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Analysis of the Attitudes and Beliefs of Pre-School Teachers Towards Teaching Science in Terms of Various Variables

Nilüfer Okur Akçay[1*]

1. Faculty of Education, Ağrı İbrahim Çeçen University, 04100, Ağrı, Turkey

* E-mail of the corresponding author: nilokur-7@hotmail.com

Abstract

The purpose of this study is to examine the attitudes and beliefs of pre-school teachers towards science teaching in terms of gender, age, seniority and graduation variables. In the study, availability sampling method was used. The study group of the study consists of 127 preschool teachers working in 2014-2015 academic years. As a data collection tool in this study; a questionnaire was used to determine the attitudes and beliefs of pre-school teachers towards science teaching and personal information form was used to determine the demographic characteristics of preschool teachers. For the analysis of the data, the data obtained from the questionnaire have been tabulated and frequency (f) and percent (%) values have been calculated. In addition, an independent t-test was conducted with ANOVA using the SPSS 16 program in order to reveal the relationship between personal information and attitudes and beliefs about science teaching. As a result of the stduy, it was determined that the attitudes and beliefs of the pre-school teachers towards science teaching did not change according to gender and age, and they differed according to seniority and school they had graduated.
Keywords: Science Teaching, Attitude And Belief, Preschool Teacher.

1. Introduction

With the rapid development of science and technology, all the countries of the world have had to review their own educational programs in order to raise science literate individuals. All eyes are focused on preschool education in terms of acquiring basic knowledge and skills in the first years of the life, and it is emphasized that pre-school education is necessary and important. In our national education system, preschool education has begun to be given importance in line with these developments that have been experienced in recent years. The preschool period is a period when children learn basic concepts and gain various experiences. In the preschool period when children's feelings of curiosity about the world they live in begins to increase and the desire to acquire new information is very intense, the children get new information by doing research and they create the basis of structuring every new information with the knowledge that they have gained (Balat and Önkol, 2010, Kandir and Orçan, 2010). According to Şimşek and Çınar (2008), it is especially important to give basic knowledge and skills in the preschool period because it is inevitable that children will have various deficiencies at the level reached even if they are equipped with many knowledge and skills in the following years.

In recent years, science education, which plays an important role in the ability of science literate individuals to grow up, has begun to be emphasized in our country. Dindar (1995) notes that science education is extremely important in the development of countries and in the scientific progress. In preschool education, science activities give students a variety of experiences including high-level thinking skills, research, scientific experiences and scientific thinking skills (Bredekamp and Copple, 1997). Since every event in the nature forms a theme of science, science is an important part of life. In preschool period when children start to wonder the events happening in their surroundings, necessary importance should be given to science education and they should be related to daily life for children (Akçay, 2014).

Science teaching is a profession that helps children understand and understand what they see in their environment. According to Durmaz (2004), science is the process of examining the natural environment, which contributes significantly to the students' better understanding of the world they live in by studying nature and natural phenomena, and is the the knowledge gathered from the systematic knowledge of this process. According to Akgün (2004), students who are engaged in science education are actively interested in the world, asking meaningful questions, gathering data by observations and experiments and analyzing them, communicating with others civilly by creating written and oral products of the information they have obtained and, acting responsibly, and talented individuals.

Science teaching is necessary for pre-school children in terms of being able to think more critically, finding

different solutions to problems, making comparisons in different cases, improving their observation skills and increasing their attention span and it has an important place in preschool curriculum. In this direction, the due importance should be given on science education in preschool period and the teachers should have a positive attitude towards science education. Attitudes show our feelings of acceptance or rejection against objects, ideas and groups (Gay and Airasian, 2000). Self-efficacy is related to the competence of the individual to cope with problems and is the first emerged in Bandura's "Social Learning Theory". Bandura stated that people develop special beliefs about their own coping abilities based on their experiences during their lifetime, and that behavioral change increases as their self-efficacy beliefs grow, advocating that this belief is necessary to organize certain behaviors to achieve certain goals (Gurcan, 2005; Yilmaz et al., 2004).

According to Hamurcu (2006), the high self-efficacy belief through which individuals can achieve the desired performance enables them to carry out the process of initiating, sustaining and achieving behavior. It is also seen that the teachers who have high self-efficacy have higher performance and their attempts to try methods that will make their students more successful increase (Kaptan and Korkmaz, 2002). On the contrary, teachers who do not have sufficient self-sufficiency are inadequate in solving the problems they face and cannot cope with the events and cannot provide adequate education. The fact that an effective teaching process can be achieved in this direction depends directly on the teacher's self-efficacy belief. Attitudes and self-efficacy beliefs, especially about science teaching, consist of judgments about determining effective methods for science teaching and using students' abilities to increase their achievement (Akbaş and Çelikkaleli, 2006).

According to the researches about the attitudes of pre-school teachers towards science education, many teachers have the least fun in science courses as they have incomplete knowledge about science, they are afraid of giving science courses in their learning / teaching activities in their classes and they cannot lecture their students about the activities because they do not understand science (Simsar, 2013, Van Aalderen-Smeets et al., 2012). As a result of various studies about self-efficacy beliefs of teacher from different branches in the literature (Alabay, 2006, Altunçekiç et al., 2005, Arslan, 2012, Azar and Akıncı, 2009, Azar, 2010, Çakır et al. 2006; Karaduman and Emrahoğlu, 2011; Özdemir, 2008), it has been found out that there is a positive relationship between self-efficacy beliefs and achievement revealed that there is a positive relationship between self-efficacy belief and success.

The fact that science teaching is important for preschool children and science education has a significant place in preschool curriculum lays a great burden on preschool teachers, and teachers' attitudes and beliefs about science teaching should be at a sufficient level in order to fulfill these responsibilities. The purpose of this research is to examine the attitudes and beliefs of preschool teachers towards science teaching in terms of gender, age, seniority and graduation variables and consists of suggestions that can be made to increase their attitudes and beliefs towards science teaching.

2. Method

In this study, descriptive survey method was used. According to Karasar (2005), descriptive survey is a research approach aiming at describing a past or present situation as it exists, and it is a descriptive arrangement in order to make a general judgement about the universe which consists of several elements done on the universe or a group, an example or a sample from the universe.

2.1. Sample of the Study

Availability sampling method was used in the study. The study group of the study consists of 127 preschool teachers working in 2014-2015 academic year.

2.2. Data Collection Tools

As a data collection tool in this research, personal information form was used to determine the demographic characteristics of preschool teachers and a scale was used in order to determine the attitudes and beliefs of the preschool teachers about the science teaching.

Personal Informatıon Form: The "Personal Information Form" prepared by the researcher was used to determine the characteristics of the study group in the study. In this form, pre-school teachers have questions about their gender, age, occupational seniority, and the type of school they graduated from.

The Scale of the Attitudes and Beliefs of Preschool Teachers towards Science Education: "The scale of preschool teachers' attitudes and beliefs towards science education " that we used in the study was developed by Maier et al. (2013). The scale is a three-factor structure scale and consists of 35 items. The questionnaire was adapted by Akçay (2015) to Turkish by using exploratory and confirmatory factor analyzes. As a result of the factor analysis, the number of factors obtained by Maier et al. (2013) was obtained. As a result of the analysis, the scale consisted of 32 items. 3 items were removed from the scale on the grounds that they did not fit the scale. The naming of the factors is as follows: the comfort of the teacher, the benefit to the child and the difficulties. The scale was formed with a 5-likert type scale (Strongly Agree, Agree, Neither, Disagree, Strongly Disagree). As a result of the analyzes, the scale was finalized with 32 items and reliability analyzes related to the sub-dimensions and the scale itself were done, and the values were calculated as .78 for Factor 1, .82 for Factor 2, .83 for Factor 3 and .83 for the whole of the scale (32 items). It is sufficient that the Cronbach Alpha value is above .70 for reliability (Bayram, 2004). This also indicates that the reliability of the scale is high.

2.3. Analysis of the Data

The personal data form used as data collection tool and the analysis of the data obtained from the scale were made separately. The data obtained from the scale are tabulated and frequency (f) and percentage (%) values are calculated. Descriptive statistics of the scale results were made and independent t test was performed with ANOVA analysis using SPSS 16 to determine the relation with the results obtained from personal data.

3. Findings and Discussion

The frequencies and percentages of the data obtained from the personal information form of preschool teachers participating in the survey are given in the table below.

Table 1. Frequency and percentage values related to data obtained from personal information form of preschool teachers

Variables		f	%
Gender	Female	98	77.1
	Male	29	22.9
Age	20-24	42	33.1
	25-29	40	31.5
	30-34	38	29.9
	35 and above	7	5.5
Seniority	0-5	86	67.7
	6-10	34	26.8
	11 and above	7	5.5
Graduation	Girls' vocational school	1	0.8
	Associate Degree	29	22.9
	Bachelor's Degree	86	67.7
	Postgraduate	11	8.6

As seen in Table 1, 77.1 % of the preschool teachers participating in the survey are girls and 22.9 % are male. It is seen that 33.1% of the teachers are between the ages of 20-24, 31.5% are between the ages of 25-29, 38% are between the ages of 30-34 and 7% of them are aged 35 and over. 67.7% of the teachers participating in the research have been working between 0-5 years, 26.8% between 6-10 years and 5.5% 11 years and above. 0.8% of the teachers have girls' vocational school degree, 22.9% have Associate Degree, 67.7% have Bachelor's Degree and 8.6% have postgraduate degree. The frequency and percentages of the answers given to scale items by preschool teachers participating in the survey are given in Annex 1.

Table 2. Independent t-test results of scale scores according to gender

Sub-dimensions	Gender	N	X	sd	t	p
Comfort of the teacher	Female	98	58.4	5,2194	,356	,723
	Male	29	58.06	6,73441		
Benefit to the child	Female	98	43.40	3,77686	1,097	,275
	Male	29	42.44	5,20018		
Difficulties	Female	98	27.60	3,87628	,997	,321
	Male	29	26.72	5,04194		

When the sub-dimensions of the scale for attitudes and beliefs of pre-school teachers towards science teaching are examined separately, it is seen that there is no significant difference in the attitudes and beliefs of preschool teachers towards science teaching in terms of gender according to the independent-t test results ($p>0.05$). The scores of attitude and belief scale were examined according to the subscales of the scale and whether there was a significant difference according to the age groups of preschool teachers, and the ANOVA results are indicated in Table 3.

Table 3. ANOVA results related to age scores according to age

Sub-Dimensions	VK	KT	sd	KO	F	P
Comfort of the teacher	Intergroup	174,083	3	58,028	1,907	,132
	Intragroup	3742,232	123	30,425		
	Total	3916,315	126			
Benefit to the child	Intergroup	112,436	3	37,479	2,250	,086
	Intragroup	2049,029	123	16,659		
	Total	2161,465	126			
Difficulties	Intergroup	114,239	3	38,080	2,260	,085
	Intragroup	2072,281	123	16,848		
	Total	2186,520	126			

As shown in Table 3, there was no significant difference between the ages of pre-school teachers and the attitudes and beliefs about science teaching ($p>0.05$). Table 4 indicates whether the scores obtained from attitude and belief scale are meaningful according to the seniority of preschool teachers.

Table 4. ANOVA results of scale scores according to seniority

Sub-dimensions	VK	KT	sd	KO	F	P
Comfort of the teacher	Intergroup	417,482	2	208,741	7,398	,001
	Intragroup	3498,833	124	28,216		
	Total	3916,315	126			
Benefit to the child	Intergroup	142,884	2	71,442	4,389	,014
	Intragroup	2018,581	124	16,279		
	Total	2161,465	126			
Difficulties	Intergroup	111,939	2	55,969	3,345	,038
	Intragroup	2074,581	124	16,730		
	Total	2186,520	126			

On analyzing Table 4, it is seen that there is a significant difference according to the scores that the preschool teachers have taken from the sub-dimensions of attitude and belief scale in terms of seniority ($p<0.05$). The Tukey test, which is one of the multiple comparison tests, was used to determine which seniority has the difference. According to the results of Tukey test, for teacher comfort sub-dimension; it is seen that there is a significant difference between the teachers 6-10 seniority years and the teachers with 0-5 seniority years and this difference seems to be in favor of teachers with 6-10 seniority years. Similarly, there is no significant difference between 0-5 years of seniority and 11 years and above of seniority and between 6-10 and 11 years and above of seniority. According to the results of the Tukey test, for the child sub-dimension; it is seen that there is a significant difference between 0-5 seniority years and 6-10 seniority years and 0-5 seniority years and 11 years and above seniority years, but no significant difference between 6-10 years and 11 years and above seniority. According to Tukey test results, for difficulties sub-dimension; there is no significant difference between 0-5 years and 6-10 seniority years but it was found that there is a significant difference between 0-5 seniority years and 11 and above seniority years and 6-10 seniority years and 11 years and above seniority years, and this difference is on behalf of the teachers with 11 years and above seniority. Table 5 indicates whether the scores obtained from attitude and belief scale are significant according to school type that the preschool teachers have graduated from.

Table 5. ANOVA results of scale according to the school the teachers have graduated from

Sub-dimensions	VK	KT	sd	KO	F	P
Comfort of the teacher	Intergroup	351,203	3	117,068	4,039	,009
	Intragroup	3565,112	123	28,985		
	Total	3916,315	126			
Benefit to the child	Intergroup	233,555	3	77,852	4,967	,003
	Intragroup	1927,910	123	15,674		
	Total	2161,465	126			
Difficulties	Intergroup	75,702	3	25,234	1,470	,226
	Intragroup	2110,817	123	17,161		
	Total	2186,520	126			

As indicated in Table 5, it is seen that the scores of the preschool teachers from the comfort of the teacher and benefit to the child dimensions of the attitude and belief scale are significantly different in terms of the school type they have graduated ($p<0.05$), however, there is no significant differences ($p> 0.05$) between the scores of the subscales of difficulties in terms of the school type they have graduated. One of the multiple comparison tests, the Tukey test, was used to determine which school type the difference was between. According to the

results of Tukey test, for teacher comfort sub-dimension; it is determined that there is a significant difference between the undergraduate degree and other school types and this difference is on behalf of the teachers having undergraduate degree, there is no significant difference between girls' vocational school and associate degree, however, there is significant difference between bachelor's degree and girls' vocational school and associate degree, and this difference is on behalf of the teachers with bachelor's degree. According to the results of the Tukey test, for the benefit to the child sub-dimension; it was found that there is a significant difference between bachelor's degree and other school types and this difference is on behalf of the teachers with bachelor's degree, and there is no difference between girls' vocational school and associate degree and undergraduate.

4. Results and Discussion

In this study which was conducted to determine the attitudes and beliefs of preschool teachers towards science teaching, it was determined that there is no significant difference between the attitudes and beliefs of male and female teachers. In the literature, self-efficacy beliefs and the attitudes of preschool teachers towards science teaching are handled separately. The result of this study which was conducted in this direction is inconsistent with the result of the other studies (Altunçekiç et al., 2005, Berkant and Ekici, 2007, Ercan, 2007, Yaman et al., 2004) that self-sufficiency is not related to gender; but is consistent with the result of the studies (Türkmen and Bonnstetter, 1999; Sansar, 2010) that it is related to the attitudes towards science education.

According to Akbas and Çelikkaleli (2006), self-efficacy beliefs should be emphasized as self-efficacy beliefs of the teachers will affect the emotional, social and academic situations of the students they will train. Teachers' roles cannot be denied especially in the education of science literate that our country needs. According to Levitt (2001), the success of the reforms in science education depends on the program, the materials to be used and the teachers' self-efficacy beliefs (cited by: Azar, 2010). Preschool teachers' beliefs about science teaching and classroom activities are closely related to science achievement. Teachers with a high level of belief in science teaching tend to use student-centered approaches, spend more time teaching science and conduct research-based instruction, and are quite successful at doing them (Schriver and Czerniak, 1999). There is no significant difference between the ages of preschool teachers and the attitudes and beliefs towards science teaching. In the literature, it has been revealed that there is no relation between self-efficacy and age and attitude and age (Alabay, 2006, Gerçek et al., 2006).

It is seen that there is a significant difference in the scores of the preschool teachers from sub-dimensions of attitude and belief scale in terms of seniority. For comfort of the teacher and benefit to the child sub-dimensions; it is on behalf of the teachers with 6-10 seniority years, for the difficulties sub-dimension; it is on behalf of the preschool teachers with a seniority of 11 years or above. It is seen that there is a significant difference in the scores of the teachers from the sub-dimensions of comfort of the teacher and benefit to the child of the attitude and belief scale in terms of the school type they graduated from, while there is no significant difference between the scores of the teachers from the difficulties sub-dimension in terms of the school type. It is seen that there is a significant difference between bachelor's degree and other school types for the benefit to the child sub-dimension, and this difference is on behalf of the teachers with bachelor's degree.

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