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INVESTIGATION OF PRESCHOOL TEACHERS' ATTITUDES TOWARDS SCIENCE TEACHING (SAMPLE OF MALATYA CITY)

OKUL ÖNCESİ ÖĞRETMENLERİNİN FEN EĞİTİMİNE KARŞI TUTUMLARININ İNCELENMESİ (MALATYA İLİ ÖRNEĞİ)

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Abstract

Preschool teachers' need to have positive attitudes towards the science teaching for increase the efficiency of the activities of science teaching. Preschool teachers' attitudes towards science teaching undoubtedly affect childrens' attitudes towards the science activities. The aim of this study was to find out the attitudes of early childhood teachers toward science teaching. The study is a descriptive research and it is carried out by survey model. The sample group of the study consisted of 143 teachers working in some public or private nursery schools/classes in Malatya with children at the age of six. The main data collection tool was "Early Childhood Teachers' Attitude Toward Science Teaching Scale" which was developed by Hyung-Sook-cho et al. (2003) and adapted to the research setting by the researchers. The scale is composed of 22 items under 4 sub-dimensions: 1) Comfort-discomfort, 2) Classroom preparation, 3) Managing hands-on science, and 4) Developmental appropriateness. In the statistical analysis of the data, t test, one-way variance analysis and LSD test were used. The findings demonstrated that the teachers' level of education, term of

service, in-service training have significant effect on their attitudes whereas the institutions where they work do not. The teachers with an undergraduate and master's degree adopt a more positive attitude compared to the teachers who hold an associate degree or a high school (lycee) degree. The teacher who worked for 1 to 10 years adopt a more positive attitude compared to the teachers working for 11 to 15 years and more than 16 years.

Key Words: Preschool education, science teaching in preschool, teacher attitudes

Öz

Okul öncesi dönemde fen eğitimi faaliyetlerinin ve verimliliğinin artırabilmesi için okul öncesi öğretmenlerinin fen eğitimine karşı tutumlarının olumlu olması gerekir. Okul öncesi dönem fen eğitiminde öğretmenlerin tutumu şüphesiz ki çocukların fen etkinliklerine karşı tutumunu da etkileyecektir. Bu araştırma Malatya ilinde görev yapan anaokulu/anasınıfı öğretmenlerinin fen eğitimine karşı tutumlarını belirlemek amacıyla yapılmıştır. Araştırma, betimsel araştırma türlerinden tarama modelinde yürütülmüştür. Araştırmanın örneklem grubunu Malatya ili resmi ve özel anasınıflarında/anaokullarında 6 yaş grubu çocuklarıyla çalışan 143 öğretmen oluşturmuştur. Araştırmada öğretmenlerin fen eğitimine karşı tutumları Hyung-Sook-cho ve arkadaşları (2003) tarafından geliştirilen ve ülkemize uyarlama çalışması yapılan "Okul Öncesi Öğretmenlerinin Fen Eğitimine Karşı Tutum Ölçeği" kullanılarak belirlenmiştir. Bu ölçek "rahat-rahatsız, sınıf hazırlıkları, ilk elden fenin idaresi, gelişimsel uygunluk" olmak üzere dört alt boyuttan oluşmaktadır. Elde edilen verilerin istatistiksel analizinde t testi, tek yönlü varyans analizi ve çoklu karşılaştırma testlerinden LSD testi kullanılmıştır. Yapılan istatistiksel analizler sonucunda elde edilen bulgular incelendiğinde öğretmenlerin öğrenim düzeyleri, hizmet süreleri, hizmet içi eğitim almalarına göre anlamlı sonuçlar ortaya çıkarken, çalıştıkları kurumlara göre anlamlı sonuçlar elde edilemediği görülmüştür. Yüksek lisans ve lisans mezunu olan öğretmenlerin ön lisans ve lise mezunu öğretmenlere göre fen eğitimine karşı daha olumlu tutum sergiledikleri, hizmet süresi 1-10 yıl arası olan öğretmenlerin hizmet süresi 11-15 yıl ve 16 yıl ve üzeri olan öğretmenlere göre daha olumlu tutum sergiledikleri görülmüştür.

Anahtar Kelimeler: Okul öncesi eğitim, okul öncesinde fen eğitimi, öğretmen tutumları

INTRODUCTION

Young children are known to be curious, exploratory, imaginative and inquisitive. Hence, they should be provided with opportunities and educational environments in which they can research to remove their curiosity, establish causal relationships, put forward various ideas and do predictions in order to develop their aforementioned qualities. It is possible to ensure this development through "scientific

activities" which develop children's curiosity and inquisitiveness by stimulating their mental skills (Arnas, 2002).

Young children are claimed to view science as an attempt to understand the world in which they live (Drons and Given, 2003). Thus, for the learners of this level, science teaching should not mean passing scientific information on to the children. Rather, it should be considered as a way to make children learn science via enriching their experience. It is important in preschool years that children acquire sound scientific knowledge by developing their research, examination and observation skills (Gürdal et al., 1993). In other words, establishing a sound scientific foundation during these years is possible by developing children's research and observation skills to the fullest.

Science for kids is learn about their achievements to the world around them, they see, they hear, they smell, touch whatever they are called (Armga et al., 2002). At the same time for children to study science to understand the world they live, is to explore the world (Drons and Given, 2005; Tsung-Hui 2001). Children themselves do not realize they can discover something, they first come face to face with science. Science is learning to learn.

Science activities in the preschool programs consist of activities that help them ask questions, uncover their thoughts, and recognize their surroundings and the nature by benefiting their natural curiosity in investigating and examining.

The Turkish national education goal of science education at the early childhood education;

- to help the child's mental development
- be able to articulate
- knowledge discovery, collection and utilization of the process, teach the child to develop a scientific attitude and demeanor
- develop independent thinking and reasoning ability
- children to gain awareness of what is happening around
- give the ability of the child is listening.

Hadzigeorgiou (2001) asserts that early childhood is an appropriate period for the development of positive attitudes toward science. For example, by allowing children to engage in scientific activities, their curiosity will inevitably be developed. Children that acquire new knowledge owing to these activities develop a different perspective toward Nature (Faulkner-Schneider, 2005).

Curiosity and inquisitiveness in children are nourished by supportive attitudes of early childhood teachers who provide various materials and various experiences for this purpose. Teachers enable children to have access to rich materials in the

environments they design, and encourage them to plan their own activities, generate products and acquire knowledge. Having observed children's learning styles, teachers design activities according to their interests and skills. They tend to ask open-ended questions to develop children's thinking, and allow them to ensure the permanence of the products they generate through their experience (Demiriz and Ulutaş, 2000).

Not every child may show the same level of interest in scientific activities in nursery schools. Young children may have greater interest in science if teachers employ various teaching skills, follow children's development by noticing their learning speed, and by designing in-class activities by considering their differences. They should enable children to develop a scientific attitude through teaching them how to find, collect, and use information. In science education, teachers should encourage and motivate children to initiate their scientific thinking processes. Moreover, in order to develop children's imagination and problem-solving skills, teachers should encourage children to express their ideas rather than motivating them to seek for a single true answer. Thus, designing a secure and unthreatening environment, where children can research and study, becomes a very important task.

METHOD

This study was carried out to find out the attitudes of early childhood teachers toward science teaching.

Universe and Sample

The sample group of the study is composed of 143 early childhood teachers, which are urban areas. All teachers in the sample group work with children at the age of six in public or private nursery schools/classes.

Data Collection Instruments

Two data collection instruments, namely, "Teacher's Personal Inquiry Form" and "Early Childhood Teachers' Attitude Toward Science Teaching Scale" were used as the main data collection instruments in this study.

"Teacher's Personal Inquiry Form" is composed of items aiming to collect demographic information. The questions focused on teacher' sex, age, most recent educational institution studied, level of education, duration of service, type of school where they work, the institution with which their school is affiliated, the province where they are working and in-service trainings they have taken.

"Early Childhood Teachers' Attitudes Toward Science Teaching Scale" was developed by Hyung-Sook-Cho et al. (2003) and is composed of 22 items under 4 sub-dimensions: 1) Comfort-discomfort, 2) Classroom preparation, 3) Managing hands-on science, and 4) Developmental appropriateness. Cho et al. (2003) were asked for required permissions. Having received the permission, the scale was translated into Turkish through translation-back translation procedure. Having translated the scale,

the researchers had recourse to five experts for the validity of the scale. The Cronbach Alpha reliability coefficient of the scale was found to be 0,839.

Sub-dimensions of the Scale:

1. Comfort-discomfort: There is no academic preparation or readiness for science teaching in this dimension. However, emotional and affective dimensions of science teaching are integrated. This is a dimension about early childhood teachers' fears for or interest in teaching science to children (Ex: I feel comfortable doing science activities in my early childhood classroom, I am afraid that children may ask me a question about scientific principles or phenomena that I cannot answer etc.)

2. Classroom Preparation: This dimension consists of items about the type of preparation early childhood teachers do for scientific activities and the time they spend for the preparation process (Ex: I enjoy reading resource books to obtain ideas about science activities for young children**,** I am ready to learn and use scientific knowledge and scientific skills for planning hands-on science etc.).

3. Managing Hands-on Science: This dimension is composed of items concerning early childhood teachers' preparations for scientific activities in which children are actively involved and whether messiness during an activity are important or not (Ex: I do not mind the messiness created when doing hands-on science in my classroom, I do not mind the messiness created when doing hands-on science in my classroom etc.).

4. Developmental Appropriateness: This dimension consists of items concerning whether it is appropriate make children meet science in their early ages and whether teachers have faced with problems while designing curriculum for young children (Ex: I do not believe it is appropriate to introduce science to children at an early age, I am familiar with the processes and ways that young children learn science etc.).

The questions were asked in form of a Likert type scale. The scale was rated from 1 to 5. Each item of the scale was assessed in one of the "Never", "Rarely", "Sometimes", "Often" and "Always" categories. Negative statements were rated reversely in the scale.

Analysis of the Data

The data were analyzed with the help of SPSS 13. t-test, one-way variance analysis and LCD, a type of multiple comparison tests were used for the analysis of the data.

FINDINGS AND INTERPRETATION

Table 1 Comparison of Preschool Teachers' Attitudes toward Teaching Science by Their Level of Education

		Sum of squares	Sd	Mean squares	F	P
Comfort-Discomfort	Intergroups	131.964	3	43.988	4.527	0.005*
	Intragroup	1360.362	140	9.717		
	Total	1492.326	143			
Classroom Preparation	Intergroups	44.123	3	14.708	1.382	0.251
	Intragroup	1489.877	140	10.642		
	Total	1534.000	143			
Managing Hands-on Science	Intergroups	81.803	3	27.268	2.545	0.059
	Intragroup	1500.197	140	10.716		
	Total	1582.000	143			
Developmental Appropriateness	Intergroups	69.498	3	23.166	1.887	0.135
	Intragroup	1718.474	140	12.275		
	Total	1787.972	143			

*$p < 0.05$

Table 1 demonstrates the comparison of early childhood teachers' mean responses to the science attitude scale and their level of education. The Table shows that the difference between "comfort-discomfort" dimension and the level of education is significant according to the ANOVA results ($p < 0.05$), and that the difference among the other three dimensions (classroom preparations, management of hands-on science and developmental appropriateness) is not significant.

Table 2 The Multiple Comparison of Preschool Teachers' Level of Education

(I) Names of Institutions		(J) Names of Institutions	Mean Difference (I-J)	S_x	P
Comfort-Discomfort	Associate	High School	-0.24675	0.88809	0.782
		Undergraduate	-1.71927	0.67825	0.012*
		Master's	-3.67857	1.24966	0.004*
	Undergraduate	High School	1.47252	0.74476	0.050*
		Associate	1.71927	0.67825	0.012*
		Master's	-1.95930	1.15221	0.091
	Master's	High School	3.43182	1.28697	0.009*
		Associate	3.67857	1.24966	0.004*
		Undergraduate	1.95930	1.15221	0.091

*$p < 0.05$

Table 2 demonstrates the results of LSD test – one of the multiple comparison tests – carried out to identify the difference among educational levels in early childhood teachers' attitudes toward science teaching. As these results suggest, in "comfort-discomfort" dimension, the teachers with an undergraduate and master's degree adopt a more positive attitude compared to the teachers who hold an associate degree or a high school (lycee) degree ($p< 0.05$).

It can be seen that teachers holding a master's and an undergraduate degree feel more comfortable when they conduct scientific activities because they took science and mathematics courses separately during their undergraduate education. Hence, they know how to conduct activities in both fields.

In literature, Parlakyıldız and Aydın (2004) suggest that early childhood teachers with an associate degree are more active in doing scientific activities when the educational level of teachers is concerned. They explain that the teachers holding an undergraduate degree are more conscious, but they are less active in practice because they usually undertake administrative tasks.

Table 3. Comparison of Preschool Teachers' Attitudes toward Teaching Science by Their Term of Service

		Sum of squares	Sd	Mean squares	F	P
Comfort-Discomfort	Intergroups	46.680	3	15.560	1.507	0.215
	Intragroup	1445.646	140	10.326		
	Total	1492.326	143			
Classroom Preparation	Intergroups	29.983	3	9.994	0.930	0.428
	Intragroup	1504.017	140	10.743		
	Total	1534.000	143			
Managing Hands-on Science	Intergroups	131.208	3	43.736	4.220	0.007*
	Intragroup	1450.792	140	10.363		
	Total	1582.000	143			
Developmental Appropriateness	Intergroups	57.286	3	19.095	1.545	0.206
	Intragroup	1730.686	140	12.362		
	Total	1787.972	143			

*$p < 0.05$

Table 3 demonstrates the comparison of early childhood teachers' mean responses to the science attitude scale by their duration of service. The Table shows that the difference between "managing hands-on science" dimension and the duration of service is significant according to the ANOVA results ($p < 0.05$).

Table 4 Multiple Comparison of Preschool Teachers' Term of Service

(I) Duration of Service		(J) Duration of Service	Mean Difference (I-J)	S_x	P
Managing Hands-on Science	1–5 Years	6–10 years	-1.27966	0.69313	0.067
		11–15 years	1.94256	0.86681	0.027*
		16 years and over	0.49307	0.69976	0.482
	6–10 Years	1–5 years	1.27966	0.69313	0.067
		11–15 years	3.222	0.93835	0.001*
		16 years and over	1.77273	0.78665	0.026*

*$p < 0.05$

Table 4 demonstrates the results of LSD test – one of the multiple comparison tests – carried out to identify which interval in the duration of service results in the difference among durations of service in early childhood teachers' attitudes toward science teaching. The Table shows that in "management of hands-on science" dimension, the teachers who have worked for 1 to 5 years adopt a more positive attitude compared to the teachers working for 11 to 15 years. Furthermore, the ones who worked for 6 to 10 years adopt a more positive attitude compared to the teachers working for 11 to 15 years and more than 16 years.

The findings reveal that the teachers who have worked for 1 to 10 years adopt a more positive attitude toward teaching science than the teachers who have worked for 11 more years. It can be concluded that teachers whose duration of service is less than 11 years feel more comfortable while planning and conducting scientific activities because their enthusiasm for the profession is higher, they are more open to innovation, and they face less factors that cause their burn-out.

Güler and Bıkmaz's (2002) study on teachers' opinions on the development of scientific activities in nursery schools. Their sample group was composed of early childhood teachers working in public nursery classes affiliated with the Ministry of National Education. The sample had been working for 11 or more years. The researchers found that none of the teachers had taken in-service training about science teaching in early childhood education, and that they were not sufficiently aware of contemporary tendencies in science teaching for young children. The results also suggested that these teachers recommend to attend workshops about science teaching in early childhood years.

According to Deryakulu (2005), the main reason for burn-out caused by exhaustion is stress. Weisberg and Sagie (1999) emphasizes that teaching is a quite stressful occupation and the increasing stress among teachers results in exhaustion, causing decrease in the quality of teaching. Thus, it can be concluded that the higher exhaustion among teachers working for 11 to 15 or more than 16 years may affect teachers' attitude toward science teaching.

The early childhood teachers whose duration of service is less than 10 years took science as a separate course in their undergraduate education. This may explain why the teachers in this group adopt a more positive attitude toward science teaching. The fact that the society regards early childhood teachers as babysitters rather than as educators requires early childhood teachers exert more effort to eliminate this impression. This may also cause that teachers whose term of service is less than 10 years adopt a more positive attitude toward science teaching. Thus, hands-on science can be applied more frequently by these teachers in their early years of teaching. It is believed that new teachers will display a more positive attitude toward science if they exchange their opinions on science teaching with their colleagues.

Table 5 Comparison of Preschool Teachers' Attitudes toward Teaching Science with In-service Training

		Sum of squares	Sd	Mean squares	F	P
Comfort-Discomfort	Intergroups	8.121	2	4.061	0.386	0.681
	Intragroup	1484.205	141	10.526		
	Total	1492,326	143			
Classroom Preparation	Intergroups	0.582	2	0.291	0.027	0.974
	Intragroup	1533.418	141	10.875		
	Total	1534.000	143			
Managing Hands-on Science	Intergroups	67.678	2	33.839	3.151	0.046*
	Intragroup	1514.322	141	10.740		
	Total	1582.000	143			
Developmental Appropriateness	Intergroups	20.668	2	10.334	0.824	0.441
	Intragroup	1767.304	141	12.534		
	Total	1787.972	143			

*p <0 .05

Table 5 demonstrates the comparison of early childhood teachers' attitudes toward science teaching with in-service training. The Table shows that the difference between the "managing hands-on science" dimension and in-service training is significant according to the statistical analysis ANOVA ($p < 0.05$).

Table 6 Multiple Comparison of Preschool Teachers' In-service Training

(I) In-service Training		(J) In-service Training	Mean Difference (I-J)	S_x	P
Managing hands-on science	Ministry of National Education	Private Institutions and Associations	0.36185	0.79514	0.650
		Not Attended	1.47501	0.61223	0.017*

*p < 0.05

Table 6 demonstrates the results of LSD test – one of multiple comparison tests – carried out to identify teachers' attitudes toward science teaching due to in-service training. The Table shows that, in "managing hands-on science" dimension, the teachers who took part in in-service trainings provided by the Ministry of National Education adopt a more positive attitude compared to the teachers who have not taken such training ($p < 0.05$).

As can be seen in the table, the teachers who attended in-service trainings provided by the Ministry of National Education adopt a more positive attitude, concerning the management of hands-on science, compared to the teachers who have

not taken such training ($p< 0.05$). This shows that teachers who feel inadequate about the planning and design of scientific activities will change their attitude toward teaching science if they compensate this insufficiency through in-service training. Content of in-service training of teachers on issues of national education, national education director requested that they give teachers training. The issues are training class management, event prepare, planning, communication methods with children, family, teachers, child communication. In-service training courses is done practice, the teachers showed positive attitudes in managing hands-on science.

Faulkner-Schneider (2005) conducted a study on early childhood teachers' attitudes toward science teaching and found out that most of the teachers demanded workshops and in-service trainings to learn how to manage hands-on science and how to plan scientific activities for children. Karaer and Köstereliođlu (2005) state that preschool teachers should be provided with information in their in-service trainings about the design, teaching methods, and activities of science and nature center in the classroom. Similarly, Demiriz and Ulutaş (2000) suggest that in-service trainings and workshops must be offered regularly so that early childhood teachers follow innovations and changes in science teaching.

Harlan and Rivkin (2000) state that negative attitudes toward science teaching can be altered through observations and scientific activities carried out with enthusiastic children. They add that participation in educational courses and workshops on scientific activities would repair self-confidence they have lost and refresh their decreasing interest. It is also their emphasis that teachers who take part in courses about scientific activities are engaged in positive behavioral change.

Similarly, Parlakyıldız and Aydın (2004) emphasize the need for acquiring awareness of science teaching through attending in-service trainings regularly particularly by the teachers holding an associate degree. Also, Ayvacı et al. (2002) emphasize the need for planning and organizing in-service training programs under the guidance of experts in order to identify and compensate the deficiencies in planning, application and evaluation of scientific activities carried out by early childhood teachers.

Şişman (1999) underlines the importance of in-service training as well as pre-service training that prospective teachers receive. It is stated that the training that teachers take before starting their profession is enough for being appointed, but this knowledge may become dysfunctional in short time. Hence, in-service training is believed to be fundamental to developing the knowledge of teaching science.

For Kocabaş (2005), teachers are ready to share the responsibility with their students by offering student-centered education if only the Ministry of National Education builds onto this reality. Thus, teachers will adopt the role required by change rather than traditional teacher's role, exert their efforts to ensure the permanence of change and be aware that in-service training is a life-long process that will improve the quality of their lives.

Table 7 The Comparison of Preschool Teachers' Attitudes toward Teaching Science by the Institutions in which They Work

		N	x	s.s	t	sd	p
Comfort-Discomfort	Public	108	25.55	3.17	1.382	142	0.169
	Private	35	24.68	3.37			
Classroom Preparation	Public	108	22.66	3.40	1.038	142	0.301
	Private	35	22.00	2.85			
Managing Hands-on Science	Public	108	18.24	3.31	0.456	142	0.649
	Private	35	17.94	3.43			
Developmental Appropriateness	Public	108	20.11	3.72	-0.754	142	0.452
	Private	35					

*$p < 0.05$

Table 8 demonstrates the comparison of early childhood teachers' mean responses to the science attitude scale by the institutions where they work. The Table shows that the difference between their attitudes toward science and the institution where they work is not significant according to the statistical analysis of the t test ($p < 0.05$).

Similar to these findings, Demiriz and Ulutaş (2000) found out that there was not a statistically significant difference in the design of science and nature center and in the implementation of scientific activities between the teachers working in public and private preschool institutions. Developmental appropriateness and compliance with national directives in science education requires that the level of science teaching is the "active entrepreneur" in preschool and primary education (Wilson, 2002). Thus, science teaching should absolutely incorporate activities that require active involvement and hands-on experience (Akman et al., 2003).

For Lind (2000), the best way of teaching science is by doing science. That is why science for young children requires asking questions, searching for answers, doing research and collecting data. Science should be seen as a way to understanding the world rather than memorizing factual information. This perspective allows children to research to understand what science actually is (Faulkner-Schneider, 2005).

A talented teacher who creates a warm classroom environment for the children must be qualified enough to guide children on their way to discover science. Additionally, good teaching entails positive attitudes toward science as well as talents and roles that facilitate the adoption of these attitudes. However, the lack of close relation between children and teachers would not allow a favorable teaching environment because children learn more from the people with whom they establish personal interest and important cordial ties (Ünal and Akman, 2006).

CONCLUSION AND RECOMMENDATIONS

Young children learn more easily by doing and experiencing because they are curious, exploratory, and inquisitive by nature. In this period, science education should

provide an environment, which nourishes their curiosity, guides them to discover, and allows them to make use of such processes like researching, examining, observing, predicting and inferring rather than mere memorizing. When organizing science programs, early childhood teachers should design activities that are appropriate for the level of children. Children should also be encouraged to initiate the scientific process by discussing the topics under study. The instructional techniques and attitudes of teachers are inter-related and necessary in establishing a sound scientific background. Early childhood teachers' attitudes toward science education and the activities they design affect the use of scientific processes and the development of thinking skills among children. Thus, it is the responsibility of teachers is to enable children acquire the skill to access information while providing mere information. Science education should be integrated with other fields in the program in early childhood education institutions. Teachers should be encouraged to take part in workshops/courses/in-service training sessions which will allow them to develop themselves.

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