



EARLY CHILDHOOD TEACHERS' VIEWS ABOUT SCIENCE TEACHING PRACTICES

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Abstract

In early childhood education, 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). In order to find out five early childhood teachers' views about early childhood science, semi-structured interviews and classroom observations were used in this study. The participating 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. The preliminary findings showed that all of the participant teachers preferred to apply science activities at least once in their weekly plans. Some of them focused on children's interests while some others mentioned the requirement of planning a special day. Furthermore, 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.

Keywords: early childhood science, teaching methods, science process skills, qualitative research

INTRODUCTION

In early childhood education, there are different types of activities applied from teachers in the classroom. Some of them are 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. Unquestionably, teachers and parents can give more importance to some activities because of the contribution of 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 in this process (Wylie & Thomson, 2003). Thus, it is important to study both teachers' views on science and their actual classroom practices related to science teaching.

Science in Early Childhood

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).

In addition, science is interesting for children because they liked engaging with their environment and tried to give meaning to them (French, Conezio, & Boynton, 2000). 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).

METHOD

The aim of this study was to explore five early childhood teachers' views about and practices of their science teaching. This study was designed as a case study. Creswell (2007) stated that case study can be defined as a qualitative research type including multiple sources of data collection such as observations, interviews, document analysis in order to investigate a case or cases.

Participants

The participants of this study were five early childhood teachers who have been working in a private preschool. In this study, purposive sampling technique was used because it examines "information-rich cases" (Patton, 1990). Table 1 indicates the demographic characteristics of participants.

Table 1 Participant Teachers' Demographic Characteristics

Participants	Year of Experience	Graduation Level & Department	Science Lessons Which were Attended By Teachers	Educational Training
Par. 1	2 years	-Hacettepe University Radio, television and cinema	No	Yes/In school
Par. 2	3 months	-Hacettepe University Elementary Education	Yes	No
Par. 3	8 years	-Girl Vocational High School Child Development	No	Yes/In school
Par. 4	10 years	-Girl Vocational High School Child Development	No	Yes/In school
Par. 5	7 years	-Two-year vocational training school Child Development	Yes	Yes/Institution

Instruments

This interview protocol was designed to investigate early childhood teachers' views about science teaching in the early childhood curriculum. It was developed by researcher through 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 of the questions. The interview included 10 main questions. The interviews were conducted in a 20-minute, face-to-face setting. The observational data were collected through filed notes from five participant observations in the classroom setting. Each observation lasted approximately one and half hour. As a total, five participant observations were conducted to see their practices. Field-notes were independently recorded on the paper by two-person team for each observation.

All audiotapes recording of the interviews and observations were transcribed verbatim. All data initially analyzed and coded independently by two coders. Codes were selected on the basis of coders' agreement. After that, codes were grouped into emergent themes.

Data Analysis

The first phase of the analysis consisted of portraying all the data related to participant teachers' views about science teaching on the basis of interviews and observations. Then, data analysis steps (Creswell, 2007) were used to make analysis and interpretation about the data. These steps are (a) organizing and preparing the data, (b) making general sense of information, (c) coding, (d) describing, (e) representing, and (f) interpreting.

FINDINGS

Teachers' views on the implementation of 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, it is important to investigate "how many times science activities were applied in classrooms". It is clear that all of

the participant teachers applied science activities at least once a week in their classes. 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. For instance:

"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" (P1).

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 explanation of in-service early childhood teacher was as follows:

"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" (P5).

Teachers' views about science teaching methods

In-service early childhood teachers need to use different teaching methods in order to reach all children's potential while planning and implementing science activities. Of course, these methods can be considered highly effective when applied correctly. Four of the participant teachers used different methods in their science teaching practices. One of them used observation method, technological tools, and visual assistance for the science project:

"I used observation method in my science activities because my children are too young. For example, we had done 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, etc. In this project, children watched a video related to birds and they investigated different bird pictures" (P5).

An overview of teachers' preferences about science teaching methods was given in Table 2. Eight teaching methods were asked to in-service early childhood teachers to list their third most important preferences.

Table 2 Teachers' preferences about teaching methods in stating order of significance

Teaching Methods	Participants					Total
	P1	P2	P3	P4	P5	
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

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. Table 3 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 3. Teachers' application of basic science process skills

Basic Science Process Skills	Participants				
	P1	P2	P3	P4	P5
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" (P3).

Scientific concepts

In early childhood, children may not readily understand some of the scientific concepts. So, 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" (P4).

DISCUSSION

This study indicated that early childhood teachers believed the importance of the place where science activities were implemented. For example, they generally preferred to implement their

science activities in the school garden. Thus, the most preferred method was stated as "field-trips and investigation". In addition, they believed that children can be actively involved in the process while attending activities in the school garden. Similarly, Stoecklin (2009) stated that the core aspect of developmentally appropriate gardening was active participation of children into the process. All participant teachers also thought that observation can be considered as an effective tool for improving children's active learning. While children investigate their environment using observation skills, they actively worked on scientific concepts. Similar results were obtained by other researchers (Covill & Pattie, 2002; de Bóo, 2006; Harlen, 2000) related to the importance of observation skill in early childhood education. They found that observation can be considered as an initial skill for children's life.

In this study, although some participant teachers described that they used "communication" as a science process skill, they did not elaborate on this skill in their 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.

CONCLUSION

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. 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. 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.

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