

## EXAMINATION OF SECONDARY STUDENTS' ATTITUDES TO SCIENCE COURSE

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### ABSTRACT

The aim of this study is to examine middle school students' attitudes towards science course. This study is a quantitative research. Science Attitude Scale was used as a data collection tool in the study. The population of this study consists of secondary school students in a school in TRNC. The sample of the study of 70 students. The study data were analyzed with IBM SPSS Statistics 26.0 program.

At the end of the study, it is seen that 57.1% of the students "strongly disagree" with the statement "I would be happy if the topics in science lessons were reduced". This shows that students are dissatisfied with the reduction of topics in science courses. In addition, 2.9% of the students "strongly agree" with the statements "Science is one of my favorite subjects", "I like science the most among the subjects" and "If possible, I would take another subject instead of science". This shows that students have a positive attitude towards science and that they like or prefer science courses. These rates reflect students' attitudes towards science. The proportions of students' negative or positive responses to some statements can be evaluated to understand their attitudes towards science. This information can be an source for understanding how science is perceived among students and students' attitudes towards science. It was tested whether the difference between the groups according to gender was significant or not and it was seen that the difference between the groups according to gender was not significant. It was tested whether the difference between the groups according to the class variable was significant or not and it was seen that the difference between the groups according to the class variable was not significant.

**Keywords:** Science course, students, attitude.

### 1. Introduction

#### 1.1. Problem status

Science education is an important field of education that helps students develop their scientific thinking skills by providing them with basic knowledge about natural sciences. Science education enables students to develop scientific thinking skills such as problem solving, analytical thinking, observation, data collection and analysis. These skills increase students' ability to solve problems they encounter not only in science lessons but also in their daily lives ( Bayar, 2023) . Science education gives students the ability to understand and interpret natural phenomena. Students who learn science such as physics, chemistry and biology have the ability to explain what is happening around them by better understanding the events occurring in the universe and the laws of nature ( Boz & Özcan, 2023) .

Science education gives students the ability to apply scientific knowledge in real life. Students can put scientific thinking into practice by using the knowledge they learn in science classes in laboratory experiments, research projects or in their daily lives (Lesinger, Oytun and Yinal, 2019). Science education is important to keep up with technological developments. Science includes many principles that form the basis of technology ( Balat et al., 2023) . Science education therefore provides students with the ability to adapt to technological advances and enter science and technology-based jobs in their future professional careers. Science education raises students' awareness of the environment and sustainability. Subjects such as the protection of nature, sustainable use of resources and finding solutions to environmental problems are handled with science education and environmental awareness of students is developed ( Balım & Aydın, 2009) .

Examining students' attitudes towards science course enables us to understand how much interest students follow the course, their attitudes towards course materials, their motivation to learn and the factors that can affect course success. This analysis is an important step for the effective teaching and learning of science ( Karalı et al., 2023) . Based on this information, the problem sentence of this study is "The attitudes of middle school students towards science lesson. how is it?" has been determined.

### 1.2. Purpose of the research

The aim of this study is to examine secondary school students' attitudes towards science lesson. The sub-objectives created within the scope of the research are as follows:

- What is the distribution of Science Lesson Attitude status?
- the Science Lesson Attitude Scale level?
- Is there a relationship between the Science Lesson Attitude Scale and gender?
- Is there a relationship between the Science Lesson Attitude Scale and the class variable?

### 1.3. Importance of research

Students' attitudes towards the science lesson may reflect how willingly they follow the lesson and how much they participate in the learning process. Students with positive attitudes will tend to be more motivated and put in more effort. Students' attitudes towards science lessons may also reflect their attitudes towards course materials. Understanding students' attitudes towards science is important for improving the educational approach. Attitudes of students towards science course can affect course success. Students with a positive attitude will tend to be more active and participatory and will focus better on course materials. Analysis of attitudes helps us develop strategies to increase student achievement. Examining students' attitudes towards science is important for improving student guidance and support services. For this reason, it is thought that this study will guide both the literature and the teachers who teach science.

### 1.4. Limitations

This work;

- With the sources used in the research;
- With the volunteer students participating in the research;
- The scale used in the research was limited to the questions.

### 1.5. Definitions

**Science Course:** It means a course that teaches students natural sciences, that is, disciplines such as physics, chemistry, biology. ( Sener et al., 2023).

**Attitude:** Defined as a combination of feelings, thoughts, and behaviors that a person has towards a particular subject or situation. (Sahin et al., 2023).

## 2. Theoretical Framework

### 2.1. Science lesson

Science is a course given to middle school and high school students in the Turkish education system. Science is an acronym for "Physics, Chemistry, Biology". This course aims to convey the basic information about natural sciences to students. Science lessons generally focus on understanding the basic concepts, principles and natural phenomena of science ( Dogan, 2010) . It offers students the opportunity to develop scientific research methods, laboratory skills and scientific thinking abilities. The course content usually covers physics, chemistry and biology ( Shirtsiz & Bulut, 2007) . Physics studies subjects such as matter, energy, force and motion. Chemistry focuses on elements, compounds, chemical reactions and molecular structures. Biology, on the other hand, deals with the structure, functions, diversity and evolution of living organisms ( Tatar and Bağrıyanık, 2012) .

Science coursework can often include theoretical knowledge as well as laboratory experiments, observation and research work. Students are provided with practical experiences so that they can understand the sciences and use this knowledge in their daily lives. Science course provides an important opportunity for students to develop their scientific thinking, analysis, problem solving and critical thinking skills ( Bakırcı et al., 2023) . In addition, gaining competencies in the field of science is also important for future career opportunities in today's world where technological advances are happening rapidly ( Tekbıyık & Akdeniz, 2008) .

### 2.2. Attitude in Science Education

Attitude is defined as the combination of feelings, thoughts and behaviors that a person has towards a particular subject or situation. Attitude refers to an internal state that affects a person's tendency to make a positive or negative evaluation, beliefs, expectations and behaviors (Şahin et al., 2023). Attitudes serve as guides that reflect people's worldviews, preferences and attitudes. For example, we may display different attitudes towards a subject such as interest, love, tolerance, indifference, negativity or hatred. Attitudes are important factors that affect people's decision-making processes, social relations and behaviors ( Badem & Akyol, 2023) .

Some factors that you can consider when examining students' attitudes towards science lesson (Şenol et al., 2007; Hacıömeroğlu & Şahin, 2010; Hançer & Yalçın, 2007) :

**Engagement and motivation:** Students' interest and motivation towards the science lesson affects how willingly they follow the lesson and how much they participate in the learning process. You may be attributing students' interest in course content and topics to their daily lives, which they associate with science.

**Attitudes towards learning materials:** Students' attitudes towards materials (textbooks, visuals, videos, experiments, etc.) used in science lessons are also important. The fact that these materials are found interesting, understandable and effective by the students can positively affect the attitude towards the science lesson.

**Teaching methods and teacher influence:** Students' attitudes towards science lesson can also be related to teaching methods and teacher's attitude and influence. Students are more likely to have a more positive attitude in a classroom setting where the lesson is interactive, participatory and engaging.

**Achievement expectations:** Students' expectations of success in science courses can affect how much they care about the course and how much effort they put into it. Students with a high sense of self-confidence, achievement expectation, and self-efficacy generally have a more positive attitude towards science.

**Functionality of science lesson:** Students' ability to associate science lesson with their daily lives and understanding the functionality of the lesson enable them to find the lesson more meaningful. An approach that emphasizes practical applications of science, real-world examples, and problem-solving skills can make students find the lesson more interesting.

### **3. METHOD**

#### **3.1. Research Model**

This study is a quantitative research. Quantitative research refers to a systematic empirical approach used to collect and analyze numerical data to understand and explain phenomena. It involves collecting data that can be digitized, statistically analyzed and interpreted to draw conclusions or test hypotheses. Quantitative research generally follows a structured research design and uses specific data collection methods such as surveys, experiments or secondary data analysis (Karasar, 2011).

#### **3.2. Universe and Sample**

The universe of this study consists of secondary school students in a school in TRNC. The sample was determined by purposive sampling method. Purposeful sample is the sample of participants selected for a specific purpose or goal in a research. Purposeful sampling involves the researcher selecting participants based on certain criteria or characteristics while sampling in order to better understand the characteristics or behaviors of a particular population (Karasar, 2011). In this direction, the sample of the study consists of 70 students.

#### **3.3. Data Collection Tools**

The Science Lesson Attitude Scale was used as a data collection tool in the research. The Cronbach's Alpha ( $\alpha$ ) reliability coefficient of the scale developed by Akınoğlu (2001) was determined as 0.89. In the attitude scale, there are positive/negative sentences stating 20 judgments about students' attitudes towards science lesson. The scale, which consists of statements that determine whether students like the science lesson and whether they like to do activities related to this lesson, is in a 5-point Likert type. The Likert scale is used to determine to what extent the respondent approves of the judgments about a research. The respondent is given a 5-point and balanced (equally spaced) scale about judgment (Kartal, 1998).

#### **3.4. Analysis of Data**

Study data were analyzed with IBM SPSS Statistics 26.0 program. SPSS is a software package used for statistical analysis and data mining. Researchers, analysts, and students often choose SPSS for data analysis in fields such as social sciences, health sciences, and business.

### **4. Findings**

#### **4.1. Demographic Information**

Table 1 contains information about the students.

Table 1. Frequency and Percentage Distribution of Students' Information (N=70)

		N	%
Gender	Woman	39	55.7
	Male	31	44.3
Class	6th grade	22	31.4
	7th grade	32	45.7
	8th grade	16	22.9
	total	70	100.0

Accordingly, 55.7% of the students are female and 44.3% are male. 45.7% of the students are 7th grade students, 31.4% are 6th grade students and 22.9% are 8th grade students.

#### 4.2. Findings on Science Course Attitude

Table 2 shows the distributions for the Science Lesson attitude.

Table 2. Distributions for Science Lesson Attitudes (N=70)

Parameters	I strongly disagree		I do not agree		I'm undecided		I agree		Absolutely I agree	
	N	%	N	%	N	%	N	%	N	%
Science is one of my favorite subjects.	28	40.0	24	34.3	8	11.4	8	11.4	2	2.9
the subjects in science lessons were reduced.	40	57.1	18	25.7	10	14.3	2	2.9		
Engaging in science class entertains me	26	37.1	26	37.1	12	17.1			6	8.6
I get bored when I study science	20	28.6	22	31.4	20	28.6	8	11.4		
I enjoy having science class make me think .	24	34.3	20	28.6	18	25.7	4	5.7	4	5.7
I'm scared in science class	14	20.0	24	34.3	20	28.6	8	11.4	4	5.7
It is the best of science classes.	20	28.6	28	40.0	8	11.4	1	1.4	4	5.7
I don't like science class.	18	25.7	26	37.1	18	25.7	4	5.7	4	5.7
I enjoy solving a science class problem.	28	40	12	17.1	14	20	1	1.4		
Anything related to science interests me.	24	34.3	30	42.9	14	20.0	2	2.9		
If they let me, I will remove all science classes in school.	26	37.1	18	25.7	14	20.0	4	5.7	8	11.4
science the most	22	31.4	18	25.7	28	40.0			2	2.9
If possible, I would take another class instead of the science class.	14	20.0	18	25.7	30	42.9	6	8.6	2	2.9
science lesson homework without getting bored and with pleasure	36	51.4	12	17.1	10	14.3	6	8.6	6	8.6
I shy away from science class	22	31.4	26	37.1	14	20.0			8	11.4
Science subjects are not subjects I am interested in.	28	40	12	17.1	14	20	1	1.4		
with science subjects in my spare time	36	51.4	12	17.1	10	14.3	6	8.6	6	8.6

I don't believe that reading a book about science is a very useful job.	22	31.4	26	37.1	14	20.0		8	11.4
I like the classroom work and activities in the science lesson.	28	40.0	12	17.1	14	20.0	1 0	14. 3	6 8.6
Thinking in science class is boring.	2	2.9	8	11.4	18	25.7	1 6	22. 9	26 37.1

The subjects in science lessons were reduced” was 57.1% of the highest participation (N=40).

The lowest participation expressions are “Science lesson is among my favorite subjects”; “Among the courses, I like science the most.” And it was seen that the statements "I would take another course instead of the science course if possible" were at the level of "strongly agree" with 2.9% (N=2).

#### 4.3. Analysis of the Mean Scores of the Science Lesson Attitude Scale Level

Table 3. Distribution of Mean Scores of Science Lesson Attitude Scale Level (N= 70)

Parameters	$\bar{X}$	ss
Science class is one of my favorite subjects.	2.0286	1.11604
I would be happy if the subjects in science lessons were reduced.	1.6286	0.83703
Engaging in science class entertains me	2,0571	1,15327
I get bored when I study science	2.2286	0.99523
I enjoy having science class make me think .	2,2000	1.14967
I'm scared in science class	2.4857	1.11307
Science lessons are the best.	2.2857	1.19350
I don't like science class	2.2857	1.09204
Anything related to science interests me .	1,9143	0.81192
If they let me, I will remove all science classes in school.	2.2857	1.33126
, I like science the most.	2.1714	0.97760
If possible, I would take another class instead of science.	2.4857	1,00351
science lesson homework without getting bored and with pleasure	2,0571	1,33932
I shy away from science class	2.2286	1,22972
I enjoy solving a science class problem.	2.2286	1,22972
Science subjects are not subjects I am interested in.	2.3429	1,36079
I like to deal with science subjects in my spare time.	3,8000	1.14967
reading a book about science is a very useful job.	2,0571	1,33932
I like the classroom work and activities in the science lesson.	2.2286	1,22972
Thinking in science class is boring.	2.3429	1,36079
<b>AVERAGE</b>	<b>2,6700</b>	<b>1,15000</b>

In Table 3, the average score distribution of the Science Lesson Attitude Scale level is given. Accordingly, it was determined that the average of the attitude level calculated out of five was  $2.67 \pm 1.15$ . Strongly disagree "1", strongly agree "5" with the highest ( $3.80 \pm 1.14$ ) mean "I like to deal with science subjects in my spare time", whereas "Science" with the lowest ( $1.62 \pm 0.82$ ) mean "I would be happy if the subjects in the lessons were reduced".

#### 4.4. Descriptive Analyzes Between Demographic Variables and the Science Attitude Scale

In Table 4, the results of the analysis in which the science lesson attitude scale scores are compared according to gender are given.

Table 4. Comparison of Science Lesson Attitude Scale Scores by Gender

Gender	n	Median (IQR)	Group Comparison
Woman	39	47.33 (10.43)	Z= 0.16; p=0.385
Male	31	46.38 (9.90)	

p>0.05

It was tested whether the difference between the groups according to the gender variable of the Science Lesson Attitude Scale scores was significant, and it was seen that the difference between the groups according to the gender of the scale scores was not significant (p>0.05). Accordingly, it can be said that the attitudes of male and female students towards science lesson are at a similar level.

In Table 5, the results of the analysis in which the science lesson attitude scale scores are compared according to the class variable are given.

Table 5. Comparison of Science Lesson Attitude Scale Scores by Class Variable

Class	n	Median (IQR)	Group Comparison
6th grade	22	47.45 (11.75)	$\chi^2 = 0.59$ ; p=943
7th grade	32	46.84 (9.11)	
8th grade	16	46.31 (10.33)	

p>0.05

It was tested whether the difference between the groups according to the grade variable of the Science Lesson Attitude Scale scores was significant, and it was seen that the difference between the groups according to the grade variable of the scale scores was not significant (p>0.05). Accordingly, it can be said that the attitudes of the students towards the science lesson are at a similar level, regardless of class.

### Conclusion and Recommendations

At the end of the research, it is seen that 57.1% "strongly disagree" was answered to the statement "I would be happy to reduce the subjects in science lessons". This shows that students are dissatisfied with the reduction of subjects in science lessons. In addition, 2.9% of the respondents "strongly agree" were given to the statements "Science is among my favorite subjects", "I like science the most" and "I would take another course instead of science if possible". This shows that students have a positive attitude towards science lesson and they like or prefer science lesson. These ratios reflect students' attitudes towards science lesson. The negative or positive reaction rates of students to some statements can be evaluated to understand their attitudes towards science lesson. This information can be an important resource for understanding how science is perceived among students and students' attitudes towards science.

Information was given about the average score distribution of the Science Lesson Attitude Scale and the average of the attitude level. It was determined that the average of the attitude level calculated out of five was  $2.67 \pm 1.15$ . The highest mean score belongs to the statement "I like to deal with science subjects in my spare time", and the mean score given to this statement was determined as  $3.80 \pm 1.14$ . This shows that students generally like to deal with science subjects in their spare time. The lowest average score belongs to the statement "I would be happy to reduce the subjects in science lessons", and the average score given to this statement was determined as  $1.62 \pm 0.82$ . This shows that students are generally not happy or dissatisfied with the reduction of subjects in science lessons. This distribution of scores and mean values reflect students' attitudes towards science lesson and their reactions to different expressions. Analysis of students' attitudes towards science is important information to understand the science education process, to make improvements when necessary, and to increase students' motivation.

It was tested whether the difference between the groups according to the gender variable in the Science Lesson Attitude Scale scores was significant, and it was seen that the difference between the groups according to the gender of the scale scores was not significant. Based on these results, it can be said that the attitudes of male and female students towards science lesson are at a similar level. In other words, it is seen that gender does not have a statistically significant effect on science lesson attitudes. Such analyzes allow researchers to understand how

attitudes towards science change by gender and to identify differences in attitudes among different groups. In this case, it can be said that male and female students show a similar level of interest in science, since as a result of the analysis, it is seen that gender does not have a significant effect on attitudes towards science.

It was tested whether the difference between the groups according to the grade variable of the Science Lesson Attitude Scale scores was significant, and it was seen that the difference between the groups according to the grade variable of the scale scores was not significant. Based on these results, it can be said that students' attitudes towards science lesson are at a similar level regardless of class. In other words, it is seen that grade level does not have a statistically significant effect on science lesson attitudes. Such analyzes allow researchers to understand students' attitudes towards science at different grade levels and to identify differences in attitudes between classes. However, in this case, it can be said that the students exhibit similar attitudes at different grade levels, as it was seen as a result of the analysis that the grade level did not have a significant effect on the attitudes towards the science lesson.

Here are some suggestions to help students develop positive attitudes towards science:

**Explaining the importance of science lesson to students:** It is emphasized how science lesson is related to daily life and why it is important. It should be noted that science forms the basis of technologies used in daily life and plays a critical role in finding solutions to problems.

**Provide hands-on experiences:** Students should be offered hands-on experiences such as laboratory experiments, observation activities, field trips to embody science topics. This will help students find their science lessons more interesting and meaningful.

**Using relevant and interesting materials:** Interesting videos, images, animations and interactive materials should be used in the lessons. This will attract students' attention and increase their motivation to learn.

**Encouraging student participation :** Students should be encouraged to participate actively in the classroom. Students should be actively involved in science subjects by asking questions, organizing group work, or allowing for discussion.

**Students should be shown real-world applications of science:** Students should be attracted by explaining real-world applications of science with examples. For example, the use of science in environmental protection, energy efficiency or health should be demonstrated.

**Encourage students' questions:** Encourage students to ask questions about the science lesson and seek answers to these questions. It should be ensured that students discover the subjects they are curious about and understand the science lesson more deeply.

**Positive feedback and rewards should be used:** Students' success in science should be recognized and appreciated. Motivation of students should be increased by giving positive feedback. In addition, students should be encouraged to develop positive attitudes by creating reward systems based on their achievements.

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