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Attitude of elementary prospective teachers towards science teaching

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Abstract

The aim of study is to investigate attitude of elementary prospective teachers towards science teaching respect to the gender, grade level and graduation type of high school. The study was carried out during fall semester of 2011 educational periods. The sample of the study consisted of 180 elementary prospective teachers at the Department of elementary Teacher Education in Faculty of Education at Artvin Çoruh University. Survey methodology was used in this study. Science teaching attitude scale was used as a data collection toll. In the study, t-test; one-way analysis of variance (ANOVA) based on p=0.05 significance level were used to clarify the significance of the differences on means. At the end of study, there are not significant difference between gender, grade level, graduation type of high school and prospective teachers' attitude towards science teaching.

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1. Introduction

Science is a way of knowing, a method of learning about nature. Some of the most distinct characteristics of science are experiment, observation, and discovery. Science provides the development of skills of students' asking questions and making investigations; making hypothesis, inference of results of experiments to students (Açıkgöz, Kaygusuz, & Öncül, 2004). Education in science serves three purposes. First, it prepares students to study science at higher levels of education. Second, it prepares students to enter the workforce, pursue occupations, and take up careers. Third, it prepares them to become more scientifically literate citizens (National Research Council. 1996; 2007). In order to these aims are carried out, laboratory method is often used in science education and it is targeted that students do trial and error activities. Therefore, the laboratory applications are integral part of science (Orbay, Özdoğan, Öner, Kara, & Gümüş, 2003). However, there are some breakdowns including shortage of time, equipment, learning and teaching environment and science course present applications of science. Because of these shortages, laboratory applications sometimes are not use in science education. But almost at each school, teaching science plays an important role (Türkmen 2002). So, students have positive opinions about science teaching. This conditions, only it can possible that teachers help students to have positive attitude towards science course and science teaching.

An attitude is an inclination to gaining a skill and is identified as an individual characteristic that provide a background for accepting a positive subject or denying a negative one. As education is an important tool in changing

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the attitudes, the fact that the teachers are aware of what the students' attitudes are towards both their lessons and the other occurences in social life, and how to measure their attitudes can make a significant for increasing the quality of the education. Therefore, the studies aiming to measure students' attitudes towards certain lesson have gained much importance (Kahyaoğlu & Yangın 2007).

The common results of the great number of researches show that teacher' attitudes towards science and science teaching influence students' attitudes towards science (Morell & Lederman 1998; Munby 1983; Gabel 1980). Also, it is revealed in most of the researches done that students with positive attitudes towards science are more likely to do well in science classes (Schwirian 1968; Gicger 1973; Koballa 1988; Baykul 1990). Besides, studies concerning the effects of the attitudes on learning the science depict a significant role (Altınok, 2004) among students success (Dieck, 1997), and also motivates them to continue to work in fields related to science (Parker & Gerber, 2000; Mattern & Schau, 2002). Some studies have provided that positive attitudes towards science have affected the learning process (Linn, 1992; Çakır et al., 2000; Saracaloğlu, Serin & Bozkurt, 2001; Altınok, 2004; Şenol, Bal & Yıldırım, 2007).

Students at the first grade of a primary school are firstly introduced to science by their class teachers. And students' attitudes and values towards science begin to be formed in this period and their attitudes towards science are among the cornerstones in teaching science. The teachers' role of learning process on students' developing attitudes towards teaching science are great (Tekbıyık & Ipek 2007). Students' attitudes towards science are affected by both class teacher and the content of the science book as well as by the attitudes of the science teachers. Likewise, attitudes of teachers towards science teaching are also great importance in achieving the intended success level and assisting students in developing more positive attitudes towards science. So elementary teachers and prospective teachers have significant role in order to students gain positive attitude towards science courses.

Therefore, it is important that determinate to attitude of elementary prospective teachers towards science teaching elementary.

Purpose of the study

The aim of study is to investigate attitude of elementary prospective teachers towards science teaching. In accordance with this objective, the study specifically focuses on the following research questions:

Is there a difference between science teaching attitudes and genders?

Is there a difference between science teaching attitudes and grade levels?

Is there a difference between science teaching attitudes and graduation types of high school?

2. Methodology

The aim of this study is to determine prospective teachers' attitude towards science teaching in the respect to the gender, grade level and graduation type of high school variables. This research was carried out in fall semester of 2011. Survey methodology was used in this study. Surveys can be useful when a researcher wants to collect data on phenomena that cannot be directly observed. Besides, surveys are used to describe attitudes, opinions, behaviours or characteristics of a group.

This research was carried out 180 voluntary prospective teachers at the Department of Primary Teacher Education in Faculty of Education at Artvin Çoruh University in Artvin. Sample of this researchers consist of 100 male and 80 female volunteer prospective teachers. It was determined that 114 of these prospective teachers were at 3rd and 66 of them were at 4th grade level. According to graduation type of high school variable, there are 120 general high schools, 20 Anatolia high schools, 4 Anatolia teacher high schools, 2 Science high schools and 34 vocational high schools.

Science teaching attitude scale developed by Thompson & Shringley (1986), translated to Turkish by Özkan et al, (2002) and consists of 19 items was used as a data collection toll. Additionally, the reliability coefficient of the questionnaire is 0.83. It's just like five point Likert Type scale and each statement were labeled as 5= strongly agree, 4= agree, 3= undecided, 2= disagree and 1= strongly disagree.

Prospective teachers' responses to the attitude scale were statistically analyzed according to gender, grade level and graduation type of high school variables via SPSS 11.5 software. Positive attributions were graded as 1-2-3-4-5 and negative attributions were graded as 5-4-3-2-1 questionnaire. In the study, some parametric tests such as t-test;

one-way analysis of variance (ANOVA) based on p=0.05 significance level were used to clarify the significance of the differences on means.

3. Finding

In order to determine whether prospective teachers' attitude towards science teaching scores differed between genders of teachers, an independent-sample t-test was conducted. The independent-sample t-test scores can be seen in Table 1.

Table 1. Independent sample t-test scores in terms of genders

	Male (n=100)		Female (n=80)			
Gender	$\bar{x}$	sd	$\bar{x}$	sd	t	p
	65.360	8.957	67.475	9.565	-1.516	**.128**

The independent-sample t-test scores showed that in terms of gender there is no significant difference between the elementary prospective teachers attitude towards science teaching and gender variable (t=-1.516; p>0.05). According to the scores, it can be said that female and male parents have the same opinions about science teaching.

In order to see whether elementary prospective teachers' attitude towards science teaching scores differed in terms of grade level, an independent-sample t-test was conducted. The independent-sample t-test scores can be seen in Table 2.

Table 2. Independent sample t-test scores in terms of grade level

	3^{rd} (n=114)		4^{th} (n=66)			
Grade level	$\bar{x}$	sd	$\bar{x}$	sd	*t*	*p*
	65.93	9.742	66.94	8.416	-.731	.483

The independent-sample t-test scores showed that in terms of grade level there is no significant difference between the elementary prospective teachers attitude towards science teaching and gender variable (t=-.731; p>0.05). According to the scores, it can be said that prospective teachers at 3^{rd} and 4^{th} grade level have the same opinions about science teaching.

In order to see whether elementary prospective teachers' attitude towards science teaching scores differed in terms of graduation type of high school, one-way between-groups ANOVA test was conducted. Table 3 provides the descriptive statistics on graduation type of high school.

Table 3. Summary of one way ANOVA on graduation type of high school

Graduation Type of High School	**GHS (n=120)**		**AHS (n=20)**		**ATHS (n=4)**		**SHS (n=2)**		**VHS (n=34)**			
	$\bar{x}$	Sd	$\bar{x}$	Sd	$\bar{x}$	Sd	$\bar{x}$	Sd	$\bar{x}$	Sd	F	P
	66.85	9.429	64.3	9.336	60.5	1.732	59	0,01	66.65	9.15	1.054	**.381**

AHS: Anatolia high school, SHS: Science high school, VHS: Vocational high school, ATHS: Anatolia teacher high school, GHS: General high schools.

As a seen Table 3, according to graduation type of high school, elementary prospective teachers graduated general high schools have higher score than the others prospective teachers. Besides, The ANOVA test scores showed that in the term of graduation type of high school, there are not statistically difference at the $p<.05$ level between elementary prospective teachers' attitude towards science teaching and graduation type of high school variable.

4. Discussion and Conclusion

The aim of study is to determine elementary prospective teachers' attitude towards science teaching respect to the gender, grade level and graduation type of high school variable. For this aim, this research was carried out 180 voluntary prospective teachers at the Department of Primary Teacher Education in Faculty of Education at Artvin Çoruh University in Artvin. In this study, it was examined that whether there are effects elementary prospective teachers' gender, grade level and graduation type of high school on their attitude towards science teaching. Therefore, results of this study were collected three categories. These categories were called as effects of elementary prospective teachers' gender, grade level and graduation type of high school on their attitude towards science teaching.

Effects of elementary prospective teachers' gender on their attitude: According to t-test scores, it was seen that femala prospective teachers have more positive attitude towards science teaching than male prospective teachers. But, there is no significant difference between the elementary prospective teachers' attitude towards science teaching and gender variable. Namely, attitude of female and male prospective teachers are similar. This results was supported many results of the researches (Türkmen, 2002; Kahyaoğu & Yangın, 2007; Bilgin & Geban, 2004; İpek & Bayraktar, 2004; Altınok 2004). But there are many studies revealed that male students have more positive attitude than female students (Catsambis, 1995; Greenfield, 1996). This result might be related to extracurricular activities that male students interested in science. Zimmerman & Bennett (1987) indicated that male students were more interested in doing science experiments than female students. In the literature as some studies support this result (Catsambis, 1995; Greenfield, 1996; Jones, Howe, & Rua, 2000), there are also some contradictory results (Catsambis, 1995; Dhindsa & Chung, 2003; Miller, Lietz & Kotte, 2002). These researchers were revealed that when education level of parents' increased, their children' attitude regarding scientific attitudes scores also increased. Based on their knowledge and experiences, parents with higher educational degrees could better coach their children in motivating to learn and increasing their adaptation of scientific attitudes.

Effects of elementary prospective teachers' grade level on their attitude: According to t-test scores, it was seen that senior prospective teachers have more positive attitude towards science teaching than junior prospective teachers. But, there is no significant difference between the elementary prospective teachers' attitude towards science teaching and grade level variable. In other words, attitude of prospective teachers at 3rd are the same as prospective teachers at 4th years. In review of the literature, the importances of the junior years are emphasized and determined decline in attitude toward science during middle or high school (Cannon & Simpson, 1985; Hill, Atwater & Wiggins, 1995). So, it is possible that determining junior prospective teachers have a little positive attitude towards science teaching than senior prospective teachers. But these declines in prospective teachers' attitude are not meaningful difference.

Effects of elementary prospective teachers' graduation type of high school on their attitude: According to ANOVA scores, it can be said that prospective teachers graduated general high schools have higher score than the others prospective teachers. But, there are not statistically differences between elementary prospective teachers' attitude towards science teaching and graduation type of high school variable. In other words, there are no effects graduation types of high school for attitude of prospective teachers towards science teaching. the result was supported some studies. In literature, it was expressed that there are no significant difference between graduation type of schools and prospective teachers' attitude and academic achievement of science courses (Serin et al, 2003; Saraçoğlu et al, 2002). According to these results, it can be said that graduation type of high schools are not effects for prospective teachers' attitude towards science teaching.

Consequently, there are no significant difference between gender, grade level, graduation type of high school and elementary prospective teachers' attitude towards science teaching.

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