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Investigation of Prospective Preschool Teachers' Attitudes towards Science Education and Learning Styles

Gamze Hastürk (Corresponding Author)

Department of Primary Education, Faculty of Education

Tokat Gaziosmanpaşa University, Tokat, Turkey

Tel: 0090-356-252-1616 E-mail: hanifegamze.yalvac@gop.edu.tr

Oğuzhan Özdemir

Master of Science, Institute of Graduate Studies

Tokat Gaziosmanpasa University, Tokat, Turkey

Tel: 0090-356-252-1616 E-mail: justredcloud@gmail.com

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Abstract

The knowledge, skills and attitudes of prospective pre-school teacher towards science education enable more effective classroom practices and science teaching. Teaching scientific processes at an early age affects students' attitudes towards science in the coming years. In this context, this study was designed to examine the relationship between prospective pre-school teachers' attitudes towards science education and their learning styles. The study was designed as correlational survey model. The sample of this study consists of 193 (165 female, 28 male) prospective pre-school teachers studying in the first, second, third and fourth class of faculty of education of a state university. The data were collected using the "The Science Teaching Attitude Scale" developed by Thompson and Shringley (1986) and adapted into Turkish by Özkan, Tekkaya, and Çakıroğlu (2002) and "Kolb Learning Style

Inventory" developed by Kolb (1984) and adapted into Turkish by Evin Gencel (2007) in the spring semester of the 2019-2020 academic year. Descriptive statistical analysis and predictive statistical analysis were used in the statistical calculations of the data obtained in the study. As a result of the study, it was found that there was no statistically significant difference in the attitudes of prospective teachers towards science education according to their learning styles. In addition, it was determined that prospective pre-school teachers developed positive attitude towards science education and had different learning styles. Based on the results, suggestions have been made regarding the organization of learning environments according to learning styles and the studies that will increase the attitude levels towards science education.

Keywords: Preschool education, Preschool science education, Attitude, Learning styles

1. Introduction

Science; it can be defined as the effort to regularly investigate and examine nature and natural events, to make a judgment as a result of these investigations and examinations, and to predict the events we may encounter in the rest of our lives with the judgments we reach. Science is part of our lives. Learning the phenomena of science that shape our world is very important for a more comfortable life. Çilenti (1985) defines science as "a process for examining the natural environment and a set of information based on organized information that is the product of this process". Science is an important issue for human life. It allows us to live our lives in a healthy, happy and secure way. Thanks to science education, we can reach much information such as notably our own organs, the protection of the environment we live in, and the creation of a healthy living environment. Through science, we can access information such as the air we breathe, the water we drink, healthy nutrition, the amount of food that needs to be consumed and so on (Grieshaber & Diezmann, 2000; Yoshikawa, Weiland, Brooks-Gunn, Burchinal, Espinosa, Gomley, & Zaslow, 2013).

Science education is a process beginning right after birth and continuing through the life span (Arnas, Bilaloğlu, & Aslan, 2007). With the mental and physiological development of individuals, the concepts they need to learn increase. Teaching these concepts is required to maintain a healthier and higher quality life. The most important places where these concepts can be learned are educational institutions. Preschool education institutions are the first place where children meet science and nature (Gülay, 2010). In this period, children unwittingly work like scientists. First, they start with exploring their environment and then perform many activities such as constantly asking questions, touching, messing, comparing and expressing an opinion due to their curiosity. It is necessary to pay attention to these features in the pre-school period (Erbaş, Ergül, Şimşekli, & Özdilek, 2002). Pre-school education is very important in science and nature teaching. Children's interest in science can be increased and their misconceptions that may be encountered in the future can be prevented with the basic knowledge gained in the family and social environment. The experiences and acquisitions that children will have in the preschool period not only affect their academic life but also shape their emotional and social life (Kesicioğlu, 2019). For this reason, basic concepts related to science and nature should be given in pre-school science education. The

effectiveness of science education in pre-school period directly depends on teachers. The quality of the education that teachers will give is directly related to their beliefs (Nespor, 1987).

The studies conducted in our country show that students success in science studying at different levels is quite low (Avcı, Özenir, & Yurtalanoğlu, 2017; Balbağ, Leblebiciler, Karaer, Sarıkahya, & Erkan, 2016; Schleicher, 2019; Şimşek, 2000; Uzun, Bütüner, & Yiğit, 2010). It was observed that Turkish education system in Turkey has difficulty even in the teaching of basic subjects such as math and science. It is known that the education system cannot fully determine the students 'abilities and competencies, and the students' interpretation and reasoning skills cannot be developed at the desired level (Gür & Çelik, 2009). It was seen that in the YKS (higher education institutions exam) held between 2018-2020 the average of the students in the science exam containing 20 questions was 2.82 in 2018; 2.24 in 2019 and 2.66 in 2020. In addition, 22.68% of the candidates failed the basic proficiency test in 2020 (OSYM, 2020). In line with these results, it can be said that success in science at the high school level is quite low in our country. Another exam example in which we can examine the science achievement of students is the LGS (High School Entrance Exam) that MEB applies to 8th grade students every year. According to the statistics of the 2020 LGS exam, students who have 0 to 10 correct answers from the science test containing 20-questions constitute 55% of all students. The average of the science test is 7.82 (MEB, 2020). In addition to the examples, the OECD's Programme for International Student Assessment (PISA) survey takes place every three years in order to determine the degree to which schools prepare students for the future by questioning 15-year-old students' abilities and decision-making mechanisms in mathematics and science. Based on the PISA reports, it is possible to make the education system more functional, to increase the students achievement levels in science, to monitor the interaction of educational policies on students, and to increase their educational qualifications (Kılıçaslan & Yavuz, 2019). Thanks to PISA, it can be seen the place of Turkish Education System in the education at the international level (Savran, 2004). The change in PISA science performance Turkey between 2006 and 2018 is given in Figure 1.

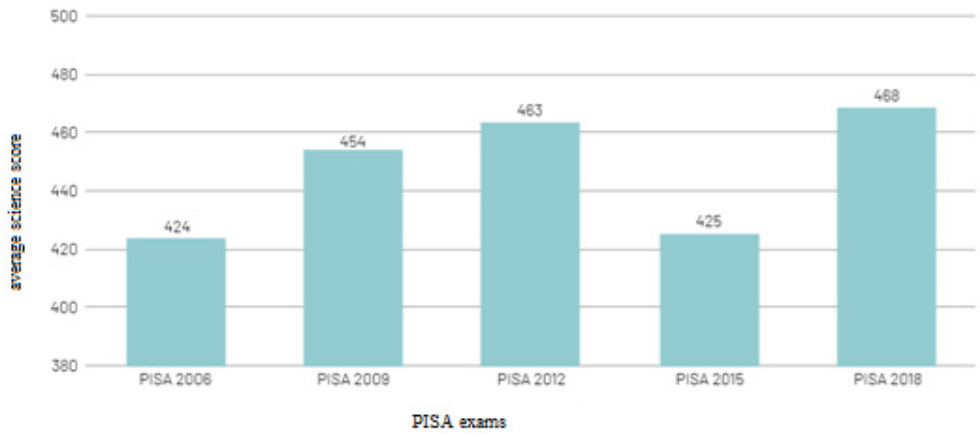

Figure 1. The change in PISA science performance of Turkey between 2006-2018

When Figure 1 was examined, it was seen that the average science achievement score of our country changed in the range of 424-468 points between the years of 2006-2018. Although the science achievement scores which were 424 in 2006 increased within six years and reached 463 points, it decreased to 425 points within 3 years. As a result of the efforts of our country, it increased again and reached 468 points. 79 nations participate in PISA 2018, the seventh cycle of PISA, with 37 being members of The Organization for Economic Co-operation and Development (OECD). According to the PISA 2018 report, Turkey took an average 468 points in the science and it ranks above the average of the scores of science of nations (458).

According to the 2015 report of The Trends in International Mathematics and Science Study (TIMSS), another international assessment test, in which turkey also participated; at fourth grade 47 countries took part in TIMSS while at the eighth grade 39 countries took part. According to study of TIMSS-R conducted in 2011-2015, Turkey ranked 35th among 50 countries in 4th grade science level by getting 463 points. In a TIMSS-R study conducted in 2011-2015, Turkey with 483 points ranked 35th among 47 countries and Turkish students' science achievements on TIMSS increased but it remained below the average. According to study of TIMSS-R conducted in 2011-2015 Turkey ranked 21st among 42 countries in 8th grade science level by getting 483 points. According to the report published in 2015, although it started to rise in science achievement, it ranked 21st among 39 countries with 493 points, still below the average. Until 2019 cycle of TIMSS, the turkey has increased average achievement in science and mathematics; however it showed performances under or at around the center point of the scale (500) as a point of reference in the TIMSS assessment. According to TIMSS 2019 data, at science achievement Turkey ranked 19th among 58 countries in 4th grade science level with 526 average points while it ranked 15th among 39 countries in 8th grade science level with an average science score of 515. With this performance, Turkey ranked significantly above the center point of the TIMSS scale for the first time. Although this score increase in TIMSS is pleasing recently, it is known that it has stability and continuity in order to make generalizations (TEDMEM, 2021).

When the conducted studies are analyzed as a whole, it is seen that science achievement is generally quite low in primary, secondary and high school periods in our country. Improving science achievement is possible with science education given in the pre-school period when the foundations of science education are laid (Ayvacı & Özbek, 2017; Kıldan & Pektaş, 2009; Nacar & Kutluca, 2020; Ünal & Akman, 2006). Preschool teachers should lay the foundations of science by encouraging students to love science (Kahraman, Ceylan, & Ülker, 2015). The Studies reveal that preschool science education is very important for individuals' future success (Duschl, Schweingruber, & Shouse, 2007; Eschach, 2011; Eshach & Fried, 2005). With science teaching it is possible to teach science to students, to teach them how to solve problems, make informed decisions, and how to think. Despite this emphasis, preschool teachers tend to teach less science than language and literacy, social studies and arts (Hanley, Cammilleri, Tiger, & Ingvarsson, 2007; Hanley, Tiger, Ingvarsson, & Cammilleri, 2009; Nayfeld, Brenneman, & Gelman, 2011). Therefore, students' scientific process skills such as hypothesizing, predicting, interpreting often do not develop in their academic life (LaParo,

Pianta, & Stuhlman, 2004). In order to eliminate this problem, preschool teachers must have teacher competence. Teachers' competence should not be evaluated only by the education they have received and the diploma they have. The teacher should have feelings such as faith and sincerity towards the profession, as well as being competent in the field or having the necessary theoretical knowledge (Jones & Carter, 2007). The knowledge, skills and attitudes of prospective pre-school teacher towards science education enable more effective classroom practices and science teaching. Teaching scientific processes at an early age affects students' attitudes towards science in the coming years (Harlen, 1990; cited in Hamurcu, 2003). There are inconsistencies in actual science teaching in preschool classrooms. It can be said that these inconsistencies are mostly caused by teachers' attitudes towards science education (Brown, 2005; Jones & Carter, 2007; Levitt, 2002; McDevitt, Heikkinen, Alcorn, Ambrosio, & Gardner, 1993). Attitude towards science education is one of the most basic facts necessary for achieving the desired success in science education. According to M. Sherif and C. W. Sherif (1996), an attitude is defined as "it is a mental and neural state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual's response to all objects and situations with which it is related". It is very important to examine the learning styles of preschool teachers who will teach science, as well as their attitudes towards science education (Çamlıbel & Çakmak, 2006). Lifelong learning styles that do not change but change our lives make life easier for individuals (Boydak, 2015). Individuals prefer at least one learning style. Learning styles are defined as individuals who learn by feeling for concrete experience, learn by watching for reflective observation, learn by thinking for abstract conceptualization, and learn by doing and experiencing for active experimentation. Individuals' learning styles were formed as a result of the components of these four basic learning styles, and each quarter was defined as a learning style.

Converging Learning Style. The competence dominating the converging learning style is abstract conceptualization and active experimentation. The main characteristics of this style are problem solving, decision making, analyzing the thoughts logically and systematic planning. Generally, individuals with this style are defined as converging because they give the most correct answer in tests where the questions have only one answer, in other words, they move toward one point (Yıldız, 2011).

Diverging Learning Style. According to experiential learning theory, its learning characteristic is of concrete experience and reflective observation. Individuals with diverging learning style see the events with a realistic perspective by observing with a concrete mindset. This style is called diverging because it creates many solutions by developing different perspectives. Thought-exploration activities such as brainstorming have an important place in this style (Kolb, 1984). Individuals with diverging styles have high cultural interests and intensely experience their own emotions by shaping their thoughts. Individuals with diverging learning style enjoy working with other people and prefer humanistic and artistic interests in their career choices.

Assimilating Learning Style. Individuals with an assimilating learning style reflect the characteristics of abstract conceptualization and reflective observation. They use inductive reasoning. They are skilled in theory and theory development. Unlike the converging style,

they are less focused on people and more interested in ideas and abstract concepts approaches based on practical value. In the assimilating learning style, logic and precision are at the forefront (Yıldız, 2011). In addition, career choice preferences are mathematics, planning and organizational areas.

Accommodating Learning Style. Individuals with accommodating learning style reflect the characteristics of concrete experience and active experimentation. It also includes the characteristics such as doing something, achieving plans and goals, and participating in new experiences. Individuals with this style are called as accommodating because they can easily adapt to unpredictable events or situations. In this style, facts are often ignored or re-evaluated. Individuals with this style learn through intuition and rely on their own analytical intelligence for learning. Individuals with an accommodating learning style may sometimes seem distressed and impatient and then, no matter how comfortable they are (Kolb, 1984). For this reason, it is important to determine the learning styles of prospective teachers.

When the relevant literature is examined, there are studies on the attitudes and learning styles of prospective teachers studying in other branches towards science education (Bulut Üner, 2018; Can & Şahin Çakır, 2015; Çamlıbel Çakmak, 2016; Gözüm, 2015; Özok Bulut, 2020; Sıcak, 2018). However, there are no studies examining prospective pre-school teachers' attitudes towards science education and learning styles together. In this context, it is thought that examining the relationship of prospective pre-school teachers' learning styles and gender, grade levels, attitudes towards science education will contribute to the literature.

In this context, answers to the following problems were sought:

1) What level are the prospective pre-school teachers' attitudes towards science education?

2) What are the prospective pre-school teachers' learning styles (accommodating, converging, diverging, assimilating)?

3) Do the prospective pre-school teachers' scores from the scale of attitude towards science education differentiate according to their learning styles?

4) The prospective pre-school teachers' attitudes towards science education differentiate significantly according to their gender and grade levels?

5) Do prospective pre-school teachers' learning styles differentiate significantly according to their gender?

2. Method

The study is a survey research and the study was designed as correlational survey model. In this model, it is aimed to determine the views of the participants or their characteristics such as interests, skills, abilities, and attitudes about an issue or event (Fraenkel & Wallen, 2006). In correlational research, the relationship among two or more variables is studied without any attempt to influence them (Karasar, 2006). In the study, the correlational survey model was used to describe the relationships between prospective pre-school teachers' learning styles

and attitudes towards science education.

2.1 Study Group

The study was conducted with second, third and fourth year prospective teachers enrolled in the Department of Preschool Education, Faculty of Education of a state university. Demographic characteristics of the prospective teachers participating in the study are shown in Table 1.

Table 1. Distribution of prospective teachers participating in the study according to their gender and class levels

		1.Class	2. Class	3. Class	4. Class	Total
Male	N	9	5	9	5	28
	%	4.7	2.6	4.7	2.6	14.5
Female	N	42	51	44	28	165
	%	21.8	26.4	22.8	14.5	85.5
Total	N	51	56	53	33	193
	%	26.4	29.0	27.5	17.1	100

As seen in Table 1, 51 (26.4%) of the prospective teachers in the sample were in the first class, 56 (29.0%) in the second class, 53 (27.5%) in the third class, and 33 of them (17.1%) are in 4th class. The sample consists of 193 (100%) prospective teachers including 165 (85.5%) female and 28 (14.5%) male. In addition, as can be understood from Table 1 there were a total of 51 (26.4%) prospective teachers, (42 (21.8%) female and 9 (4.7%) male) in the first class; a total of 56 (29.0%) (51 (26.4%) female, 5 (2.6%) male) in the 2nd class; a total of 53 (27.5) (44 (22.8%) female, 9 (4.7%) male) in the 3rd class; a total of 33 (17.1%) (28 (14.5%) female and 5 (2.6%) male).

2.2 Data Collection Tools

In this study, which aimed to examine the relationship between prospective pre-school teachers' learning styles and their attitudes towards science education, data were collected using the "The Science Teaching Attitude Scale" and "Kolb Learning Style Inventory". Information about the data collection tools used in the study is given below.

The Science Teaching Attitude Scale. The Science Teaching Attitude Scale developed by Thompson and Shrigley (1986) and adapted to Turkish by Özkan, Tekkaya, and Çakıroğlu (2002) was used in order to determine prospective teachers' attitudes towards science education. A 5-point likert scale consists of 21 items and it was developed to determine teachers' attitudes towards science education. Response options were defined as 1 point

"strongly disagree", 2 points "disagree", 3 points "undecided", 4 points "agree", 5 points "strongly agree". For the reliability of the scale Cronbach's alpha coefficient was found as .82. A total of 19 items, 10 of which were positive and 9 of which were negative, were used in the scale. Cronbach's alpha for 19 items was calculated as .79. The reliability coefficient calculated as .70 or higher is generally considered sufficient for the reliability of the test scores. Thus, it was concluded that the scale was applicable for the study. The scores obtained from the attitude scale were interpreted as 19-34 "very low", 35-49 "low", 50-64 "medium", 65-79 "high", 80-95 "very high".

Kolb Learning Style Inventory. Kolb Learning Style Inventory-III (LSI-III) developed by Kolb (1999) for students and adapted to Turkish by Evin Gencel (2007) was used to determine the learning styles of prospective pre-school teachers. The validity and reliability study of the inventory was done by Evin Gencel (2007). In Evin Gencel's study, it was determined that Cronbach Alpha reliability coefficients of learning style dimensions ranged from .71 to .80 (n = 320). Cronbach Alpha internal consistency coefficients calculated on the data collected in this study are .75 and .84 (concrete experience .79; reflective observation .75; abstract conceptualization .82; active experimentation .78; Abstract Conceptualization-Concrete Experience .84; active experience-reflective observation .81) (n:193). The reliability coefficient of .70 or higher is generally considered acceptable for the reliability of the test scores (Büyüköztürk, 2016). Thus, it was concluded that the inventory could be used for this study.

In the Kolb Learning Style Inventory-3, 4 learning styles specified in the Kolb learning style model are defined. The inventory consists of 12 items with 4 options asking individuals to rank 4 learning styles that best describe their learning styles. Each option is aimed at determining concrete experience, reflective observation, abstract conceptualization and active experience learning styles. Those who will answer the inventory answer the complementary items by giving 1, 2, 3, 4 points from the least appropriate item to the most appropriate item. The scores given to each option are added up sequentially and as a result, a score between 12 and 48 is obtained for each individual.

Combined scores are obtained as follows:

- abstract conceptualization (3rd option)—concrete experience (1st option)
- active experimentation (4th option) reflective observation (2rd option)

According to the information given, the combined score is obtained by subtracting the score given by the respondents to the Concrete Experience (CE) (1st option) score from the score given to the Abstract Conceptualization (AC) (3rd option) while subtracting the score given to the Reflective Observation (RO) (2nd option) from the score given to the Active Experimentation (AE) (4th option). Combined scores range from +36 to -36. In Figure 2 the intersection of the two combined scores in the chart arranged according to Kolb's experiential learning theory indicates the appropriate learning styles of the individuals.

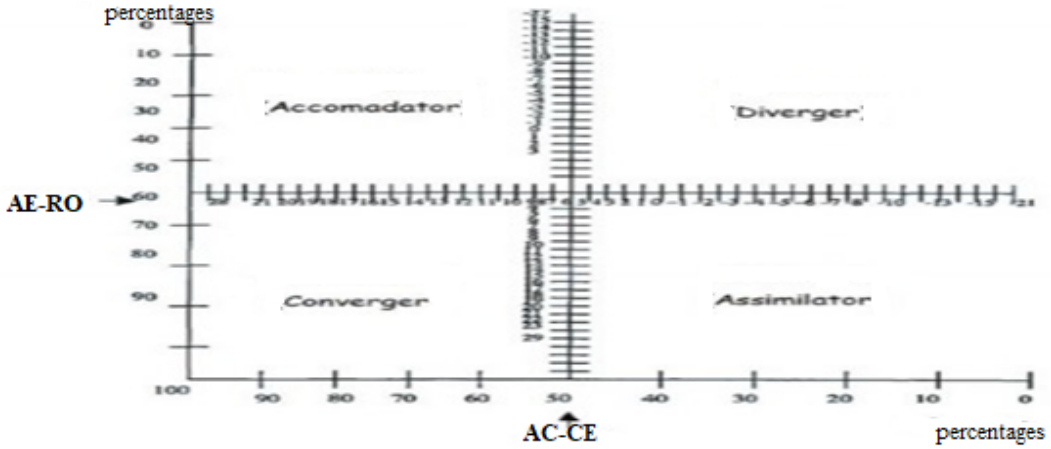

Figure 2. Chart showing learning styles determined by Kolb according to experiential learning theory

As an example, to determine the learning style of the prospective teacher, who is in the 11th place, in line with the points s/he got from the inventory:

- Concrete Experience: 24 point
- Abstract Conceptualization: 31 point — AC-CE = 24-31 = -7 Point, and
- Reflective Observation: 23 point — AE-RO = 4 Point
- Active Experimentation: 19 point

When we place the scores obtained by the prospective teacher on the chart arranged according to Kolb's experiential learning theory, it is seen that the prospective teacher has a divergent learning style.

2.3 Data Analysis

The data obtained from the scales were examined one by one, the scores of each participant were determined, and with the information on the information form they were entered on the SPSS data entry pages and filed. The Pearson Product-Moment Correlation Coefficient, One-Dimensional Analysis of Variance, Mann-Whitney Test for Independent Samples and the one-sample chi-square test were analyzed according to all the descriptive statistical measures required in the analysis and the type of data groups. It was examined if the data are normally distributed and given in Table 2.

Table 2. Normal distribution of data

	Kurtosis	Skewness
Class Levels	-1.17	0.15
Attitude Scale	-0.32	-0.28
Learning Styles	-0.81	-0.58
Gender	2.15	-2.03

Tabachnick and Fidell (2013) stated that the kurtosis and skewness values should be in the range of +1.5 to -1.5 for the data to have a normal distribution. It was determined that the data except for the gender variable fulfill normality and homogeneity of variances. The Mann-Whitney U Test, one of the non-parametric test methods, was used in order to test whether prospective pre-school teachers' learning styles and attitudes towards science education differentiate according to gender variable. One-Dimensional Analysis of Variance was applied to determine whether the learning styles of prospective pre-school teachers differentiated according to their attitudes towards science education. In addition, one-sample chi-square test was used to understand whether prospective teachers' learning style preferences differentiated according to gender variable.

- Mann-Whitney Test for Independent Samples is used to test whether the scores obtained from two independent samples differentiate significantly from each other.
- One-Dimensional Analysis of Variance is used to test whether the mean difference between independent or more samples is statistically different from zero.
- The one-sample chi-square test examines the significance of the difference between the observed numbers in each category of the variable from the expected numbers for the categories (Büyüköztürk, 2016).

The data obtained from the scales were examined one by one and transferred to the Statistical Package for Social Sciences (SPSS) in computer environment and required analyzes were made.

3. Results

This section includes the data collected as a result of the study conducted to examine the relationship between prospective pre-school teachers' attitudes towards science education and learning styles and the findings of the data analysis.

3.1 General Distribution of Prospective Teachers' Attitudes towards Science Education

Prospective preschool teachers' scores from the scale measuring attitudes toward science education are given in Table 3.

Table 3. Descriptive statistics on prospective teachers' attitudes towards science education

	N	Minimum	Maximum	$\overline{X}$	S
Overall Score	193	48.0	64.0	56.43	3.21

As seen in Table 3, the highest score that prospective pre-school teachers could get from the scale measuring attitudes toward science education consisting of 19 items was 95.00 and the lowest score was 19.00. The highest score obtained by prospective pre-school teachers regarding the level of competence established on a scale was calculated as 64.0, the lowest score 48.0; besides the mean of the scale was 56.43 and the standard deviation was 3.21. In line with these data, it was found that prospective pre-school teachers' attitudes towards science education were at a medium level.

3.2 Descriptive Statistics on Prospective Teachers' Learning Styles

The distribution of prospective teachers' learning styles is given in Table 4.

Table 4. Distribution of prospective teachers' learning styles

	n	%	X^2	Sd	P
Accommodating	30	15.5	32.016	3	.00
Converging	28	14.5			
Diverging	73	37.8			
Assimilating	62	32.2			
Total	193	100.0			

As seen in Table 4 it was observed that 30 (15.5%) of prospective pre-school teachers had accommodating learning style, 28 (14.5%) participants had converging learning style, 73 (37.8%) participants had diverging learning style and 62 (32.2%) participants had assimilating learning style. As a result of the one-variable chi-square test that was conducted to understand whether the difference between prospective teachers 'learning styles was significant, it was found that the difference between prospective teachers' learning styles was statistically significant [$X^2 = 32.02$ $p < .05$]. In line with the findings it was found that at most prospective preschool teachers had diverging learning style (37.8%) and assimilating (32.2%) while at least they had accommodating (15.5%) and converging (14.5%) learning styles.

3.3 Analysis of Prospective Teachers' Attitudes towards Science Education According to Their Learning Styles

The analysis of prospective pre-school teachers' attitudes towards science education

according to their learning styles is given in Table 5.

Table 5. Descriptive statistics of prospective teachers' attitudes towards science education according to their learning styles

Learning Styles	n	$\overline{X}$	S
Accommodating	30	56.67	3.60
Converging	28	56.50	3.93
Diverging	73	56.29	2.97
Assimilating	62	56.47	2.97
Total	193	56.43	3.21

As seen in Table 5, it was found that prospective teachers with the highest attitudes towards science education had accommodating learning style ($\overline{X}$ = 56.67) while prospective teachers with the lowest attitudes towards science education have diverging learning style ($\overline{X}$ = 56.29).

The one-way analysis of variance was performed to determine whether there is a statistically significant difference in the attitudes of prospective pre-school teachers towards science education according to their learning styles, and the results are given in Table 6.

Table 6. Variance analysis results of prospective teachers' attitudes towards science education according to their learning styles

	Sum of Squares	df	Mean Square	F	P
Between Groups	3.38	3	1.13	.108	.955
Within Groups	1970.06	189	10.42		
Total	1973.44	192			

As seen in Table 6, there is no statistically significant difference in prospective pre-school teachers' attitudes towards science education according to their learning styles [$F(3,189) = 0.11$, $p > .05$].

3.4 Analysis of Prospective Teachers' Attitudes towards Science Education According to Their Gender

The Mann-Whitney U Test was conducted to determine whether there is a statistically significant difference in prospective pre-school teachers' attitudes towards science education in terms of gender. The data of the U-test are given in Table 7.

Table 7. U-Test results among prospective teachers' attitudes towards science education according to their gender

Gender	N	Mean Rank	Sum of Rank	U	P
Male	28	98.18	2749.00	2277.00	.90
Female	165	96.80	15972.00		

Table 7 shows that there is no statistically significant difference in prospective pre-school teachers' attitudes towards science education in terms of gender [U = 2277.00, p > .05].

3.5 Analysis of Prospective Teachers' Attitudes towards Science Education According to Class Levels

The analysis of prospective pre-school teachers' attitude scores towards science education according to their class levels is given in Table 8.

Table 8. Analysis of prospective teachers' attitude scores towards science education according to class level

Class level	N	$\overline{X}$	S
1.class	51	55.58	3.35
2.class	56	56.62	3.12
3.class	53	56.75	3.09
4.class	33	56.90	3.18
Total	193	56.43	3.21

As seen in Table 8, when the average scores of prospective pre-school teachers from the scale measuring attitudes toward science education are examined the prospective teachers in the 4th class have the highest average score (= 56.90) while the prospective teachers studying in the first class (= 55.58) have the lowest average score. One-dimensional variance analysis was performed to determine whether prospective pre-school teachers' attitudes towards science education differentiate significantly according to their grade levels and the results are given in Table 9.

Table 9. Variance analysis results of pre-school teacher attitude scores towards science education according to class levels

	Sum of Squares	df	Mean Square	F	P
Between Groups	51.42	3	17.14	1.69	.17
Within Groups	19.22	189	10.17		
Total	19.73	192			

As seen in Table 9, there is no statistically significant difference as a result of variance analysis of prospective pre-school teachers' attitudes towards science education according to their class levels [$F(3,89) = 1.69$, $p > .05$].

3.6 Analysis of Prospective Teachers' Learning Styles According to Their Gender

The chi-square results regarding whether prospective teachers' learning styles show a significant difference according to their gender are given in Table 10.

Table 10. Chi-square test results of prospective teachers' learning styles according to the gender

Gender		Learning Styles				Total	X^2	Sd	P
		Accommodating	Converging	Diverging	Assimilating				
Male	N	2	1	11	14	28	7.46	3	.59
	%	7.1	3.6	39.3	50.0	100.0			
Female	N	28	27	62	48	165			
	%	17.0	16.4	37.6	29.1	100.0			
Total	N	30	28	73	62	193			
	%	15.5	14.5	37.8	32.1	100.0			

As seen in Table 10, it was seen that prospective male teachers had 50% assimilating learning style, 39.3% diverging, 7.1% accommodating and 3.6% converging while prospective female teachers had 37.6% diverging learning style, 29.1% assimilating, 17% accommodating and 16.4% converging [$X^2(3) = 7.46$, $p > .05$]. As a result of the chi-square test, it was seen that there was no significant difference between prospective teachers' learning styles according to their gender.

4. Discussion

In this study, which aims to examine the relationship between prospective pre-school teachers 'learning styles and their attitudes towards science education, it was found that prospective teachers' attitudes towards science education were at a medium level. The main reason why the prospective teachers' attitudes towards science teaching are at a medium level can be shown that they tend to teach less science (Brenneman, Stevenson-Boyd, & Frede, 2009; Sackes, Trundle, Bell, & O'Connell, 2011). In the studies conducted on the attitudes of prospective teachers towards science education, it was determined that prospective teachers' attitudes towards science education were positive (Denizoğlu, 2008; Genç, Deniş, & Demirkaya, 2010). Similarly, Cho, Kim, and Choi (2003) stated that, instead the scholars equip prospective teachers with the basic knowledge of science teaching, they should first aim to develop their prospective teachers' attitudes positively by determining their negative attitudes towards science education. In this way, it can be expected that the quality and efficiency of prospective teachers' science education will increase.

According to the findings obtained in the study, it was determined that the attitudes of the prospective teachers towards science education did not make a significant difference according to the gender variable. The reason for the lack of significant difference can be shown that the number of male prospective teachers in the sample group was lower than that of women. When other studies in the literature were examined, it was possible to achieve similar results to our study (Denizoğlu, 2008; Türkmen, 2002; Türkmen & Bonnstetter, 1999; Tosun, 2000). However, in the literature, it was stated in the studies (Çamlıbel Çakmak, 2006; Özkan, Tekkaya, & Çakıroğlu, 2002; Sarıkaya, 2004) that the gender variable is one of the factors affecting the attitudes of prospective teachers towards science education.

According to the findings of the study, there is no significant difference between the prospective teachers' class levels and their attitudes towards science education. The reason for the lack of a significant difference can be shown that the education they received during their undergraduate period was not at a level that would affect their attitude towards science education and thus their attitudes did not develop in the upper classes. In studies examining prospective teachers' attitudes towards science education and their class levels (Çakır, Şenler, & Taşkın, 2007; Denizoğlu, 2008; Kocaoğlu, 2011), a significant difference between 1st and 4th class levels is frequently encountered. The main reason for this situation can be shown that they should be aware of the requirements of the profession as their class level rises.

It was determined that prospective pre-school teachers have the most diverging learning style, later assimilating, accommodating and converging learning style. In line with these findings, it can be said that prospective pre-school teachers are generally individuals who like problem solving, can see the whole from the part, attach importance to the details, adopt learning by doing and living, follow the stepped teaching, interpret and reach the truth by adopting all the ideas. When other studies in the literature were examined, it was seen that at most prospective teachers had diverging and assimilating learning styles while at least they had with accommodating and converging learning styles. In this way, the findings obtained in the study are similar to the studies conducted in previous years (Hasırcı, 2006; Honigsfeld &

Schiering, 2004; Koç, 2007; Zengin & Alşahan, 2012; Y. Zorlu, F. Zorlu, & Dinç, 2019). It is possible to encounter different results between the findings of the study and those of the studies conducted in previous years. Kurtuluş (2019) found in her study that prospective teachers mostly had assimilating learning style. The reason for this difference can be thought to be due to the differences in the education level of the sample group and learning environments. Because learning styles change people's experiences and lives (Kolb, 1984; Manolis, Burns, Assudani, & Chinta, 2013).

As a result of the study, pre-school prospective teachers' attitudes towards science education do not show statistically significant difference according to their learning styles. The reason for this can be shown that attitudes can change as a result of experience but learning styles do not change. In previous studies, the relationship between prospective teachers' learning styles and their gender was examined and no significant difference was found (Çağlayan & Taşğın, 2009; Koç, 2007; Shaw & Marlow, 1999; Şimşek, 2007). In the literature, it is also possible to encounter the results that do not correspond to the findings obtained from the study. In previous studies, it was determined that prospective teachers mostly have assimilating learning style (Deryakulu, Büyüköztürk, & Özçınar, 2010; Gürsoy, 2008; Jones, Reichard, & Mokhtari, 2003; Karademir & Tezel, 2010; Kılıç, 2002; Peker, 2005; Willcoxson & Prosser, 1996).

5. Suggestions

Based on the results obtained from the study, the following suggestions can be made:

1) In the study, the research was conducted with data obtained from a single university. This study can be expanded with pre-school prospective teachers from different universities.

2) The research was conducted using only quantitative data.

3) More detailed results about teacher candidates can be obtained by adding different variables to the scales used in the study.

4) Since the genders of the prospective teachers do not show a normal distribution, studies can be conducted to encourage male prospective teachers prefer the preschool department.

5) Considering that the majority of prospective teachers have diverging and assimilating learning styles, education programs can be updated by program developers.

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