.

4.5.7 Summary

In this chapter, findings of how participant early childhood teachers used science, which type of teaching methods they use in their science teaching process, and how they integrated science and art in their classroom practices were reported. Detailed descriptions were provided to represent participant teachers' views about these issues. With regard to pre- and post-interviews, observations, activity plans, participant teachers' views about science teaching and integration of science and art were described and analyzed by comparing them. The findings of this study indicated that early childhood teachers believed in the importance of science activities in their

practices. They provided child-centered activities for children to improve their science experiences. In addition, they used different learning experiences that were naturalistic, informal, and structured in early childhood classrooms. They put more emphasis on "field-trips" as a teaching method because they tried to apply the science activities in school garden. They believed that this was a good opportunity for children to investigate their environment. Comparison of participant teachers' pre- and post-interview findings showed that some teachers changed their views about some issues. For example, some of the participant teachers stated in their pre-interviews that they did not need to put extra effort for science activities before implementing them. However, they changed their views and stated that teachers should pay more attention to science activities before implementing them. In addition, they suggested that it was good to prepare science materials prior to the workshop. With regard to science process skills, all teachers preferred to use "observing" skill in their classroom practices. They stated that it was important to provide different activities for children to improve their science process skills. However, only one teacher used all science processs skills in their actual classroom practices. Comparison of the pre- and post-interviews indicated that teachers changed their views that they used comparison in their science teaching practices because they believed that children like comparing different objects in terms of their characteristics. In terms of the place of art in early childhood curriculum, all participant teachers stated the importance of art in early childhood settings. They also mentioned that art could be considered as an effective tool for teaching science because children like attending art activities. Regarding participant teachers' views about integration of science and art activities, they preferred to use art activities after they implemented their science activities. This finding was consistent with observation notes because all teachers wanted children to make drawing after they implemented their science activities. Teachers also mentioned that children could easily express themselves with the help of art activities so they stated that they generally used art activities in their classroom practices.

CHAPTER 5

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

5.1 Discussion

The main purpose of this study was to explore the changes in early childhood teachers' views about and practices of their science teaching practices that occurred after they attended the teaching training workshop concerning the integration of art activities into the curriculum. In this chapter, the major findings of the study are discussed and then the implications and recommendations for future research are presented.

5.1.1 Early childhood teachers' views about science teaching in early childhood education

The findings of this study showed that early childhood teachers believed that the place where the science activities were implemented was important. They stated that they generally preferred to implement science activities in the classroom or the school garden. Specifically, nature-related activities were implemented in the school garden and the participant teachers stressed the active involvement of children in the learning process in the garden using skills such as observing and investigating. This seems to be supported by Stoecklin (2009) who considered that the main issue about developmentally appropriate gardening was the children's active involvement into the learning process and she mentioned that the results of this active engagement increased children's natural curiosity. One of the important findings for this study was the issue about the ideal science teaching environment. The participant teachers drew attention to the need for a particular place in which the science teaching could take place. Similarly, Kıldan and Pektaş (2009) found in their study that most of the early childhood teachers stated that physical conditions in early childhood institutions were

inadequate for the successful teaching of science concepts and that there was a need for a special science laboratory.

The findings of the study also showed that teachers had the view that children can learn science by doing. All the participant teachers agreed that young children learn science while actively engaging in activities through experience. This finding was consistent with the literature (Bredekamp & Copple, 1997; French et al., 2000; Kilmer & Hofman, 1995; Lind, 2000; National Science Council, 1996). As a general view, Bredekamp and Copple (1997) stated that active involvement was one of the prerequisites for children's learning and Kilmer and Hofman (1995) coined the term "sciencing" refer to the child's active involvement in science learning process. In addition, French et al. (2000) commented that the nature of the science activities in early childhood classrooms should be based on the children's interests and their active participation.

With regard to the role of the early childhood teacher in supporting children's learning, all teachers participating in the study had the view that early childhood teachers had an important role in the science teaching process. The participant teachers generally considered that authentic science learning experiences were valuable in involving the children in the process. A similar result was obtained by Worth and Grollman (2003) related to improving children's learning. They found that teachers organized the classroom in such a way as to provide a variety of science activities, equipment and materials to encourage the children to explore many ideas and questions about science. In addition to the influence of the classroom teachers, parents also have an impact on children's science learning practices. The findings of this study showed that most of the participant teachers had positive views about parental participation on children's interests' about science. This appears to be consistent with findings of other studies which indicted that when children dealt with science activities with their families in their daily lives, they were able to spend more time and concentrate for longer on science exploration (Crowley, Callanan, Jipson, Galco, Topping, & Shrager, 2001). In addition, children were more confident about science when their parents actively participated in their learning process (Cotton & Wikelund, 2001).

The findings of current study revealed that the participant early childhood teachers used different teaching methods in their classrooms. All the teachers stated that their most preferred method was "field-trips and investigation". This might be because of the large play garden in the early childhood institution that included an area of grass, flowers, trees, with a place for sand and water. All the teachers could use this area to implement science activities. According to participant teachers, they chose to use observation in their field trips and then they conducted an activity which was related to their gardening practices. Thus, the teachers demonstrated that they believed that children learned meaningfully when they were able to observe and interact with different scientific phenomenon in the garden. In this regard, Arnas (2007) reported that field trips gave children the opportunity to encounter different situations in the natural environment. Kaptan (1998) found that observations in the field trips were important in allowing children to learn easily and accurately. In the current study, the "concept map" was stated as a second most preferred method for early childhood teachers to implement science activities. This might be due to the early childhood institution in which the teachers worked had adopted an integrated project approach and according to Katz and Chard (1989), Phase 1 of project work included a web or concept map to initiate the discussion about teachers' and students' knowledge of the selected topic.

In the current study all the early childhood teachers used observation as a science process skill in their science teaching practices. They also mentioned the role of observation skills in the children's learning and pointed out the connection between observation and active learning. While children observed their environment, they actively experienced real scientific issues. This finding was supported by the literature where observation was considered to be an essential initial skill in the early childhood years (Covill & Pattie, 2002; de Bóo, 2006; Harlen, 2000). In the study the early childhood teachers generally planned to use observation skills in science activities not only in the classroom but also in the school garden. Maynard and Waters (2007) confirmed that one of the important opportunities for children to support their observation skills about natural issues was an appropriate outdoor environment within the school or nearby.

In the current study, although some participant teachers described that they used "communication" as a science process skill, they did not elaborate on this skill in either their pre-interview or post-interview discussions. This could be due to their lack of science education in their backgrounds as only two participant teachers gained a bachelor degree from departments other than early childhood education. Furthermore, two teachers graduated from vocational high school for girls and one from a two-year vocational training school. Four teachers stated that they had not participated in any course related to science or science teaching methods. Only one teacher who graduated from university in the department of elementary education mentioned attending science related courses. As a result, the teachers might have used communication skills in the classroom but might not be aware of the use of communication into the science process skills and lack the knowledge of science terminology. This might be due to the deficiency of content knowledge. According to Rojas (2008), there was a relationship between teachers' content knowledge and effective practices on the basis of the term pedagogical content knowledge. Grossman (1991) also mentioned that teachers' content knowledge directly affected their classroom practices including how they teach that content to children.

Regarding teachers' sense of confidence about their science teaching practices, in the current study it was seen that early childhood teachers generally felt confident in their science teaching practices. This finding might be related to the level of the participant teachers' interest in science. According to Cho (1997), teachers' personal interest such as participating science workshops, reading science related magazines or books, and having hobbies related to science are associated with their attitude to science teaching. Similarly, Seefeld (2007) commented that rather than attending teacher training course, early childhood teachers can develop their understanding of science through reading books related to science, visiting museums, watching videos or documentary. This autonomous learning about science can have a direct positive impact on the teachers' confidence levels. Another reason for the participant teachers' high level of confidence about science might be result of the preschool's in-service training program which consists of weekly seminars on different topics related to early childhood education and curriculum. This seems to be supported by the literature

related to the professional development of early childhood teachers (DeNobile, 2007; Hartshorne, 2008; Kallery, 2004). According to Hartshorne (2008), through professional development the early childhood teachers were able to improve their confidence levels and attitudes and provided them with opportunities to experience with recent science content and different teaching strategies about science teaching. Similarly, Kallery (2004) found that professional development can be considered as a best way to support teachers' science teaching practices. If the professional development was organized on the basis of teachers' needs, this could improve their content knowledge and understanding about science and overcome low levels of confidence about their science teaching in the early childhood stage of education (DeNobile, 2007).

5.1.2 Early childhood teachers' views about the importance of integrated curriculum in early childhood education

The findings revealed that early childhood teachers believed that an integrated curriculum was important but they derived their opinion from different perspectives. Most of the participant teachers mentioned the use of themes in project work as an example of an integrated curriculum. According to Drake (1998), the three levels of continuum of integration (multidisciplinary, interdisciplinary, and transdisciplinary) include theme-based instruction and the multidisciplinary approach has similar features to the Project Approach. Thus, the teachers' responses in the current study might result from the use of the Project Approach within the school. This showed that these teachers generally used the integrated curriculum in the form of the multidisciplinary level of Drake's continuum of integrated education. With regard to the positive aspect of an integrated curriculum, teachers addressed the impact of integrated curriculum on children's different intelligences. This seems to be supported by Chen (1997 as cited in Wu, 2003). He found that the use of projects in the Multiple Intelligence classrooms assisted teachers to understand children's individual differences.

The teachers were aware of the use of projects assisted them in understanding the children's individual differences and learning styles. Thus, it can be seen that the teachers incorporated Multiple Intelligence theory in their classrooms. Armstrong (1998)

stated four ways of using Multiple Intelligence Theory which included applying Multiple Intelligence theory within the integrated curriculum to help teachers discover each child's strengths and helping teachers support children's strength areas.

With regard to children's development, the findings revealed that teachers felt that an integrated curriculum improved children's developmental progress. Specifically, the children's cognitive development was improved through the use of integrated activities. Many studies showed that an integrated curriculum was able to support the whole child model by providing different types of activities (visual, linguistic, and physical), in order to improve their holistic development (Schirrmacher, 2002; Walker, 1995). Similarly, Öztürk and Erden (2010) found that early childhood teachers used integrated activities because it addressed children's different developmental areas such as physical, cognitive, social development.

Concerning the integration of science and art, participant early childhood teachers pointed out two important issues. The first is related to children's learning experiences. The teachers believed that children learned scientific concepts meaningfully with the help of art because they were interested in art-based activities. Furthermore, they felt that the children's different developmental areas were supported by the use of visual art in learning process. This supported by Appel (2006) who found that if visual art was effectively integrated into the curriculum it had benefits for the children such as supporting the development of their literacy skills, improving their abilities related to mathematics and science, and helping develop their investigation skills such as concentrating on details in a particular context. The second finding was about the use of art as an assessment tool in science activities. Participant teachers considered that they were able to evaluate children's understanding on the basis of their art work such as their drawings. This finding was parallel to other research. Dever and Jared (1996) stated that one of the advantages of using visual art was related to teachers' assessment practices because they were able to determine children's understanding and progress in the light of their art work. Moreover, according to Gallas (1991), art can be defined as outer reflection of children's understanding.

In the current study the participant early childhood teachers indicated that they preferred to use art after implementing science activities. Specifically, they wanted

children to make drawings about what they had seen in the activity. In their actual classroom practices, all participants planned to use art activity after the children made their own observations which waere defined by Smith et al. (1998) as "observation drawing". Moreover, this can be considered as a component of a learning process because it was helpful for teachers to see children's reflections about what they saw in different ways.

5.1.3 Early childhood teachers' views and practices about the teaching of visual art activities and science concepts after the workshop

In the study most of the early childhood teachers commented that detailed preparation was required for the teaching of science. In addition, teachers' actual classroom practices showed that teachers spent long period of time preparing for science activities. In this study, the teachers did not complain about this preparation process; however, the literature showed that some teachers' did have a negative attitude towards the amount of time spent in science activity preparation (Cho 1997). Jablon and Sobel (1992) found that many teachers felt that preparation and implementation process of science activities were taken too much time. Similarly, Cho (1997) found that early childhood teachers had negative attitudes toward preparation for science teaching. In fact, these teachers stated that the preparation period for science activities were longer than any other activities in early childhood curriculum.

Regarding the implementation of science activities, in their interviews all the teachers stated that child-centered science activities were important. In particular, all the participants felt that the active participation of children in the science learning process was essential. The views expressed in the interviews were consistent with the classroom practice of the participant teachers. A similar consistency was found in the literature, for example, Fishbein and Ajzen (1975) found that teachers' views related to learning and teaching were connected to their actual classroom practices. Moreover, the literature revealed that teachers' beliefs were directly related to their classroom practices in terms of developmental appropriateness (Charlesworth et al., 1993, Hart et al., 1998; Kagan & Smith, 1988; McMullen, 1999; Smith & Shepard, 1988; Stipek & Byler, 1997).

The participant early childhood teachers had the view that art activities in the early childhood curriculum were important. Although they gave different examples of the types of art activities, they selected drawing and painting as art activities in their actual classroom practices. Only one participant teacher implemented three-dimensional art work using drawing at the end of the activity that she applied. Thus, the views of teachers were not supported by their classroom practice and this is supported by another study conducted by Alvino (2000). He found that even though early childhood teachers stated the role of art activities in their daily schedules as crucial, they did not give it the deserved importance. Other studies found that early childhood teachers had limited knowledge of and confidence in implementing art activities with young children (Baker, 1994; Bresler, 1993; Douglas & Schwartz, 1967; Seefeldt, 1995; Thompson, 1995; Thompson & Bales, 1991). The early childhood teachers in this study might have selected only drawing and painting activities because they lacked the knowledge of different techniques or confidence in carrying out art activities in the classroom. Another reason might be due to the effects of the preschool's assessment technique because this school used portfolio method while evaluating children's progress. In portfolio assessment technique, drawing may be considered one of the ways to follow children's progress (Grace, 1992). For this reason, teachers might have preferred to implement drawing activities in their classroom practices.

Regarding the effects of the workshop on early childhood teachers' views and practices about teaching science and the integrated curriculum, the findings showed two important issues. First, all the teachers had willingly attended the workshop during which they gave different examples concerning their prior experiences and shared views about science teaching and integrated curriculum. When asked them to prepare an art-based science activity, all of them were eager to participate in this study. This might be related to their prior experiences since the institution in which they worked provided opportunities for them to attend various seminars at least three times a month. These seminars were delivered by the school administrator who was doctoral candidate in the field of education and other specialists in the field of education. This was a requirement for these teachers for professional development. The positive affect

of in-service training on early childhood teachers' professional development in science teaching was shown in the literature. For example, Corvin (1986 as cited in Cho, 1997) commented that in-service workshops helped teachers to improve their attitude to science teaching. Visone (2009) found that professional development played an essential role on early childhood teachers' science teaching practices in terms of raising their comfort levels. In addition, appropriate teacher training related to science or science teaching methods is an important factor in an early childhood teacher being able to implement effective science teaching in the classroom and this is widely supported in the literature (DeNobile, 2007; Downing, Filer, & Chamberlain, 1997; Jablon & Sobel, 1992). For this study, the findings revealed that participant teachers were positively influenced by the workshop. For example, they showed different types of science activities on the basis of science process skills after the workshop. In addition, they also changed their views about the preparation process of science activities after they attended the workshop.

The second issue was related to the participant teacher's views about integrated curriculum. All the participants were familiar with the concept of an "integrated curriculum". This response might be due to the fact that the school had implemented "Project Approach" by integrating it into the National Early Childhood Program (2006). One of the components of this system was the integration of different subjects on the basis of a selected theme. Therefore, the teachers were used to planning different activities in combination. In addition, the National Early Childhood Program in Turkey (Ministry of National Education, 2006) although not including any statement about integrated curriculum did include the concept of integrated activities and the character of the Early Childhood Program (2006) was in keeping with the basic components of an integrated curriculum (Öztürk, 2008).

5.2 Implications

The findings of this study contributed to the field of early childhood education by investigating the views of early childhood teachers about the issues of science teaching and integrated curriculum. According to findings of this study and the related studies in the literature, some conclusions can be drawn.

The main conclusion offered by this study is the importance of early childhood teachers' views and practices concerning the teaching of science. This study showed that early childhood teachers' views about science teaching are closely related to their classroom practices. Thus, it is important to pay more attention to the relationship between teachers' views and their actual classroom practices.

The current study showed that art-based science activities were helpful for early childhood teachers to make science activities meaningful for young children. In addition, art-based science explorations encourage children to experiment with different materials. Thus, it is essential to make connection between art and science activities in order to create more appropriate learning environment.

Another conclusion is related to the early childhood teachers' views about science teaching preparation process. Although the preparation for science activities is lengthy, it is necessary in order to provide better science teaching. The workshop training in this study might have helped teachers become aware of the importance of the preparation process of science activities in order to apply effective science activities.

This study indicated that parental participation was essential in the process of children being able to understand science. Therefore, this finding seems to suggest that parental involvement activities should be integrated into the science teaching process. Therefore, teachers could start working with professionals in the field of education so that parents can be involved in the curricular activities. Furthermore, teachers and parents can work together to jointly support children's science learning practices.

This current study showed the importance of the school environment on children's development, in this case the school garden which contained green space, trees, and flowers. This study can raise awareness in teachers and school administrators of the benefits of providing a place for the children to undertake natural science explorations.

Most of the participants graduated from the department of child development in vocational high schools. Hence, it is hoped that Ministry of National Education may realize the importance of science courses for vocational school graduates and may add

courses such as “science in early childhood education”, “science teaching methods in early childhood settings”, and “general science for teacher candidates”.

Hence, it is hoped that this study will encourage related departments such as early childhood education, to give more importance to child development by adding more courses or enriching the content of the courses such as “curriculum in early childhood education, visual art in early childhood education, teaching science and teaching mathematics in early childhood settings”.

This study also offered significant information on the role of in-service training on early childhood teachers’ professional development. There is a need to create various workshops which can directly increase teachers’ understanding about science and its use in early childhood education. In addition, further training in the concept and implementation of the integrated curriculum is also required. Similarly, the Ministry of National Education may realize the importance of providing more in-service training programs on teachers’ professional development in terms of the integration of science and visual art and the implementation of an integrated curriculum in early childhood education.

With regard to visual art in early childhood level, this study also showed the importance of visual art into teachers’ assessment practices. This may encourage curriculum specialist as planning visual art as one of the assessment tools in early childhood curriculum. In addition, this research may help teachers to be aware of different types of visual art activities in order to support children’s science learning experiences.

5.3 Recommendations

There were certain suggestions based on the findings of this study. These recommendations were represented in this section.

This study was conducted only in one school including early childhood teachers. The replication of this study with different teacher groups would be useful in continuing to assess the impact of these training workshops on teachers’ attitudes and practices including the implementation of art-based science activities. In addition, the participant of this study had different educational degrees. A similar study might be

conducted with teachers who graduted from the related departments such as early childhood education or child development. Thus, this would be useful in showing the effects of these workshops on teachers' views and practices about art-based science activities.

The current study was conducted with in-service early childhood teachers in order to investigate their views and practices about integration of science and art activities. Thefore, further studies can be conducted to explore the relationship between in-service and pre-service early childhood teachers' views about teaching science and an integrated curriculum.

The workshop lasted one and half hour in this study. Thus, the workshop program should be extended to 12 months or more in order to investigate the long term effects of the workshops on early childhood teachers' views.

The study included different data collection methods such as observations, interviews, and teachers' activity plans. Thus, more data should be obtained from an increased number of classroom observations to achieve a broader more detailed account of the early childhood teachers' actual classroom practices related to science teaching and integrated curriculum.

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APPENDIX A

PRE-INTERVIEW PROTOCOL OF THE STUDY

Merhaba,

Ben Elif Öztürk. Orta Doğu Teknik Üniversite'si İlköğretim Bölümünde doktora yapmaktayım. Bu çalışmanın amacı okul öncesi öğretmenlerinin "bütünleştirilmiş program" (bir etkinliği diğer etkinliğe entegre etmek) ve bu program içerisinde sanat etkinliklerinin yeri hakkındaki bakış açılarını araştırmaktır. Bu çalışmada kullanılmış olan "sanat" terimi okul öncesi eğitim programında kullanılan resim çalışmaları, boyama, çizim, baskı, ebru vd. iki boyutlu çalışmalar ve üç boyutlu inşa ve şekillendirme çalışmaları, kil, oyun hamuru, artık malzeme ile inşa çalışmalarını içermektedir. Bu görüşmeye gönüllü olarak katılmanız önemlidir ve herhangi bir zamanda veya durumda bu görüşmeyi bırakabilirsiniz.

Sormuş olduğum sorular kesinlikle sizin bilginizi ölçmemektedir. Ayrıca, cevaplarınızı benden başka kimse görmeyecektir. Sadece size ait olan demografik bilgileri kullanabilirim. Bu noktada da sizin bilgilerinizi takma ad kullanarak yazabilirim.

Bu görüşme dahilinde size 25 soru soracağım. Bu soruların hiçbirinin doğru yada yanlış cevapları yoktur. Ben sadece sizin bu konu hakında ne düşündüğünüzü merak etmekteyim.

Eğer sizin için de bir sakıncası yoksa görüşmemizi kaydetmek istiyorum. Görüşmemiz yaklaşık 40-45 dk. sürecektir. Görüşmeye başlamadan önce bana sormak istediğiniz bir şey var mı? Görüşmenin herhangi bir noktasında ara vermek isterseniz bana söylemeniz yeterli.

O zaman görüşmeye başlayabiliriz.....

Demographic Information Form

1. Kaç yıldır okul öncesi öğretmenliği yapmaktasınız?

   1☐ 2☐ 3☐ 4☐ 5☐ Diğer.....

2. Mezun olduğunuz okullar ve bölümleriniz nelerdir?
   a. Lise:
   b. Ön Lisans:
   c. Lisans:
   d. Yüksek Lisans:
   e. Doktora:

3. Mezun olduğunuz Lise Türü:
   a. Genel Lise
   b. Anadolu Lisesi
   c. Anadolu Öğretmen Lisesi
   d. Kız Meslek Lisesi
   e. Diğer.....

4. Eğitim hayatınız boyunca "fen ya da okul öncesinde fen eğitimi" ile ilgili almış olduğunuz dersler hangileridir? (zorunlu/seçmeli)
   a. Lise:.....
   b. Ön Lisans:.....
   c. Lisans:.....
   d. Yüksek Lisans:.....
   e. Doktora:.....

5. Öğretmenlik hayatınız boyunca "fen bilgisi, fen eğitimi, fen ve doğa" ile ilgili seminer yada hizmetiçi eğitimlere katıldınız mı?
   a. Eger katıldıysanız;

Interview Questions

1. Çalışmakta olduğunuz sınıfta fen ve doğa köşesi bulunuyor mu?
2. Haftada kaç kere fen etkinliği uyguluyorsunuz?
    a. Siz sınıfınızda hangi fen etkinliklerini uyguluyorsunuz?
3. Sizce fen ve doğa etkinlikleri için gerekli olan materyaller nelerdir?
    a. Kurumunuzda fen etkinliklerini rahatlıkla yapabileceginiz materyaller ve ortam var mı?
    b. Uyguladığınız fen etkinliklerini hangi mekanlarda yapıyorsunuz? Örnek verir misiniz?
    c. Sizce fen etkinlikleri okul öncesi kurumlarının hangi mekanlarında yapılabilir?
4. Fen etkinliklerini, okul öncesindeki diğer etkinliklerle karşılaştırdığınızda sizce önemi nedir?
5. Sizce çocuklar feni nasıl öğrenirler?
6. Sizce okul öncesi dönemde fen nasıl öğretilmelidir
7. Sizce fen öğretiminde ailenin rolü nedir
8. Sizce okul öncesinde fen etkinliklerinin uygulanmasında öğretmenin rolü nedir?
9. Fen etkinliklerini hazırlarken ya da bu etkinliklere hazırlanırken diğer etkinliklerden farklı birşeyler yapıyor musunuz?
10. Siz sınıfınızda fen ve doğa etkinliklerini uygularken hangi yöntemleri kullanıyor sunuz?
11. Fen etkinliklerini uygularken aşağıda bulunan yöntemlerden en çok kullandığınız 3 yöntemi söyler misiniz?

    _Kavram Haritaları

    _Proje Yaklaşımı

    _Deneyler

    _Gezi-gözlem ve inceleme

    _Analoji

    _Drama

    _İş birlikli öğrenme

_Bilgisayar destekli öğrenme

12. Bu yöntemlerden en çok hangisinde kendinizi yeterli hissediyorsunuz? Neden?
13. Siz sınıfınızda fen ve doğa etkinliklerini uygularken hangi sorunlarla karşılaşıyor sunuz?
14. Fen etkinliklerinizi planlarken aşağıda bulunan temel bilimsel süreç becerilerilerinden hangilerini desteklemeyi planlıyorsunuz? Örnek verebilir misiniz?

    _Gözlem

    _Karşılaştırma

    _Sınıflandırma

    _Ölçme

    -İletişim

    Siz genel olarak bunlardan hangilerine yer veriyorsunuz?
15. Uygulamakta olduğunuz fen etkinliklerinde kendinizi yeterli hissediyor musunuz?
16. Kendinize 1 den 5e kadar puan vermenizi istesem, kendinizi en çok hangi sayı ile gösterirsiniz?

    1 Hiç rahat hissetmem

    2 Biraz rahat hissederim

    3 Kararsızım

    4 Rahat hissederim

    5 Çok rahat hissederim
17. Size göre fen konularından hangileri anlaşılması ve öğretilmesi en zordur?
18. Sizce fen etkinliklerinin daha etkili olması için neler yapılabilir?
19. Eğer planlamış olduğunuz bir etkinlikte çocuklar farklı bilimsel sorular sorarlarsa nasıl bir yöntem izlersiniz?
    a. Her şekilde etkinliğe devam mı edersiniz?
    b. Sordukları soru üzerinde mi konuşursunuz?
20. Hazırlamış olduğunuz fen etkinliklerinde kavram haritalarını kullanıyor musuuz?

Evet ise, sizce yararlı nelerdir? Çocuklar açısından/sizin açısınızdan/planlama açısından nasıl değerlendirir siniz?

21. Okul öncesinde etkinliklerin birbirleri ile bütünleştirilmesi (entegre edilmesi) hakkında ne düşünüyorsunuz?
    a. Sizce bütünleştirmenin olumlu yanları var mıdır? Nelerdir, bahsedebilir misiniz?
    b. Sizce bütünleştirmenin olumsuz yanları var mıdır? Nelerdir, açıklayabilir misiniz?
22. Sizce okul öncesi müfredatında sanat etkinliklerinin yeri nedir?
23. Siz sınıfınızda en çok sanat etkinliklerinden hangisini kullanıyorsunuz?
24. Siz uygulamalarınızda fen ve sanat etkinliklerini bütünleştirerek kullanıyor musunuz?
25. Sizce kullanilabilir mi? Nasil kullanilabilir?

APPENDIX B

POST-INTERVIEW PROTOCOL OF THE STUDY

Interview Questions

1. Haftada kaç kere fen etkinliği uyguluyorsunuz?
   a.Bunlar projeye bağlı olarak değişiklik gösteriyor mu, hem etkinlik çeşitleri olarak hem de sayısı olarak?
   b.Hangi fen etkinliklerini uyguluyorsunuz? (Deneyler, araçları tanıma ve kullanma, çalışma teknik ve yöntemleri, keşifler-icatlar, mutfak çalışmaları, doğa gezileri ve yürüyüşleri, koleksiyonlar, ilgili bilim alanındaki kişileri çağırma, kitap-dergi inceleme, fotograf çekme-inceleme, belgesel izleme).
2. Sizce okulöncesinde fen ve doğa etkinliklerini uygularken hangi materyallere ihtiyaç duyarız?
   a. Siz etkinliğinizi uygularken materyalleriniz yeterli miydi?
3. Okul öncesinde uyguladığınız tüm etkinlikleri düşündüğünüzde sizce fen etkinliklerinin yeri nedir?
4. Fen etkinliklerini hazırlarken farklı birşey yapıyor musunuz?
   a. Benim gözlemlemiş olduğum etkinlikte nasıl bir hazırlık yaptınız ve bu etkinlik diğer etkinliklere hazırlanırkenki gibi miydi?
5. Sizce çocuklar feni nasıl öğrenirler?
   a. Uygulamış olduğunuz etkinlikte sizce nasıl öğrendiler.
6. Okul öncesinde bulunan yöntemlerden hangilerini fen ve doğa etkinliklerini uygularke kullanıyor sunuz?
7. Bu yöntemlerden en çok kullandığınız (en sık) 3 tanesini söyleyebilir misiniz?
   _Kavram Haritaları

_Proje Yaklaşımı

_Deneyler

_Gezi-gözlem ve inceleme

_Analoji

_Drama

_İş birlikli öğrenme

_Bilgisayar destekli öğrenme

8. Çocuklar size farklı bilimsel soru sorduğunda (etkinliğiniz sırasında) ne yaparsınız?

   Örnek olarak gözlemlerde;

9. Okulöncesinde kullanılan 5 temel süreç becerilerinden (gözlem-karşılaştırma-sınıflandırma-ölçme-iletişim) bunlardan hangilerine yer veriyorsunuz?_
   a. Gözlemlemişolduğum etkinlikte hangilerini geliştirmeyi amaçladınız?
10. Uygulamakta olduğunuz fen etkinliklerinde kendinizi yeterli hissediyor musunuz?
    a. Gözlemlemiş olduğumuz etkinliklerde kendinizi nasıl hissettiniz, sizce yeterlimiydiniz?
    b. Planladığınız şekilde etkinliği uygulayabildiniz mi?
11. a. Kendinize 1 den 5e kadar tekrar puan vermenizi istesem, kendinizi en çok hangi sayı ile göstterirsiniz?
        i. Hiç rahat hissetmem
        ii. Biraz rahat hissederim
        iii. Kararsızım
        iv. Rahat hissederim
        v. Çok rahat hissederim
    b. Uyguladığınız etkinliği yine 5 üzerinden nasıl değerlendirir siniz?
12. Sizce fen etkinliklerinin çocuklar üzerinde daha etkili olması için neler yapılabilir?
    a. Uygulamış olduğunuz etkinliği daha etkili hale getirmek ister miydiniz-yoksa yeterlimiydi?

13. Kavram haritalarının çocuklar için yararı nedir? Size ne gibi kolaylıklar sağlıyor? Çocuklarla birlikte zaman zaman kavram haritalarına geri dönüş yapıyor musunuz? Etkinlikleri birlikte planlıyor musunuz?
14. Okul öncesinde etkinliklerin birbirleri ile bütünleştirilmesi (entegre edilmesi) hakkında ne düşünüyorsunuz?
    Öğretmene/çocuğa/programa nasıl katkı sağlar?
15. Sanat yolu ile fen öğretimi konusunda ne düşünüyor sunuz?
    a. Sizce olumlu/olumsuz yanları nelerdir?
16. Sizce okul öncesinde fen etkinlikleri hangi mekanlarda uygulanabilir?
    a. Uygulamış olduğunuz etkinliği başka nerede uygulayabilirdiniz?
17. Sizce sanat yolu ile fen öğretiminin öğretmene sağladığı katkılar nelerdir?
    a. Siz birebir uygulama imkanı bulduğunuz bu etkinliklerden nasıl faydalandınız?
    b. Bu etkinlikleri uygulamak size nasıl yardımcı oldu?
18. Sizce sanat yolu ile fen öğretimi eğitim sürecine nasıl katkı sağlar (değerlendirme, merak uyandırma, aile katılımı)?
19. Sizce sanat yolu ile fen etkinlikleri uygulamaları, daha onceden uygulamış olduğunuz fen etkinlikleri ile ne gibi farklılıklar gösterir?
20. Kullanmış olduğunuz sanat-fen etkinliğinin çocuklar açısından değerlendirdiğinizde- sanatı kullanmadan yapmış olduğunuz fen etkinlikleri ile arasındaki fark nedir?
21. Öğretmene özel
22. Öğretmene özel

APPENDIX C

OBSERVATION PROTOCOL OF THE STUDY

Tarih:

1. Sınıfta kaç çocuk var?
2. Sınıfta yardımcı öğretmen var mı?
3. Fen etkinliğinin süresi: Başlangıç: Bitiş:
4. Sınıfta fen köşesi var mı?
5. Fen etkinliği nerede uygulandı?
6. Uygulanan alan fen etkinliği uygulamak icin uygun bir alan mı?
7. Küçük grup etkinlinliği ☐ Büyük grup etkinliği ☐
8. Kullanılan materyaller nelerdir?
9. Öğretmen etkinliğe nasıl bir giriş yaptı? Geçiş etkinliği kullandı mı?
10. Fen etkinliği hangi concept öğretilmek için hazırlanmıştır?
11. Öğretmenin soruları nelerdir?
12. Çocuklar ne sordular?
13. Öğretmenin bu sorulara cevabı nasıl oldu?
    Öğretmene bilmediği bir soru sordularsa öğretmen nasıl bir tepki verdi?
14. Öğretmen çocukları etkinliğe nasıl dahil etti?
15. Öğretmen fen etkinliği sırasında başka etkinlikler kullandı mı?
16. Öğretmen fen etkinliğini uygularken hangi bilimsel süreç becerilerini kullandı?
    Gozlem
    Karsılastırma
    Sınıflama
    Ölçme
    İletişim kurma
17. Öğretmen fen çalışmalarından hangisini uyguladı?
    Deneyler

Araçları tanıma ve kullanma

Çeşitli çalışma teknik ve yöntemlerini kullanma

Keşifler, icatlar

Mutfak çalışmaları

Doğa gezileri ve yürüyüşleri, piknikler, kamplar

Koleksiyonlar

İlgili bilim alanındaki kişileri konuk olarak çağırma

Başvuru kitaplarını, diğer kitapları ve dergileri inceleme

Fotograf çekme, fotograf inceleme

Belgesel vb. İzleme gibi çalışmlar

18. Öğretmen etkinlik sonunda değerndirme yaptı mı? Bu değerlendirmeye çocuklarda katıldı mı?
19. Bu etkinlikle çocukların hangi gelişim alanları desteklendi?

APPENDIX D

DETAILED INFORMATION ABOUT TEACHERS' CLASSROOM PRACTICES

Aysun

Duration: 30 minutes

Integrated Activity: Working butterflies

Number of Children: 13

Place: Classroom and garden

Description of the Activity:

Teacher and children made physical movements at the beginning of the activity. At the end of this, teacher wanted children to be the butterfly. She directed children to observe their environment such as flowers, trees, and leaves in the garden. She said children:

> -My butterflies are curious about flowers? [Children went to the place where flowers were placed]
>
> -My butterflies are curious about trees and leaves? [Children started to investigate trees and leaves on the ground].

Teacher gave magnifiers to all children in order to make their investigations. She wanted them to observe whatever they want. She asked children to collect natural materials in the garden. They started to collect them and put them into a plastic bag. Children collected different materials such as "cones, leaves, grasses, flowers, and stones".

After that, children and teacher came back to the classroom. Teacher took a magnifier and asked children what it is. Children said the name it as “magnifier”. The following dialogue was:

-Teacher: When do we use magnifier?

-One of the children: In order to see animals.

-Teacher: What else?

-One of the children: We can see bees.

-Teacher: What is the difference between these two magnifiers? [While one of the magnifiers has glass, the other one do not have glass].

-Child 1: One of them is empty.

Child 2: There is a hole.

Teacher gave two magnifiers to children to look at the difference. Each child touched them and decided which one is empty. After that, teacher gave the magnifier [with glass] to children one by one. She wanted them to investigate collected materials from the garden. Generally, children chose cones for investigating. They tried to feel the touch while engaging with cones. Teacher asked children what they see on the cones. They said:

-Child 1: I saw a stone in it.

Child 2: I saw cone and insect in it.

Child 3: There was an insect. Moreover, I saw ants and stones in it.

Child 4: I could not see anything.

After that, teacher wanted children to select one of the leaves on the table. Children put these leaves on white paper and glued them on it. Teacher asked them to hang these on classroom tree. All children took their leaves and stick them on the classroom tree.

Figure 1. Classroom tree with children's works

Emel

Duration: 35 minutes

Integrated Activity: Making own filed glasses

Number of Children: 9

Place: Classroom and garden

Description of the Activity:

Teacher started an activity with nursery rhymes [Oo piti piti]; she wanted children to sit in the chairs. Teacher showed field glasses to children. She asked:

> Teacher: What is the name of it?
>
> Children: Field glasses.
>
> Teacher: When do we use field glasses?
>
> One of the children: We can use it when we want to see animals.
>
> Another child: I can see animals.

Teacher explained children:

> I put up my field glasses and look out the window. I can see the lights from the distance as close to us. In other words, this is helpful for us to bring to get a closer look at our environment. Would you like to look out using field glasses?

Children looked at the trees up close through their field glasses. Teacher gave field glasses to all children in order to look out the window. She asked children whether they see distant objects as bigger or smaller. Then she asked that:

-Do you like to make your field glasses?

-Children: “Yes”

-Teacher: OK, we can make our field glasses and use it in the garden.

Teacher distributed two plastic cups and helped children to glue them to each other. After that, she said that children can paint which colour they want. However, she realized that children could not paint on the plastic cups. She provided alternative materials for children. These are junk materials including ornament and folios. Then, children started to decorate their plastic cups with these materials by using tear and paste technique. At last, she distributed glues to children for combining two cups to each other (Figure 2).

Figure 2. Field Glasses

Children and teacher took their own field glasses and went to the garden. Teacher reminded children how to use field glasses. While children listened her, they tried to make what she did. Teacher said that she can see different thing in the garden such as ants, trees, and the sky. After that, she asked children what they saw. Children said "*ladybird", "flies",* and *"water fountain*". She also directed children to realize different things in the garden. Moreover, she reminded children not to forget what they saw in the garden because she said that they would draw a picture related to their observations in the garden.

They came back to the classroom. While teacher summarized what they did so far, she distributed white papers to children. She wanted them to draw pictures what they saw using their field glasses (Figure 3). She gave opportunity to all children to tell their pictures to all their friends.

Figure 3. Children's drawings

Seda

Duration: 40 minutes

Integrated Activity: Magic eyeglasses

Number of Children: 13

Place: Classroom

Description of the Activity:

Children and teacher sit in a circle. They talked about daily life. Then, teacher reminded children how they helped a child who wants to go holiday. Children proposed him to wear sunglasses.

Teacher brought a box into the classroom. She asked them to guess what types of materials are in the box. After estimating part, teacher selected one pair of material [two small boxes] in the box and asked children whether they can be used as eyeglasses or not. Children answered that "*they are not circular*". Moreover, teacher asked same question showing two plates. Children said again that *"these plates that do not look like glasses*". Teacher wanted them to try these materials whether they can be eyeglasses or not. Children tried to put different materials as eyeglasses. Teacher provided different materials for children's attempts such as plates, boxes, books. Lastly, teacher selected magnifier from the box and asked children what it is. Children said "*magnifier"* while one of the children told that *"this looks like a field glasses".* At this point, teacher put two magnifiers like eyeglasses and asked:

-*Do you think these can be eyeglasses?*

-Children answered *"Yes".*

-Teacher asked again *"Why?"*

-They said that *"because they are glass"*.

Teacher directed children to try out whether they can be eyeglasses or not. Teacher distributed small magnifiers to children. She asked that:

Teacher: Why do you want to use magnifiers?

One of the children: We can see objects bigger.

Teacher: What do you see using magnifiers?

Children: small insects" and "small things.

After that, teacher wanted them to investigate whatever they see in the classroom by using their magnifiers. Teacher wanted children to put magnifiers into the box while sitting in the circle. She explained that:

> I gave a white paper to you. You can see eyeglasses on the paper. This is magical glasses so they want to help you. That is, you can see whatever you want with the help of this eyeglasses.

After explanation of the activity, teacher asked children what they want to see with these eyeglasses. Children answered *"wolf, fish, horse, monster, car, and lion".* Teacher wanted them to draw these on their white papers.

Sibel

Duration: 45 minutes

Integrated Activity: Daytime and Night

Number of Children: 12

Place: Classroom

Description of the Activity:

Teacher showed different physical movements in order to warm up. She also counted the numbers while showing the movements. Then, children and teacher showed the movements while saying this counting rhyme. During this part, teacher directed children to make movements correctly. After that, teacher asked children that *we see ground when we look at the land. What do we see when looking at the sky?"*

> Children said: *"sky".*
>
> Teacher asked again: *When we looking out a window, can we see our backwards?*
>
> Children said: *"no".*

Teacher put a chair in the middle of the classroom in front of the mirror on the wall. She wanted children to get out of a chair on foot. Then, she asked children: *"What do you see looking your back?"*

One of the children put this chair and said that "*I saw a car and bust of Atatürk*".

At this time, teacher explained that:

> When the light hits the window, some of it goes through the window and seeing the reflection off the glass. So, we can see our back". In addition, she gave an example related to hairdressing saloon. After hairdressers cut our mothers' hairs, they put mirror in order to help mothers to see their back.

One of the children said that *"she cannot see her back when turning back. So, mirror helps her to see hairs".* Teacher asked all children to get out of this chair in order. When next child got out of this chair, one of the children said that "Teacher, you and Batu have same length". Teacher turned her head toward that child and smiled at him.

All children told what they saw. At this time, teachers again explained the issue of reflection. She said that *"look at the television! You can see your reflection because shinny items such as glass help us to see our reflections".*

Teacher asked children: "*Why cannot we see?"*

Children answered: "*at night", "when the electricity is cut off*", and "*the fuse is closed".*

After these answers, teacher prepared another activity related to darkness. She put four chairs in the middle of the classroom. Thus, she built a frame of tent for this experiment. Then, she covered it in plenty of dark material such as curtains and blankets. She invited children to make a prediction about what they will be able to see in the darkroom. She wanted children to go into the darkroom. She asked them:

-*"What can you see in there (darkroom)?"*

Children answered as *"dark"*, *"too dark",* and "*completely dark*". After that, teacher asked again that *"How can we see in the dark at night?"* Children answered as "there are lots of lights on the road" and "cars have lights".

Teachers asked them again: *"How can we see in the dark at night?" and "What do you think what helps us to see at night?"* After these questions, teacher answered the question as "moon". Then, children said that *"moon and stars help us to see at night".* Teacher asked:

> *"What do you think that how moon lighten our planet?"*

One of the children said that *"moon received light from the sun".* Teacher explained this phenomenon as using hand movements. She also said that *"moon received light from the sun".* After that teacher explained following activity to children. She said that:

> I want you to draw a picture of day and night. You can use both sides of the paper. Sorry, we have a problem about our materials. We only have whitepapers in our classroom.

She also asked children: *"How can we draw night on the paper?"* One of the children answered that *"we can paint a paper plate with black paint. Thus, it can be dark".* Then, she distributed white papers to children in order to make that activity. Children paint one side of the white paper with black paint. After that, they started to make their paintings about daytime and night. While drawing their pictures, children spontaneously started to tell their pictures to each other.

After all children finished their paintings, teacher wanted them to tell their pictures to their friends. So, all children told their pictures in order.

Bahar

Duration: 35 minutes

Integrated Activity: Natural life

Number of Children: 15

Place: Classroom and Garden

Description of the Activity:

Teacher started an activity with a question:

-"*What do you remember about our previous activity?"*

She explained that they went to eye doctor because of medical examination. She said that *"Now, I want to show you different object"*. She showed a magnifier and asked what it is. Children responded as "*magnifier"* as loudly.

Teacher distributed magnifiers to all children in the classroom. She wanted them to investigate their hands, fingers, and on the surface of table.

-She asked *"How do we see using magnifiers?"*

-Children answered that "We can see bigger".

-Teacher asked again *"When do we use magnifiers in our life"?*

-One of the children said that *"it is helpful for us to see details of the something"*.

Then, teacher asked *"Do you want to be nature hunter today?"*

Teacher directed children to make field-trip in the garden. They wanted them to make observations about natural life. In addition, she asked them to collect natural materials from the garden. Firstly, she indicated how children use magnifier in the garden. After that, she wanted them to observe different things by using magnifier and to collect these materials in the box. At this time, children started to observe their environment using magnifiers. She also helped some children who could not use magnifier in there. One of the children called teacher and other friends in order to show an insect. All of them observed the insects and observe its movements.

After collecting materials, teacher and children came back to the classroom. Teacher wanted them to sit as a circle while putting magnifiers. She placed collected natural materials in the circle. Then, she asked children to investigate which material they want. Children observe collected natural materials such as leaves, small stone, and cones. After separate investigation process was completed, teacher helped children to investigate a piece of leaf on a big magnifier. At this time, she introduced bigger

magnifier to children and the usage of it. Then, each child worked on the parts of leaf with the help of teacher. Teacher asked children:

"What natural material did we collect?"

Children answered *"branch, stones, and leaves".*

Then, teachers asked again *"Which one is heavier than the other: leaf or stone?"*

Children answered this question as *"stone".*

At this time, teacher set up the balance scale into the classroom. She wanted them to measure "*leaf"* and *"stone"* using balance scale. She explained the concept of heavy and light by using a stone on one side of the scale and a leaf on the other side. She also encouraged children to weight these items after putting more leaves on one side. She wanted them make comparison between these two items. After that, teacher encouraged children to weight stones and cones. She also added more cones on one side of the balance scale. Children realized that stones were heavier than cones. Teacher also asked:

-*"Which is heavier leaf or cone?"*

-*"Is cone heavier than the stone?"*

-*"Is leaf lighter than stone?"*

-*"Which is the heaviest object, leaf, cone, and stone?"*

After completed measurement part, teacher asked children to separate natural objects putting different plastic bags. So, children grouped these objects as leaves, stones, and cones. Then, they put these items into the bags. After that, the teacher wanted them to sit at the table and asked them what types of materials they collect from the garden. Children said the names of the three groups including natural materials. Then, teacher distributed blank papers to children and wanted them to select one group of natural material collected from the garden. After investigating this object with magnifier, she wanted them to draw pictures of these objects.

Children investigated objects with the help of bigger magnifier and drew pictures whatever they see on there.

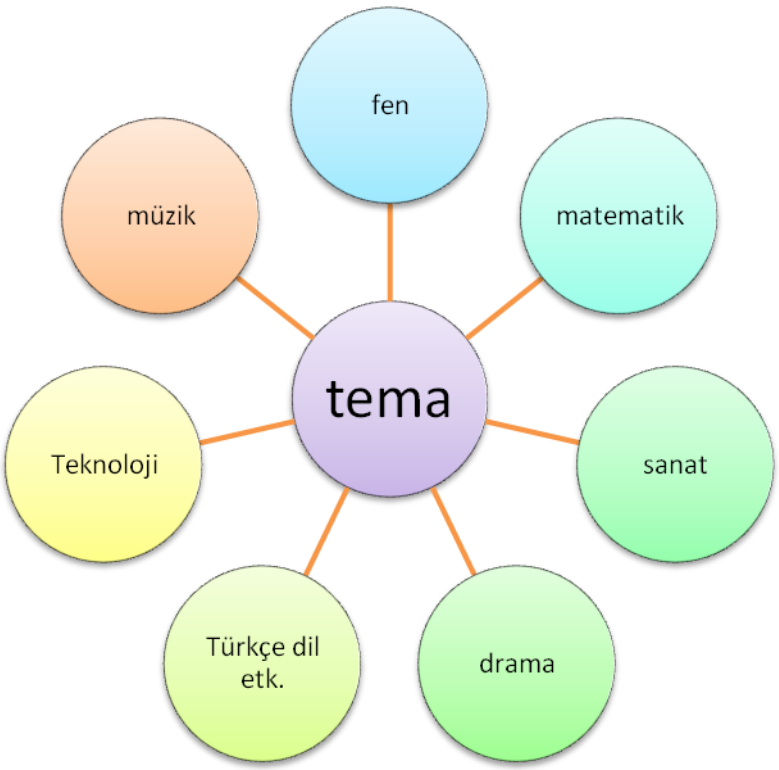
APPENDIX E

WORKSHEET

Okul Öncesi Dönemde Sanat Yolu ile Fen Öğretimi

- Bütünleştirilmiş program nedir?
  - öğretmenin ortak temaya yönelik çok boyutlu düşünmesi için farklı etkinliklerdeki farklı konu alanlarındaki bilgilerin transferinin birlikte yürütülmesidir
  - yapısı "tema"tiktir

- Sizlere ;
  - kendiniz için anlamlı olan bir program yaratmanız, gelistirmeniz ve bu programı uygulamanız konusunda yardımcı olur.
  - yaratici olmanız konusunda sizi teşvik eder.
  - sınıfınızı daha iyi kontrol etme imkanı sağlar
  - Kendi hedeflerinizi seçip, değerlendirme yapmanıza olanak verir.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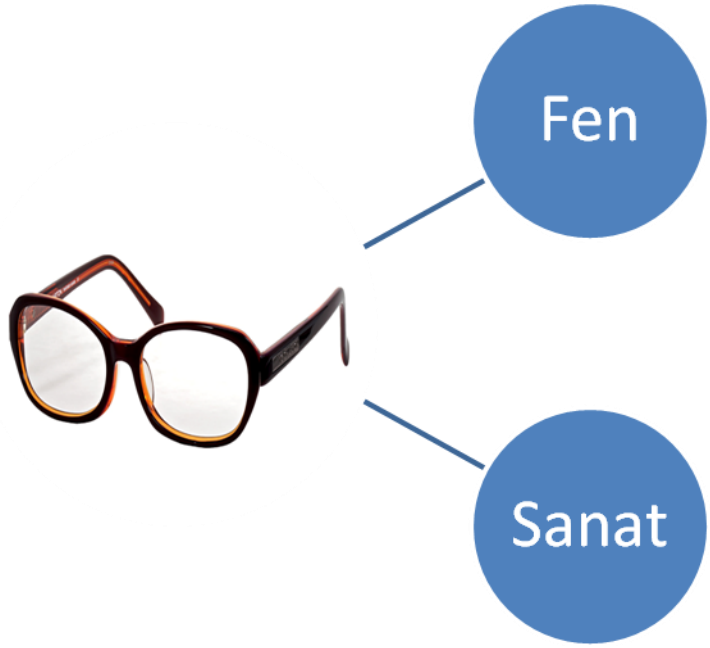
drama


Fen
Sanat

Okul Öncesinde Fen

- Kavram haritaları aslında okul öncesinde fen öğretiminde kullanılan yöntemlerden sadece biri…….
- Diğer yöntemler;
  - Proje yaklaşımı
  - Deneyler
  - Gezi-gözlem ve inceleme
  - Analoji
  - Drama
  - İş birlikli öğrenme
  - Bilgisayar destekli öğrenme

  ➢ yaparak yaşayarak öğrenmesini destekler

  ➢ fikir geliştirme, ilişkili terimleri öğrenme, öğrendiklerini uygulama, ve diğerleri ile paylaşma fırsatı bulurlar

MEB'programında yer alan fen ve matematik etkinlikleri;

- Deneyler
- Araçları tanıma ve kullanma
- Çeşitli çalışma teknik ve yöntemlerini kullanma
- Keşifler ve icatlar
- Mutfak çalışmaları
- Doğa gezileri ve yürüyüşleri, piknikler, kamplar
- Koleksiyonlar
- İlgili bilim alanındaki kişileri konuk olarak çağırma
- Başvuru kitaplarını, diğer kitapları ve dergileri inceleme
- Fotograf çekme, fotograf inceleme
- Belgesel vb. izleme gibi çalışmalar

- **Bilimsel Süreç Becerileri**

  Öğrenmeyi kolaylaştıran,

  araştırma yeteneği kazandıran,

  çocukların öğrenme ortamlarında aktif olmalarını ve
  öğrenmenin kalıcılığını sağlayan becerilerdir

  - Bilgilerin çocuklara öğretilmesi değil; çocukların bilgiyi yaparak, yaşayarak öğrenmesidir.

Somut deneylerle yeni bilgiler kazandırmasını sağlar
Okul öncesi dönemdeki çocuklar için en uygun bilimsel beceriler;

- Gözlem yapma
- Karşılaştırma
- Sınıflama
- Ölçme
- İletişim

Gözlem Yapma: Olaylar ve nesneler hakkında bilgi toplamak için duyuları kullanmak

- Daha iyi tahmin yapmalarını sağlar.

değişik gözlük çeşitlerinin incelenmesi ve renkleri, şekilleri, yapıları gibi gözlükler arasındaki farkları ve benzerlikleri keşfedebilirler.(renkler, büyük-küçük kavramı, sert-yumuşak, parça-bütün Ilişkisi, vb.)

Karşılaştırma: Çocuklar gözlem becerisini geliştirirken, benzerlikleri, farklılıkları, zıtlıkları karşılaştırmaya başlarlar.

- Miktar, boyut, renk, sıcaklık, mesafe, ses düzeyi gibi….

Sınıflama: Çocukların gerçek nesneleri ayırması ve gruplaması ile başlar.

Ayırma ve gruplama, nesnelerin özellikleri hakkında yapılan gözlem temel alınarak yapılır.

- Çocuk nesneleri karşılaştırmaya ihtiyaç duyar ve alt gruplar oluşturur.

  - Bir alt grup, gruptaki tek bir genel özelliği vurgular….
  - Ilk olarak nesneleri renklerine ve şekillerine göre, sonra boyutlarına göre sınıflandırırlar

Ölçme: Miktarı ölçme becerisidir.

- Ölçme sıcaklık, hacim, zaman, ağırlık, uzunluk gibi niteliklerin miktarını belirlemek için……
- Okul öncesinde standard olmayan ölçü birimlerini kullanabiliriz..
  - Kuru fasülye, tahta çubuk, ip…….

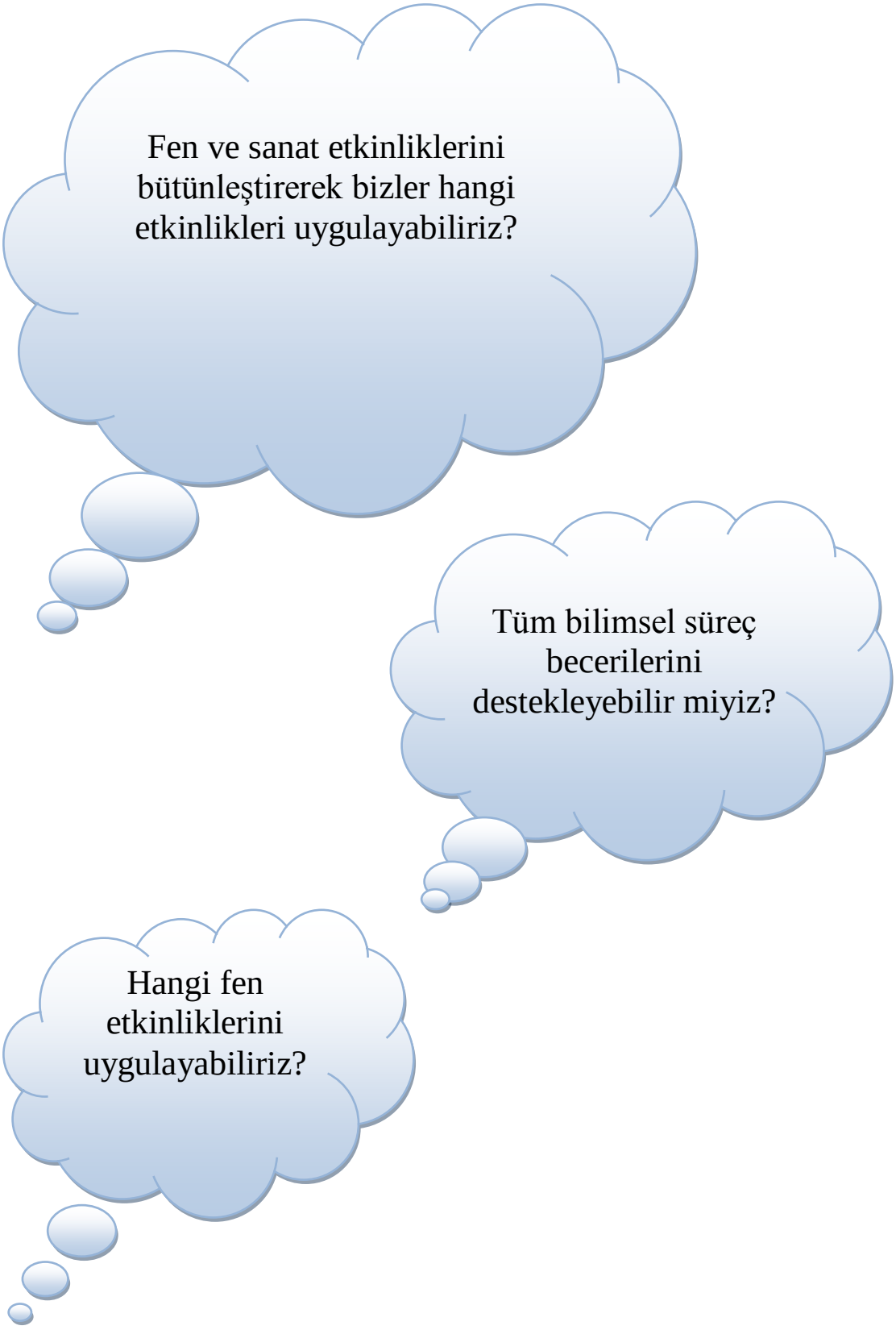
İletişim Kurma: Çocuklar fikirleri, yönergeleri ve tanımları sözel olarak veya resimler ve grafikler gibi yazılı şekillerle…….

- Çocuklardan gözlemledikleri bir durumun sonucunu grafikler kullanarak, resim yaparak, fotograf çekerek veya kameraya kaydederek anlatmasını isteyebiliriz…..

Okul öncesinde sanat:

- sanatsal bakış açısı
- estetik değerler
- yaratıcı düşünebilen bireyler

Böylece;
- Görsel olgunluğa ulaşırlar
- Farklılıkların ve benzerliklerin ayrımına varır
- El-göz koordinasyonu gelişir
- Dikkat süresi uzar


Fen ve sanat etkinliklerini bütünleştirerek bizler hangi etkinlikleri uygulayabiliriz?
Tüm bilimsel süreç becerilerini destekleyebilir miyiz?
Hangi fen etkinliklerini uygulayabiliriz?

APPENDIX F

TURKISH SUMMARY

Okul Öncesi Öğretmenlerinin Fen ve Sanat Etkinliklerinin Bütünleştirilmesi Konusundaki Bakış Açıları ve Deneyimlerindeki Değişikliklerin İncelenmesi: Durum Çalışması

1. GİRİŞ

Öğretmenler, öğretme süreci içerisinde önemli rol oynarlar. Sınıf içinde çeşitli etkinlikler planlarken ve uygularken, daha önceden edinmiş oldukları deneyimlerini kullanırlar. Bu yüzden, öğretmenlerin sınıf içi uygulamalarının eğitim sürecine çok büyük etkisi vardır. Charlesworth ve diğer. (1993)' ne göre, öğretmenlerin sınıf-içi uygulamaları, önem verdikleri veya önem vermedikleri durumlarla ilgili inanışlarını belirlemektedir. Bunlar, bazı kavramların ve değerlerin öğretilmesi açısından çok önemlidir. Çünkü, öğretmenlerin sınıf-içi kararlarının ve uygulamalarının, onların eğitim süreci hakkında sahip oldukları inanışları tarafından etkilendiği açıkça ortadadır (Spodek, 1988). Benzer olarak, Clark ve Peterson (1986) öğretmenlerin inanışlarının ve teorilerinin onların planlarını ve düşüncelerini yansıttığını savunmaktadır. Diğer bir deyişle, öğretmenlerin sınıf-içi uygulamalarını anlamak için onların sahip oldukları bakış açılarının incelenmesi önem taşımaktadır.

Okul öncesi öğretmenleri, genellikle program içerisinde bulunan tüm etkinlikleri uygulamaya çalışırlar. Bu yüzden, öğretmenlerin tek bir alana örneğin fen alanına odaklanmaları beklenmez (Englehart, 2008). Bu durum öğretmenlerin fen alanı

hakkındaki inanışları, bakış açıları ve uygulamaları sonucunda oluşmuş olan bir durum olabilir. Abd-El-Khalick, Lederman, Bell ve Schwartz'in 2001 yılında yapmış oldukları çalışma, öğretmenlerin fen ile ilgili bazı durumları anlamakta zorluk çektiklerini göstermektedir. Buna benzer olarak, diğer bir çalışma öğretmenlerin çoğunun fen öğretiminde araştırma ile ilgili yeterli donanıma ve deneyime sahip olmadıklarını göstermektedir (Davis, Petish ve Smithey, 2006).

Literatürde bulunan bazı çalışmalar öğretmenlerin inanışları ve bakış açıları ile onların sınıf-içi uygulamaları arasında ilişki olduğunu göstermektedir. Özellikle, okul öncesi öğretmenlerinin fen eğitimine yönelik görüşleri, inanışları ve uygulamaları ile ilgili yapılan çalışmalara bakıldığında, öğretmenlerin diğer alanlarla karşılaştırıldığında, fen öğretimi konusunda kendilerini yeteri kadar hazır hissetmedikleri belirtilmiştir (Wenner, 1993). Bu durumun sonucunda, fen öğretiminin zor olduğu konusunda bazı yanılgılar ortaya çıkmaktadır. Bu yanılgılar, öğretmenlerin kendilerini fen öğretimi konusunda rahat hissetmemelerine ve istekli olmamalarına yol açmaktadır (Seefeldt ve Galper, 2002, akt. iç. Yoon ve Onchwari, 2006). Özellikle, okul öncesi öğretmenlerinin fen öğretimi konusundaki bakış açıları incelendiğinde, bazı öğretmenlerin kendilerini fen öğretimi konusunda yeterli hissetmedikleri ortaya çıkmıştır (Coulson, 1992). Bununla birlikte, Conezio ve French (2002), bazı öğretmenlerin olumsuz fen deneyimlerinden dolayı fen öğretimine karşı istekli olmadıklarını saptamıştır. Tüm bu çalışmalar okul öncesi öğretmenlerinin mesleki gelişimlerini desteklemek için, fen ve eğitim bilimleri alanlarını birleştirmeleri gerektiğini göstermektedir. Böylece ortaya daha etkili bir program çıkacaktır (Tsitouridou, 1999). Bu strateji sayesinde, öğretmenler fen öğretirken kendilerini daha güvenli hissedeceklerdir. Diğer bir strateji ise, okul öncesi dönemde fen etkinliklerinin diğer etkinliklerle bütünleştirilmesinin gerekliliğidir (Watters, Diezmann, Grieshaber ve Davis, 2001).

1.1 Fen Etkinliklerinin Bütünleştirilmesi

Bredekamp ve Copple (1997), fen etkinliklerinin okul öncesi programının önemli bir parçası olduğunu vurgulamaktadırlar. Çünkü, fen çocukların doğal merakları ile yakından ilişkilidir. Bununla birlikte, fen çocuklara sunduğu değişik

olanaklarla, onların düşünme becerilerini destekler. Eshach ve Fried (2005)'e göre fenin çocukların hayatları üzerinde önemli rol oynadığına ilişkin 6 neden vardır. Bunlar,

1- Çocuklar doğa hakkında düşünmekten ve gözlem yapmaktan hoşlanırlar.
2- Çocuklar fen deneyimleri sayesinde olumlu tutumlar geliştirirler.
3- Eğer çocuklar erken yaşlarda fen ile ilgili uyaranlarla karşılaşırlarsa, bu durum örgün eğitimden önce fen kavramlarını anlamalarına yardımcı olur.
4- Eğer çocuklar erken yaşlarda fen okur-yazarı olurlarsa, bu durum fen kavramlarını öğrenmelerini sağlar.
5- Çocukların fen kavramlarını öğrenmelerini ve nedenlerini bilimsel açıdan anlamalarını sağlar.
6- Fen, çocukların bilimsel düşünmelerini destekleyen etkili yollardan biridir.

Tüm bu nedenler ışığında, fen etkinlikleri bilimsel bir bütün içinde oluşturulmalıdır. Eğer fen etkinlikleri çocuklara uygun bir yöntemle planlanır ve uygulanırsa, bu hem çocukların gelişim alanlarını destekler hem de onların ilgilerine hitap eder. Örneğin, bütünleştirilmiş yaklaşım çocuklara fen öğretmek için uygun bir yöntemdir. Bu yaklaşım sayesinde, bilimsel konular diğer derslerden ayrı bir şekilde öğretilmek yerine onlarla bütünleştirilerek öğretilir (Cannon ve Scharmann, 1996). Bu süreç içerisinde, çocuklar kendilerini yetişkinler gibi ifade edemeyebilirler. Bu noktada, çocuklar konuşarak değil daha farklı yollarla kendilerini anlatmaya ihtiyaç duyarlar. Bu yüzden, bütünleştirilmiş yaklaşım çocukların öğrendiklerini daha etkili bir şekilde göstermelerine yardımcı olur. Fen öğretimi içerisinde gözlem yapma, ayırt etme, ölçme, zaman ve mekan ilişkileri, iletişim, sonuçları görme ve sayıları kullanma gibi değişik etkinlikler yer alır (Cannon ve Scharmann, 1996). Tüm bu öğrenme deneyimleri düşünüldüğünde, sanat etkinlikleri okul öncesi programının ana parçasını oluşturmaktadır. Çünkü, sanat etkinlikleri, çocuklara bazı şeyleri öğretmek için düzenlenebilen bir alan olarak düşünülebilir. Diğer bir deyişle, sanat okul öncesi eğitimin en önemli parçalarından birisidir. Sanat yolu ile çocuklar renk, yoğunluk,

örüntü gibi bazı kavramları öğrenebilirler (Piersol, 1996). Buna ek olarak, sanat çocukların tüm gelişim alanlarını destekleyerek yaşamlarına katkı sağlar (Jackman, 2005).

Çocuklar, fen ile ilgili bazı ilkeleri sanatı kullanarak daha kolay öğrenebilirler. Örneğin, çocuklar boyaları su ile karıştırdıkları zaman suyun renkli olacağını gözlemleyebilirler. Buna ek olarak, çocuklar sanat yolu ile hipotez oluşturma, tahmin etme, gözlem yapma, soru sorma, açıklama gibi bilimsel süreç becerileri hakkında deneyim sahibi olurlar (Schirrmacher, 2002). Ayrıca, su, yemek, temiz hava gibi temel ihtiyaçlar üzerinde araştırmalar yaparak çevre eğitimi ile sanatı bütünleştirebilirler (Mayesky, 2002).

Öğretmenler, bu etkinliklerin planlanmasında ve uygulanmasında çok önemli bir role sahiplerdir. Öğretmenler genellikle etkinlik uygulamalarını yaparken almış oldukları örgün eğitimlerden, hizmet-içi eğitimlerden ve sınıf-içi uygulamalardan faydalanırlar. Bu yüzden, öğretmenlerin etkinlik uygulamalarını anlamak için, almış oldukları örgün eğitim, katılmış oldukları hizmet-içi eğitimler ve sınıf-içi uygulamaları incelenmelidir. Bu sayede, öğretmenlerin etkinlik uygulama ve planlama deneyimleri daha net anlaşılmaktadır.

Bu çalışmanın amacı, okul öncesi öğretmenlerinin fen öğretimi ve bütünleştirilmiş fen ve sanat etkinliklerinin uygulanması hakkındaki görüşlerinin araştırılmasıdır. Bu çalışma kapsamında, öğretmenlerin katılmış oldukları "fen ve sanat etkinliklerinin bütünleştirilmesi" konulu seminer öncesinde ve sonrasında fen öğretimine karşı sahip oldukları bakış açıları ve uygulamaları incelenmiştir. .

2. Yöntem

Bu çalışmanın amacı, özel bir okul öncesi eğitim kurumunda çalışmakta olan beş okul öncesi öğretmeninin "fen ve sanat etkinliklerinin bütünleştirilmesi" konulu seminere katıldıktan sonra fen öğretimi konusuna bakış açıları ve uygulamalarını araştırmaktır. Çalışma kapsamında, öğretmenlerle birebir görüşmeler yapılmış, sınıf-içi uygulamaları gözlenmiş ve etkinlik planları incelenmiştir.

2.1 Araştırma Soruları

1. Okul öncesi öğretmenlerinin fen öğretimi konusundaki görüşleri nelerdir?
    a. Okul öncesi öğretmenlerinin, okul öncesi dönemde fen etkinliklerinin önemi konusundaki görüşleri nelerdir?
    b. Okul öncesi öğretmenlerinin çocukların feni nasıl öğrendikleri konusundaki görüşleri nelerdir?
    c. Okul öncesi öğretmenlerinin etkili fen öğretimi konusundaki görüşleri nelerdir?
2. Okul öncesi öğretmenlerinin fen öğretimi konusundaki bakış açıları ve uygulamaları katılmış oldukları seminerden nasıl etkilenmiştir?
    a. Okul öncesi öğretmenlerinin seminere katılmadan önce ve katıldıktan sonra fen öğretimi konusundaki görüşleri nelerdir?
    b. Okul öncesi öğretmenlerinin seminere katılmadan önce ve katıldıktan sonra fen öğretimi konusundaki uygulamaları nelerdir?
3. Okul öncesi öğretmenlerin katılmış oldukları seminer, bütünleştirilmiş program ile ilgili bakış açılarını ve uygulamalarını nasıl etkilemiştir?
    a. Okul öncesi öğretmenlerinin, katılmış oldukları seminer öncesi ve sonrası fen ve sanat etkinliklerinin bütünleştirilmesi konusuna bakış açıları nelerdir?
    b. Okul öncesi öğretmenlerinin, katılmış oldukları seminer öncesi ve sonrası fen ve sanat etkinliklerinin bütünleştirilmesi konusundaki uygulamaları nelerdir?
4. Okul öncesi öğretmenlerinin katılmış oldukları seminer sonrasında fen öğretimi konusundaki uygulanmaları nelerdir?
5. Okul öncesi öğretmenlerinin katılmış oldukları seminer sonrasında fen ve sanat etkinliklerinin bütünleştirilmesi konusundaki uygulanmaları nelerdir?

2.2 Araştırmanın Kapsamı

Bu çalışmanın katılımcıları, Ankara iline bağlı Çayyolu semtinde 1996 yılında kurulmuş olan özel bir anaokulunda çalışmakta olan beş okul öncesi öğretmeninden oluşmaktadır. Bu kurumda, toplam altı okul öncesi öğretmeni çalışmakta olup 48

öğrenci okul öncesi eğitim almaktadır. Milli Eğitim Bakanlığı'na bağlı olan bu kurum, okul öncesi eğitim programını uygulamakta olup, yöntem olarak Proje Yaklaşımını benimsemiştir. Her ayın başında belirlenen temalar doğrultusunda projeler aylık olarak uygulanmaktadır. Bu okulda çalışmakta olan öğretmenler her ay rutin olarak düzenlenen proje toplantılarına katılmakta olup, projenin gerçekleştirilmesi için gerekli olan aşamaları planlarlar. Sonrasında, tüm öğretmenler kendi yaş grubuna uygun bir şekilde projelerini oluştururlar.

Okulun fiziksel özellikleri çocukların gelişim özelliklerine uygundur. Örneğin, tüm sınıflarda büyük pencereler vardır ve bu pencerelerin hepsi bahçeye açılmaktadır. Okul büyük bir bahçenin ortasına konumlandırılmıştır.

2.3 Araştırma Deseni

Bu çalışma kapsamında örnek olay incelemesi yaklaşımı benimsenmiştir.. Cresswell (2007)'ye göre, nitel araştırma yöntemlerinden birisi olan örnek olay incelemesi, araştırmacıların zaman içerisinde değişik veri toplama tekniklerini (gözlem, görüşme, rapor incelemesi gibi) kullanarak örnek olay ya da olaylar oluşturmalarına olanak sağlamaktadır. Bu bağlamda, bu çalışmada ortaya çıkarılan örnek olay aynı kurumda çalışmakta olan okul öncesi öğretmenlerinin "fen ve sanat etkinliklerinin bütünleştirilmesi" konulu katılmış oldukları seminer öncesi ve sonrası fen öğretimi hakkındaki görüşlerini ve uygulamalarını içermektedir.

2.4 Veri Toplanma Süreçleri

Araştırmada birebir görüşme, gözlem ve döküman incelemesi gibi nitel veri toplama yöntemleri bir arada kullanılmıştır. Aşağıdaki tabloda araştırma soruları ile ilişkili olan veri toplama teknikleri verilmiştir.

Tablo 1. Araştırma Soruları ve İlgili Veri Toplama Teknikleri

Araştırma Soruları	Veri Toplama Teknikleri
1. Okul öncesi öğretmenlerinin fen öğretimi konusundaki görüşleri nelerdir?	Okul öncesi öğretmenleri ile yarı-yapılandırılmış ön-görüşme
2. Okul öncesi öğretmenlerinin fen öğretimi konusundaki bakış açıları ve uygulamaları katılmış oldukları seminerden nasıl etkilenmiştir?	- Okul öncesi öğretmenleri ile yarı-yapılandırılmış ön-görüşme -Okul öncesi öğretmenlerinin etkinlik uygulamalarının gözlemlenmesi -Okul öncesi öğretmenleri ile yarı-yapılandırılmış son-görüşme
3. Okul öncesi öğretmenlerin katılmış oldukları seminer, bütünleştirilmiş program ile ilgili bakış açılarını ve uygulamalarını nasıl etkilemiştir?	-Okul öncesi öğretmenlerinin etkinlik uygulamalarının gözlemlenmesi
4. Okul öncesi öğretmenlerinin katılmış oldukları seminer sonrasında fen öğretimi konusundaki uygulanmaları nelerdir?	
5. Okul öncesi öğretmenlerinin katılmış oldukları seminer sonrasında fen ve sanat etkinliklerinin bütünleştirilmesi konusundaki uygulanmaları nelerdir?	-Okul öncesi öğretmenlerinin etkinlik uygulamalarının gözlemlenmesi

Katılımcı öğretmenlerle yapılan birebir görüşmeler ön-görüşme ve son-görüşme olarak iki şekilde gerçekleştirilmiştir. Görüşme soruları oluşturulurken ilgili literatür taranmış olup, okul öncesi eğitimi, okul öncesinde fen eğitimi ve nitel araştırma teknikleri alanında uzmanlaşan üç akademisyenden destek alınmıştır. Görüşme soruları oluşturulduktan sonra, gerçek çalışma öncesinde pilot uygulama

yapılarak soruların anlaşılıp anlaşılmadığı tespit edilmiştir. Bu pilot uygulama sonucunda, daha net olması gereken soruların formatı değiştirilip, daha anlaşılır olması sağlanmıştır. Birebir ön-görüşmeler yaklaşık 30 dakika sürmüştür. Bu görüşmeler öğretmenlerin çalışma saatleri içerisinde, onlara uygun olan zamanlarda yapılmıştır. Görüşmeler, öğretmenlerin özellikle gün içindeki eğitim programlarını etkilemeyecek şekilde planlanmıştır. Ön-görüşme sorularının bazıları Tablo 2'te gösterilmiştir.

Tablo 2. Ön-görüşme Sorularından Bazı Örnekler

- Haftada kaç kere fen etkinliği uyguluyorsunuz?

Siz sınıfınızda hangi fen etkinliklerini uyguluyorsunuz?

- Fen etkinliklerini, okul öncesindeki diğer etkinliklerle karşılaştırdığınızda sizce önemi nedir?
- Sizce çocuklar feni nasıl öğrenirler?
- Sizce okul öncesi dönemde fen nasıl öğretilmelidir
- Fen etkinliklerini hazırlarken ya da bu etkinliklere hazırlanırken diğer etkinliklerden farklı birşeyler yapıyor musunuz?
- Fen etkinliklerinizi planlarken aşağıda bulunan temel bilimsel süreç becerilerilerinden hangilerini desteklemeyi planlıyorsunuz? Örnek verebilir misiniz?

_Gözlem _Karşılaştırma _Sınıflandırma _Ölçme _İletişim

- Okul öncesinde etkinliklerin birbirleri ile bütünleştirilmesi (entegre edilmesi) hakkında ne düşünüyorsunuz? Sizce bütünleştirmenin olumlu yanları var mıdır? Nelerdir, bahsedebilir misiniz?
- Siz uygulamalarınızda fen ve sanat etkinliklerini bütünleştirerek kullanıyor musunuz?

Bunlara ek olarak, görüşmeler katılımcı öğretmenlerle seminer sonrasında tekrar yapılmıştır. Son-görüşmeler dahilinde sorulan sorular ön-görüşme sorularıyla aynı olmakla birlikte ek olarak öğretmenlerin sınıf-içi uygulamaları ile ilgili özel sorular da eklenmiştir.

Bu çalışmada birebir görüşmelere ek olarak, öğretmenlerin sınıf-içi uygulamaları da incelenmiştir. Bu bağlamda, öğretmenlerin sanat yolu ile uygulamış oldukları fen etkinlikleri iki gözlemci tarafından gözlemlenmiştir. Her iki gözlemci de, gözlemledikleri etkinlikleri not tutarak kayıt altına almışlardır. Gerçek gözlemler yapılmadan önce üç katılımcı öğretmenin fen uygulamaları gözlemlenerek hem sınıflar hakkında daha fazla bilgi sahibi olunmuş, hem de tutulan notlar üzerinden gözlemciler arası güvenilirlik değerlendirilmiştir.

Bu çalışmanın bir diğer veri toplama yöntemi de döküman incelemesidir. Katılımcı öğretmenlerin uygulamış oldukları bütünleştirilmiş sanat ve fen etkinlikleri ile ilgili hazırlamış oldukları günlük planlar incelenmiştir.

2.5 Seminer

Bu çalışma kapsamında araştırmacı, okul öncesi öğretmenler için bir seminer düzenlemiştir. Bu seminerin içeriğinde okul öncesi dönemde fen, sanatın okul öncesi eğitimdeki yeri ve bütünleştirilmiş programın özellikleri yer almaktadır. Bu seminer, Milli Eğitim Bakanlığı'nın yayınlamış olduğu okul öncesi eğitim programına göre alandaki uzmanlardan görüşler alınarak hazırlanmıştır. Seminer öğretmenlere verilmeden önce, araştırmacı tarafından doktora tez izleme komitesine sunulmuş olup, bazı eklemeler yapılarak son halini almıştır. Araştırmacı seminer sırasında katılımcı öğretmenlerin semineri takip edebilmeleri için küçük bir kitapçık hazırlamış olup, seminer öncesinde öğretmenlere dağıtmıştır. Böylece öğretmenlerin semineri daha rahat takip etmeleri sağlanmıştır. Yaklaşık 1 buçuk saat süren seminer bir öğleden sonra oturumunda gerçekleştirilmiştir. Araştırmacı semineri verirken diğer yandan ikinci gözlemci olan kişi seminer hakkında notlar almıştır. Bu sayede, seminer sırasında paylaşılan bazı örnekler veya deneyimler kayıt altına alınmıştır. Seminerin sonunda katılımcı öğretmenlerle birlikte üç tane bütünleştirilmiş sanat ve fen etkinliği planlanmış olup, etkinliklerin değişik şekillerde ve değişik materyallerle nasıl uygulanabileceği üzerinde tartışma yapılmıştır. Bu seminer ile, öğretmenlerin sanatı kullanarak fen etkinlikleri uygulayabilecekleri vurgulanmıştır. Ayrıca, öğretmenlerin sanatın okul öncesi eğitimindeki önemini hatırlamaları amaçlanmıştır.

2.6 Verilerin Analizi

Okul öncesi öğretmenlerinin bütünleştirilmiş fen ve sanat etkinlikleri ile ilgili görüşleri ve uygulamaları hakkında incelemeler yapılarak, onların bu konu hakkındaki görüşleri ve uygulamaları daha detaylı bir şekilde araştırılmıştır. Araştırmacı tarafından gerçekleştirilen birebir ön-görüşmeler, son-görüşmeler ve gözlem raporları harfiyen metne dönüştürülerek, metinlerin analizi yapılmıştır. Görüşmeler ön-görüşme ve son-görüşme formlarına, gözlemler ise gözlem formuna bağlı kalınarak gerçekleştirilmiştir.

Araştırmacı elde edilen metin üzerinde incelemeler yaparak ve metni anlamlı bölümlere ayırarak her bölümün ne ifade ettiğini bulmaya çalışmıştır. Verilerin analizi yapılırken yardım alınacak bir kavramsal yapı olmadığı için, toplanan verilerin tümevarımcı bir yaklaşımla analizi yapılmıştır. Verilerin analizine kodlar oluşturularak başlanmıştır. Sonrasında, kodların ortak yönleri bulunarak kodların kategorize edilmesi işlemi yapılmıştır. Tüm bu aşamalar, görüşme metinleri, gözlem notları ve öğretmenlerin hazırlamış oldukları etkinlik planları için ayrı ayrı yapılmıştır.

2.7 Geçerlilik ve Güvenilirlilik

Creswell ve Miller (2000)'a göre, nitel çalışmaların kalitesini güçlendirmek için bazı stratejiler vardır. Bu stratejiler geçerlik ve güvenirlik başlıkları altında toplanır. Creswell (2007)'e göre geçerli nitel çalışmalar yapmanın sekiz tane stratejisi vardır. Bunlardan bazıları, araştırma yöntemlerinin ayrıntılı bir şekilde tanımlanması, araştırmacının önyargılarının ve yönelimlerinin belirtilmesi, ulaşılan verilerin bir başka araştırmacı tarafından da doğrulanması ve değişik veri toplama yöntemlerinin kullanılmasıdır. Bir nitel çalışmanın geçerliğini sağlamak için, Creswell (2007)'ye göre bu stratejilerden en az iki tanesinin kullanılması gerekmektedir. Bu çalışmada gözlem yoluyla elde edilen bulguların, görüşmeler ve döküman analizi yolları ile teyit edilmesi sağlanmıştır. Ayrıca, verilerin toplanması, incelenmesi, analiz edilmesi ve yorumlanması süreci doktora tez danışmanı tarafından takip edilmiştir. Bununla birlikte, belirli zamanlarda toplanan tez izleme jürisinde bulunan üç öğretim üyesi tarafından aşamalar değerlendirilmiştir. Nitel bir araştırmanın güvenirliğini sağlamak için katılımcıların, ortamın ve toplanan verinin açık bir şekilde tanımlanması

gerekmektedir. Böylece, okuyucu araştırmacının durumu ile çalışma arasındaki bağlantıyı rahatlıkla kurabilecektir (Merriam, 1998). Bunun yanında, bu araştırmanın güvenirliğini sağlamak için verilerin toplaması ve analiz edilmesi sürecine, araştırmacı dışında bir kişi daha dahil edilmiştir. Böylece, yapılan görüşme metinlerinin ve gözlem raporlarının incelenmesi ve kodlanması iki bağımsız araştırmacı tarafından yapılarak bulguların güvenirliği sağlanmıştır.

3. BULGULAR

Bu çalışmanın bulguları iki şekilde sunulacaktır. Öncelikle, katılımcı okul öncesi öğretmenleri ile gerçekleştirilen ön-görüşme, gözlem ve son-gözlem bulguları verilecektir. Sonrasında katılımcı öğretmenlerin ön-görüşme, gözlem ve son-görüşme bulguları karşılaştırılacaktır.

3.1 Ön-Görüşme Bulguları

Ön-görüşme bulguları sonucunda bazı ana temalar oluşmuştur. Ortaya çıkan ana temalar, (1) okul öncesi öğretmenlerinin fen öğretimine bakış açıları, (2) öğretmenlerin fen öğretimi ile ilgili deneyimlerine bakış açıları ve (3) okul öncesi öğretmenlerinin fen ve sanat etkinliklerinin bütünleştirilmesi konusuna bakış açıları.

3.1.1 Okul öncesi öğretmenlerinin fen öğretimine bakış açıları

Okul öncesi sınıflarında fen öğretimi düşünüldüğünde, sınıflarda bulunan fen ve doğa köşeleri önemli rol oynar. Bu çalışmada üç katılımcı öğretmen sınıflarında fen ve doğa kösesi bulunmadığını belirtirken, yanlızca iki öğretmen sınıflarında fen ve doğa köşesi bulunduğunu ve bu köşelerin ayın temasına uygun bir şekilde hazırlandığını belirtmiştir. Bununla birlikte, katılımcı öğretmenlerin hepsi mutlaka haftada bir kere fen etkinlikleri uyguladıklarını söylemişlerdir. Uygulamış oldukları fen etkinliklerinde değişik materyaller kullanmayı tercih ettiklerini belirtmişlerdir. Bu durum ile ilgili görüşünü Aysun şu şekilde yansıtmıştır:

> Çocuklar dışarıya çıkmayı çok seviyorlar....Büyüteçlerle bahçede oynamayı çok seviyorlar. Büyüteçlerle birşeyleri incelemeyi çok seviyorlar. Onun dışında kova, kürek, kumlarla oynamaktan çok hoşlanıyorlar.

Tüm katılımcı öğretmenler okulun fiziksel koşullarının fen etkinlikleri uygulamaya elverişli olduğunu vurgulamışlardır. Katılımcı üç öğretmen fen etkinliklerini genellikle sınıf içinde ya da bahçede olmak üzere iki şekilde planladıklarını belirtmişlerdir. Bu öğretmenlerden Bahar bu durumu şu şekilde açıklamıştır:

> Ben genellikle fen etkinliklerini bahçede yapmayı tercih ediyorum. Böylece çocuklar gözlemlerini çok rahat yapabiliyorlar. Bununla birlikte, bazı fen etkinliklerini de sınıfta yapıyoruz. Mesela, hava durumu üzerinde konuşacağımız zaman bu etkinliği sınıf içerisinde camın önünde yapabiliyoruz.

Benzer olarak Aysun, hem sınıf içerisinde hem de bahçede fen etkinlikleri uyguladığını belirtmiştir:

> Örneğin, biz bir kuş yuvası yaptık en son onu örnek verebilirim. O kuş yuvasına işte ekmekleri koyduk, ekmekleri inceledik, kuşlara baktık, genelde bahçede oluyoruz, kum havuzuna çok kullanıyoruz, eğer rahat olamazsak sınıfta mutlaka köşede yani dışarıdan yaprak toplayıp getiriyoruz, yani dışardakileri sınıfa getiriyoruz. Bunları fen köşesine yerleştiriyoruz ve incelemelerimizi sınıf içinde yapıyoruz.

Fen etkinliklerinin, ister bahçede uygulansın ister sınıf içerisinde, çocuklara sağladığı katkılar gözardı edilemez. Katılımcı öğretmenler, fen etkinliklerinin çocukların bilimsel becerilerini desteklemenin yanı sıra; onların merak duygularını da geliştirdiğini düşünmektedirler. Emel bu konu hakkında düşüncelerini şu şekilde belirtmiştir:

> Fen hayatın her yerinde oldugu için böyle çok basite indirgeyerek çocuk aslında hayatında olan hersey daha böyle dikkatini çekiyor, dikkatini çekmeyen bir şeyler bile daha sonra dikkatini çekebiliyor, nedenlerini bazı seylerin nasıl olduklarını böyle hani daha rahat görebiliyor.

Aynı konu hakkında Aysun düşüncelerini şu şekilde açıklamıştır:

> Çocukların merak duygusunu ilk başta çok geliştiriyorlar, çocuklar hani onlar için şu an çok küçük oldukları için merak onlar için çok önemli,araştırmayı seviyorlar, hani merak etmeyi seviyorlar,yani bunların dışında öğreniyorlar.

Tüm katılımcılar, çocukların feni öğrenme sürecine aktif olarak katıldıkları zaman öğrenebileceklerini savunmaktadırlar. Bu konu hakkında katılımcılardan Emel *"çocuklar feni yaparak, deneyerek ve yaşayarak öğrenirler*" şeklinde yorum yapmıştır. Emel'in söylediklerine benzer olarak Sibel de çocukların feni yaparak öğrenebileceklerini belirtmiştir:

> Feni derken deneyleri, etkinlikleri hepsini yaparak öğrenirler. Bahçeye çıktığınızda mesela şimdi çıktık bahçeden geldik, hemen örneğini vereyim kuru şey bulmuşlar, ağaç kabuğu bulmuşlar ve getirdiler, öğretmenim bak ağaç artık çürümüş deyip getirip verdiler onun yere düştüğünün çürümeden olduğunu çok iyi biliyorlar.

Tüm bu bulgular, katılımcı öğretmenlerin sanat etkinliklerinin çocuklar üzerinde çok önemli bir etkiye sahip olduğunu düşündüklerini göstermektedir. Bu konu hakkında, bazı öğretmenler fen etkinliklerinin çocukların ilgilerine göre düzenlenebileceğini vurgularken bazıları ise özel fen günleri düzenlenebileceğini vurgulamışlardır.

3.1.2 Öğretmenlerin fen öğretimi ile ilgili deneyimlerine bakış açıları

Fen etkinliklerinin uygulanmasının önemli aşamalarından birisi hazırlık sürecinin olmasıdır. Katılımcı dört öğretmen, fen etkinliklerini uygulamadan önce belli bir hazırlık süreci geçirdiklerini belirtmişlerdir. Örneğin:

> Hepsine (zaman) harcıyoruz, her etkinlik bizim için çok önemlidir, hepsi aynıdır, ee tabiki yani bugünkü yapacağımız fen etkinliği bizim biraz daha zamanımızı alabilir (Sibel).

> Kesinlikle fen etkinliklerini yaparken ön bir hazırlık yapmak gerekiyor. Örneğin, deney yapıcaksınız, bunun öncesinde bir tecrube etmeniz gerekiyor, malzemeleri yani o an orada olması gerekiyor gibi, hani fen etkinliklerinin biraz daha şey, çalışma ve ön-hazırlık gerektiren etkinliklerdir (Bahar).

Katılımcı öğretmenlerden yanlızca bir tanesi küçük yaş öğretmeni olduğu için ayrıca bir hazırlığa ihtiyaç duymadığını belirtmiştir.

Katılımcı öğretmenler fen uygulamaları sırasında çok çeşitli öğretim yöntemlerini kullanmaktadırlar. İki katılımcı kullanmış olduğu öğretim yöntemini şu şekilde açıklamıştır:

> Ben küçük yaşlarla çalıştığım için daha çok gözlem [gezi-gözlem ve inceleme]yöntemini kullanıyoruz, mesela biz gecen senelerde kuş gözlemciligi yapmıstık çocuklarla, nerdeyse 2 ay boyunca ve onların nerelere geldigini, neler yedigi ve herseyi koyduk cikolata koyduk, yer mi falan gibi ve bunları döküm haline getirmiştik, yani küçük yaşta biraz daha gözlem, biraz da hani onunla ilgili bir video kayıtları izletmek, biraz daha resimler göstermek... (Bahar).

> İşte araştırma yapıyoruz, gözlem yapıyoruz, bazı şeylerin tadına bakıyoruz, dokunuyoruz, ee hissediyoruz, mesela işte biraz önceki limon örneğinde olduğu gibi genelde zaten onların çok hoşuna gidio yeni yeni cisimleri ayırdetmeye başlıyorlar, aa bu sert, bu yumuşak o yüzden hepsini söyleyebilirim (Aysun).

Katılımcılar tarafından kullanılan fen öğretim yöntemleri aşağıdaki tabloda belirtilmiştir:

Table 3. Öğretmenlerin sınıf içinde kullanmış oldukları fen öğretim yöntemleri

	Katılımcılar					
Öğretim Yöntemleri	Aysun	Emel	Seda	Sibel	Bahar	Toplam
Kavram haritaları	X		X	X		3
Proje yaklaşımı		X	X	X		3
Deney	X	X				2
Gezi-gözlem ve inceleme	X	X	X	X	X	5
Benzetme (Analoji)						0
Drama					X	1
İşbirlikli öğrenme						0
Bilgisayar destekli öğrenme					X	1

Tablo 3'te belirtilen öğretim teknikleri dikkate alındığında, katılımcı öğretmenlerin çoğunun "gezi-gözlem ve inceleme" yöntemini en sık kullandıkları yöntem olarak tanımladıkları görülmüştür. İkinci en çok tercih edilen yöntem ise hem kavram haritaları hem de proje yaklaşımıdır. Fakat, benzetme (analoji) ve işbirlikçi öğrenmenin hiçbir öğretmen tarafından belirtilmediği saptanmıştır.

Katılımcıların çoğu, yukarıda belirtilen öğretim yöntemlerini uygularken kendilerini rahat hissettiklerini belirtmişlerdir. Örneğin:

> Dediğim gibi bir yönteme başlarken neyin nereye götureceğini siz evet amaçlıyorsunuz ya da planlıyorsunuz ama hani oraya direk gidemiyorsunuz bu her etkinlikte böyle (Bahar).

> Üçüde aslında çok farklı, üçüde bana çok eğlenceli geliyor, çok rahat geliyor, ama en yeterli hissettiğim bu deney yaparken yani mesela limonun tadına bakma gibi, çünkü ozaman çocuklarda çok eğleniyor, çocuklarda çok rahat ediyor, mutlu oldukça bende seviniyorum yani (Aysun).

> Yani gezi -gözlem de herhalde daha şey olabilir , çünkü bahçeye çıktigimız zaman bir şey planlayıp çıkıyoruz ama doğada hayat devam ettigi için o planladığımız şeylerin dışında farklı şeylere ben bu tarz şeyleri çok iyi görürüm, bir an dikkatimi çeker ona yönelirim mesela bu tarz şeyler olabiliyor (Emel)

Bilimsel süreç becerileri ile fen etkinliklerinin uygulanması arasında yakın bir ilişki bulunmaktadır. Özellikle, okul öncesi dönemde çocuklara uygun bilimsel beceriler; gözlem yapma, karşılaştırma, sınıflama, ölçme ve iletişimdir. Aşağıdaki tabloda, katılımcı öğretmenlerin kullandıkları bilimsel süreç becerileri bulunmaktadır.

Tablo 4. Öğretmenlerin bilimsel süreç becerileri ile ilgili uygulama tercihleri (ön-görüşme)

	Katılımcılar				
Temel Bilimsel Süreç Becerileri	Aysun	Emel	Seda	Sibel	Bahar
Gözlem Yapma	X	X	X	X	X
Karşılaştırma	X		X		X
Sınıflama			X		X
Ölçme					
İletişim					
Toplam	2	1	3	1	3

Tablo 4'te gösterildiği gibi, katılımcı öğretmenlerin hepsi bilimsel süreç becerilerinden gözlem yapmayı planlıyorken, hiçbir öğretmen ölçme ve iletişim becerilerini kullanmayı hedeflememiştir.

Katılımcı öğretmenler, okul öncesi dönem çocuklarının bazı bilimsel kavramları anlamakta zorluk çektiklerini ve hatta bu anlaşılması zor bilimsel kavramlar yüzünden bazı öğretme güçlükleri yaşadıklarını belirtmektedirler. Katılımcı

öğretmenlerden bazıları okul öncesi çocukları için öğrenilmesi zor olan kavramları aşağıdaki ifadelerle açıklamışlardır:

> Feni düşündüğümde mesela şeker yaptık boyadık onu yapıştırdık, durduramadık çocukları, bunu boyayacağız diye ısrar ettiler ama biraz boyamamız gerekiyor çünkü su şekeri eritir, ama orda biz hicbirini durduramadık, kıyametler koptu hemen boyamak istediler, onu veremedik (Emel).

> Gökyüzünü [kavramı] onlar için yabancı geliyor, fakat onuda anlatabilirsiniz, çok daha basite indirgeyerek hepsini anlatabilirsiniz, bana göre en zor gökyüzünü anlatmak çocuklara, ama onuda basite indirgediğiniz zaman çok rahat anlatırsınız (Sibel).

> Bir etkinlik yaptık, hayvanlarla ilgiliydi, mesela işte kuşlar, arılar uçabilen hayvanlar ile ilgili, onda zorlanmıştık çünkü bu sefer çocuklar hani şey yapıyordu, çok küçükler zaten, oda uçuyor, buda uçuyor, hani onların ayırtetmelerini sağlayamamıştık hani şu ana kadar zorlandıkları hani nasıl ayırdedebilirler (Aysun).

Katılımcı öğretmenler bu anlaşılması zor kavramları öğretebilmek için bazı önerilerde bulunmuşlardır. Örneğin, bir katılımcı öğretmen eğer basit kelimeler seçilirse çocukların birçok kavramı kolaylıkla anlayabileceklerini savunmuştur.

3.1.3 Okul öncesi öğretmenlerinin fen ve sanat etkinliklerinin bütünleştirilmesi konusuna bakış açıları

Bütünleştirilmiş program sayesinde çocuklar öğrendiklerini ayrı ayrı değil bir bütün halinde görebilmeyi öğrenirler. Katılımcı öğretmenler bütünleştirilmiş programı genellikle proje yaklaşımı ile bağdaştırarak deneyimlerini paylaşmışlardır:

> Evet, zaten biz öyle çalışıyoruz, bağlantılı benim yaptığım planlarda da, bence bağlantılı olması lazım çünkü çocukları biryerden başlayıp bir noktaya getirebilmeniz için o aradakilerin birbirleri ile bağlantılı olması lazım. Yani en basitinden biz aylık projeye dayalı çalışmalar yapıyoruz ve [bu projeler] bir ay boyunca devam etmekte. Projeler dahilinde seçtiğimiz temalara uygun etkinlikler planlıyoruz (Sibel).

> Konuların birbirleri ile bağlantılı gitmesi cocukların da dikkatini birşekilde çekiyor [….] hem de çocukların dikkatini çekiyor, hem

> gerçekten öğrenmelerini sağlıyor çünkü bazıları yazarak öğrenir bazıları okuyarak öğrenir, hani çocuklar da bu şekilde hani kuşu anlatıyorum ama belki beş çocuk varsa ikisi benim anlattığımdan anlıyor, üçü anlamıyor. Üçü belki şarkı ile öğreniyor belki ne bileyim boyarken öğreniyor, belki dışarıda gözlemlerken öğreniyor, o yüzden hep bağlamaya çalışıyorum konuları (Aysun).

> Bence bütünleştirilebilir zaten bütünleştirilmelidir diye düşünüyorum [....], zaten hepsini birbirine çok fazla bağlayarak gitmek durumundasınız. Böylece daha anlamlı bir öğrenme sağlanmış olur (Bahar).

Öğretmenler, bütünleştirilmiş etkinliklerin uygulanmasının kendilerine bazı yararlar sağladığını düşünmektedirler. Örneğin, Emel bütünleştirilmiş program ile çoklu zeka kuramı arasında bağlantı kurarak, bütünleştirilmiş etkinlikler sayesinde farklı zeka türlerine ulaşılabileceğini belirtmiştir. Benzer bir şekilde, Bahar bütünleştirilmiş program sayesinde çocukların değişik öğrenme stillerine uygun etkinlikler uygulanabileceğini savunmuştur.

Bütünleştirilmiş fen ve sanat etkinlikleri düşünüldüğünde, katılımcı öğretmenlerin hepsi fen ve sanat etkinliklerinin birbirleri ile bütünleştirilmesi konusunda olumlu bir bakış açısı ortaya koymuşlardır. Örneğin, Seda bu durum hakkında *"fen ve sanat etkinliklerinin bütünleştirilmesi çocukların daha çok ilgilisini çekmektedir"* demiştir. Ayrıca, Bahar:

> Yani kesinlikle kullanılabilir. Örneğin, kuş gözlemlediyseniz bunu çok rahat zaten sanatla feni birleştirebiliriz. [...] Bütünleştirilmiş etkinlikler çocukların değişik bilgileri birleştirmelerine yardımcı olur.

3.2 Gözlem Bulguları

Katılımcı öğretmenlerin uygulamış oldukları bütünleştirilmiş fen ve sanat etkinlikleri gözlemlenmiş olup, öğretmenlerin uygulamaları incelenmiştir. Katılımcı öğretmenlerin üç tanesi etkinliğini bahçede uygulamayı tercih ederken, iki öğretmen etkinliklerini kendi sınıflarında uygulamışlardır. Araştırmanın yapıldığı ayın teması "büyüteç" olduğu için katılımcı öğretmenlerin etkinlikleri genellikle büyüteç, dürbün, ayna gibi kavramlardan oluşmaktaydı. Öğretmenlerden üçü etkinliklerinde büyüteç

kullanmayı tercih etmiştir. Bu öğretmenlerden ikisi etkinliğini çocuklarla birlikte bahçeden toplamış oldukları doğal materyalleri inceleme şeklinde uygulamış olup, bir öğretmen sınıf içinde bulunan değişik materyallerin ve oyuncakların büyüteç ile incelenmesini sağlamıştır. Diğer öğretmenlerden biri dürbün etkinliği yaparak dürbünün özelliklerini öğretmeyi amaçlarken, diğer bir öğretmen gece gündüz kavramını pekiştirmeyi amaçlamıştır. Uygulamış oldukları sanat etkinlikleri incelendiğinde öğretmenlerin hepsi sanat etkinliğini fen etkinliğinin sonunda uygulamayı tercih etmişlerdir. Katılımcı öğretmenlerden sadece biri üç-boyutlu sanat etkinliği uygulamayı tercih ederken, diğer öğretmenlerin hepsi iki-boyutlu sanat etkinliği uygulamışlardır. Öğretmenlerin bütünleştirilmiş etkinlikleri uygulama süreleri 30 dakika ile 45 dakika arasında değişiklik göstermektedir. Etkinliğin hazırlanması, uygulanması ve değerlendirilmesi bu süre dahilinde yapılmıştır.

3.3 Son-Görüşme Bulguları

Katılımcı öğretmenler fen etkinliklerini uygularken değişik materyaller kullanmanın çocukların öğrenim sürecini destekleyeceğini belirtmişlerdir. Özellikle fen etkinliklerinde her türlü materyalin kullanılabileceğini vurgulamışlardır. Örneğin,

> Bizim bahçemiz var çok şanslıyız, çok büyük bir avantaj bizim için, [...] hani çocuklar doğal olanı yaşama, doğal olanı gözlemlemeyi seviyorlar. Örneğin, büyüteç bize etkinliklerimizde çok yardımcı oluyor, onun dışında yaşımız gereğide küçük yaş grubu olduğumuz için işte bahçede kazma kürek kullanıyoruz (Emel).

> Büyük şeyler genelde mesela bu yoğurt kapları işte artık malzemeleri çok kullanıyoruz, çünkü çocukların çok ilgilerini daha çok çekiyor, hem keşfediyorlar, işte sert yumusak üzeri pürüzslü pürüzsüz, tırtıklı işte bakın bu düz bu yamuk diye, o yüzden genelde büyük materyalleri ben tercih ediyorum (Aysun).
> Okul öncesinde kullanılabilecek değişik materyaller varıdr. Fen etkinlikleri de çok geniş bir etkinlik olduğu için işte daha çok bilime dayalı materyal büyüteç gibi hani çocukların dikkatlerini çekebilecek, teleskop gibi, o tarz materyaller bulunabilir (Seda).

Öğretmenler fen etkinliklerinin okul öncesi eğitim programında önemli bir yere sahip olduğunu düşünmektedirler. Okul öncesi dönem çocuklarının fen etkinliklerine karşı ilgileri çok fazladır. Özellikle fen etkinliklerine aktif olarak dahil olduklarında

hem eğlenirler hem de öğrenirler. Bunlara ek olarak, öğretmenler fen etkinliklerinin çocukları geleceğe hazırladığını düşünmektedirler. Örneğin, Seda uygulamış olduğu çiçek etkinliğini çocuğun gerçek yaşamına taşıyabileceğini savunmaktadır. Bu sayede, çocuklar almış oldukları bilgileri okul dışındaki deneyimleri ile birleştirebilirler.

Tüm bu öğrenme sürecini desteklemek için öğretmenler uygulamalarında değişik öğretim yöntemlerine başvururlar. Aşağıdaki tabloda öğretmenlerin fen uygulamalarında kullanmış oldukları yöntemler gösterilmektedir.

Tablo 5. Öğretmenlerin fen öğretim yöntemleri (son-görüşme)

	Katılımcılar					
Öğretim Yöntemleri	Aysun	Emel	Seda	Sibel	Bahar	Total
Kavram haritaları	X	X	X		X	4
Proje yaklaşımı				X		1
Deney		X		X		2
Gezi-gözlem ve inceleme	X	X	X	X	X	5
Benzetme (Analoji)						0
Drama	X		X		X	3
İşbirlikli öğrenme						0
Bilgisayar destekli öğrenme						0

Tablo 5'te gösterildiği gibi öğretmenlerin hepsi gezi-gözlem ve inceleme yöntemini kullandıklarını belirtmişlerdir. Proje yaklaşımın bir parçası olan kavram haritaları ise öğretmenlerin en çok kullandığı ikinci yöntem olarak bulunmuştur. Üçüncü en çok kullanılan yöntem ise dramadır. Özellikle küçük yaş grubu öğretmenleri dramayı etkinliklere giriş aşamasında kullandıklarını belirtmişlerdir.

Okul öncesi dönemde, gözlem yapma, karşılaştırma, sınıflama, ölçme ve iletişim gibi temel süreç becerilerinin desteklenmesi çok önemlidir. Katılımcı öğretmenlerin hepsi feni öğrenmek için bu temel bilimsel süreç becerilerinin desteklenmesinin şart olduğunu savunmaktadırlar. Katılımcılardan Emel, fen etkinliklerini planlarken temel bilimsel süreç becerilerini de kullanmayı hedeflediğini belirtmiştir. Benzer bir şekilde Aysun da bazı fen etkinliklerinde belirtilen temel bilimsel süreç becerilerinin hepsinin kullanılması gerektiğini vurgulamıştır. Aşağıdaki tabloda katılımcı öğretmenlerin son-görüşmede belirtmiş oldukları temel bilimsel süreç becerilerinden hangilerini kullanmayı tercih ettikleri yer almaktadır.

Tablo 6. Öğretmenlerin bilimsel süreç becerileri ile ilgili uygulama tercihleri (son-görüşme)

	Katılımcılar				
Temel Bilimsel Süreç Becerileri	Aysun	Emel	Seda	Sibel	Bahar
Gözlem Yapma	X	X	X	X	X
Karşılaştırma	X	X	X	X	X
Sınıflama	X				X
Ölçme					X
İletişim	X				X
Toplam	4	2	2	2	5

Katılımcı öğretmenlerden Aysun ve Bahar, temel bilimsel süreç becerilerini etkinliklerine dahil ettiklerini belirtmişlerdir. Diğer üç katılımcı öğretmen ise genellikle gözlem yapma ve karşılaştırma becerilerini desteklemeyi hedeflediklerini ifade etmişlerdir.

Katılımcı öğretmenlerin fen uygulamaları sırasında kullanmış oldukları sanat etkinlikleri incelendiğinde, öğretmenlerin fen ve sanatın bütünleştirilmesine değişik açılardan yaklaştıkları bulunmuştur. Aşağıda Seda, Emel ve Sibel'in bu konu hakkındaki görüşleri yer almaktadır:

> Bence çok başarılı bir fikir, yani olabilir ben denedimde zaten, gayet iyi yani ayrı ayrı verileceğine hatta ben şey diye düşündüm acaba farklı etkinlikler birleştirilebilir mi? Sizin gözlemlemiş olduğunuz etkinlikte de uyguladık. Bunun sonucunda bence değişik etkinlikleri ortak bir konu altında birleştirmek çok daha iyi (Seda).

> Sanat ve fen aslında çok da iç içe olabilecek iki dal sanat yoluyla da çok başarılı olunabilir. Bizim fen etkinliğinde sıkça başvurduğumuz bir dal, çünkü mutlaka bir fen etkinliğinden sonra resim yapıyoruz. Böylece, çocukların zihnindekileri biraz daha şekillendirmek onu biraz daha şeye [kağıda] dökmek (Emel).
> Bütünleştirilmiş fen ve sanat etkinlikleri çocukların fen kavramlarını sürecin içine dahil olarak öğrenmelerini sağlar (Sibel).

3.4 Ön-görüşme, Gözlem ve Son-Görüşme Bulgularının Karşılaştırılması

Öğretmenlerle yapılan ön-görüşmeler, öğretmenlere seminer uygulanmadan önce yapılmıştır. Seminer sonrasında ise gözlem ve son-görüşmeler gerçekleştirilmiştir. Bu yüzden, öğretmenlerin ön-gözlemleri ve son-gözlemleri

arasında bazı farklılıklar bulunmaktadır. Bunlar, gözlem bulguları ile de desteklenmektedir. Tüm bulgular ana başlıklar altında gösterilmiştir.

3.4.1 Fen Etkinliklerinin Önemi

Katılımcı okul öncesi öğretmenleri fen etkinliklerinin çocuklar üzerinde olumlu etkisi olduğunu düşünmektedirler. Ön-görüşmeler ve son-görüşmeler okul öncesi dönem çocuklarının katılmış oldukları fen etkinliklerinin onların günlük yaşamlarına katkı sağladığını göstermektedir. Diğer bir yandan, öğretmenler fen yoluyla çocukların merak duygularının arttığını düşünmektedirler. Örneğin, Aysun hem ön-görüşmesinde hem de son-görüşmesinde çocukların, fen etkinlikleri sayesinde merak duygularının geliştiğini ve bunun sonucunda da fen etkinlikleri ile daha çok ilgilendiklerini belirtmiştir.

Bunlara ek olarak, katılımcı öğretmenler fen etkinliklerine çocuklar dahil olduklarında fen kavramlarını daha kolay öğrendiklerini vurgulamışlardır. Öğretmenler, çocukların feni yaparak, yaşayarak ve deneyimleyerek öğrenebileceklerini savunmaktadırlar. Öğretmenlerin sınıf-içi uygulamaları incelendiğinde, uygulamış oldukları fen etkinliklerinde çocukların aktif olarak sücede dahil oldukları gözlenmiştir.

3.4.2 Fen Etkinliklerine Hazırlanma Süreci

Ön görüşmelerde dört öğretmen, fen etkinliklerine hazırlanma sürecinin çok önemli olduğunu vurgulamışlardır. Fakat, son-görüşme bulgularına bakıldığında tüm öğretmenler fen etkinliklerini uygulamadan önce mutlaka hazırlık yapılması gerektiğini savunmuşlardır. Tüm bunlar, gözlem bulguları ile de tutarlılık göstermektedir. Öğretmenlerin uygulamış oldukları etkinlikler öncesi gerek mekan düzenlemesi gerek materyal sağlanması gibi hazırlıklar yaptıkları gözlenmiştir.

3.4.3 Fen Öğretim Yöntemleri

Katılımcı öğretmenler ön-görüşme ve son-görüşmelerinde değişik fen öğretim yöntemlerini kullandıklarını belirtmişlerdir. Özellikle, öğretmenlerin son-görüşmelerde belirttikleri öğretim yöntemleri incelendiğinde, öğretmenlerin gezi-

gözlem ve inceleme ve kavram haritalarını kullandıkları ortaya çıkmıştır. Ön-görüşmelerden farklı olarak öğretmenler son görüşmelerde drama etkinliğini fen etkinliklerine girişte tercih ettiklerini belirtmişlerdir. Aslında, hiçbir öğretmen tarafından belirtilmeyen benzetme (analoji) yöntemi öğretmenler tarafından tercih edildiği gözlem bulgularında ortaya çıkmıştır. Fakat, öğretmenlerin benzetme yöntemini bir yöntem olarak benimsemedikleri söylenebilir.

3.4.4 Temel Bilimsel Süreç Becerileri

Öğretmenlerle yapılan ön-görüşmeler ve son-görüşmeler değerlendirildiğinde, son-görüşmelerde öğretmenler daha fazla bilimsel süreç becerilerini kullanmayı amaçladıklarını ifade etmişlerdir. Örneğin, ön-görüşmelerde hiçbir öğretmen ölçme ve iletişimi kullanmayı amaçlamazken, son-görüşmelerde Aysun ve Bahar bu becerileri desteklemeyi hedeflediklerini belirtmişlerdir. Bu durum seminer sırasında temel süreç becerilerinin çocukların fen öğrenimi üzerindeki olumlu etkilerinin tartışılması sonucunda oluşmuş olabilir. Öğretmenlerin etkinlik planlarında da bu konu hakkındaki bulgular yer almaktadır. Tüm katılımcı öğretmenler planlarında gözlem becerilerini desteklemeyi planladıklarını açıkça belirtmişlerdir. Bununla birlikte, öğretmenlerden bazıları iletişim kurmanında etkinliklerinin sonunda tartışma şeklinde yer alacağını belirtmişlerdir. Öğretmenlerin sınıf-içi uygulamaları gözlendiğinde ise iki katılımcı öğretmenin aslında tüm temel süreç becerilerini kullandığı, diğer katılımcıların ise en az iki beceriyi desteklemeyi sağlayıcı uygulamalar yaptıkları gözlenmiştir.

3.4.5 Fen ve Sanat Etkinliklerinin Bütünleştirilmesi

Katılımcı öğretmenlerin hepsi fen ve sanat etkinliklerinin bütünleştirilebileceğini savunmaktadırlar. Uygulamalarında sanat etkinliklerini tek başına kullandıkları gibi bütünleştirerek de kullandıklarını belirtmişlerdir. Öğretmenlerin son-görüşmeleri, katılımcı öğretmenlerin sanatı fen etkinlikleri içine dahil ederek bir değerlendirme aracı olarak kullandıklarını göstermiştir. Bu sayede, çocukların kavramlar arasında nasıl bir bağlantı kurduklarını daha rahat değerlendirebildiklerini savunmaktadırlar. Ayrıca, çocukların sanat etkinliklerini değerlendirirken, fen etkinliğinin bir sonraki aşamasına rahatça karar verebileceklerini

ifade etmişlerdir. Bu durum, öğretmenlerin aslında sanatı fen etkinlikleriyle bütünleştirerek kullandıklarını göstermektedir. Bu çalışma sayesinde bunun farkına varmış oldukları çalışmanın bulguları arasında yer almaktadır. Öğretmenlerin uygulamış oldukları bütünleştirilmiş fen ve sanat etkinlikleri incelendiğinde, iki katılımcı öğretmenin sanat yolu ile fen materyali geliştirmeyi hedefledikleri gözlenmiştir. Diğer öğretmenlerin sanatı kullanma amaçlarının ise boyama etkinliği yaparak çocukların yapmış oldukları fen etkinliğinden neler anladıklarını incelemek olduğu anlaşılmıştır..

Bu çalışma, öğretmenlerin katılmış oldukları seminer sonrasında uygulamış oldukları etkinlikler üzerinde düşünerek kendilerini biraz daha geliştirmeyi hedeflediklerini göstermiştir. Tüm bunlar aslında okul öncesi öğretmenlerinin hizmet-içi eğitim konusunda desteklenmesi gerektiğini göstermektedir. Ayrıca, okul öncesi öğretmenlerinin çocuk merkezli bir yaklaşımı benimsedikleri ortaya çıkmıştır. Bu durum, bütünleştirilmiş programın ana özelliklerinden birisidir. Bu çalışmanın sonucunda okul öncesi öğretmenlerinin sanatın okul öncesindeki önemi hakkındaki farkındalıkları artırılmış olup öğretmenlerin okul öncesinde zor gibi algılanan fen etkinliklerini aslında daha rahat uygulayabileceklerini anlamaları sağlanmıştır.

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PUBLICATIONS

1. **Öztürk, E.,** and Tantekin Erden, F. "Turkish preschool teachers' beliefs on integrated curriculum: Integration of visual arts with other activities", Early Child Development and Care*, iFirst Article,* 1-17 (2010)

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Tennis, Movies.