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Determination of 7th Grade Students' Thoughts of the Science Course

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Abstract

This research aims to identify the opinions of 7th grade students studying at private and public middle schools regarding the science course. The survey model was used in the study. The study group consisted of a total of 1070 students, including 120 students from the 7th grades of 3 private middle schools and 950 students from the 7th grades of 25 public middle schools located in the center of Kars. The "Interview Form on 7th Grade Students' Opinions Regarding the Science Course", consisting of five structured interview questions, was used as a data collection tool. The students answered the questions in written form. Students' written responses were read repeatedly by the researcher, and students' thoughts were identified through both predefined and emerging explanatory and inferential codes during the analysis process. The study found that the students attending private middle schools mostly expressed the following opinions regarding the science course: that it is a great and enjoyable course, and they like the course and their teachers. The study found that students studying at public middle schools mostly stated that science is a nice and enjoyable course, they like the course, and that during the course they feel excited, happy, curious and discover themselves.

Keywords: Science course; private middle school; public middle school; student opinions

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1. Introduction

Today, countries are developing policies to equip individuals with the knowledge and skills appropriate to the needs of the age in order to rank high in the global competition in science and technology, and in this context, they are undertaking various initiatives to improve the quality of science education (Ayas, 1995). Individuals who receive education in the field of science can offer more rational and applicable solutions to the problems they encounter in daily life by using scientific methods and techniques (Kaptan, 2006). Science education is a learning area that allows individuals to understand natural phenomena in depth by using their creativity and imagination (Çil & Çepni, 2016). Given that science is a field of learning that systematically examines observable natural phenomena and strives to predict phenomena that have not yet been observed, science courses have taken their place in school curricula (Çepni, 2023). The main goal of this course, which has taken its place in the curriculum, is to raise scientifically literate individuals who interpret science correctly (Akgün, 2000; Korucuoğlu, 2008; Balbağ et al., 2016). Science is a course that allows students to access information, internalize the information they have acquired and transfer it, thus equipping them with higher-order thinking skills (Doğru & Aydoğdu, 2003). The science course is an engaging subject that addresses students' needs, contributes to various aspects of their lives, and covers topics ranging from themselves as individuals in their daily lives to the universe (Aktamış & Dönmez, 2016; Gürdal, 1988). The science course encompasses a broad content that includes various disciplines such as physics, chemistry, biology, astronomy, and environmental sciences (Soğukpınar & Karışan, 2022). Science course is a course that aims to provide students with knowledge about situations they may encounter in their daily lives, as well as to develop their problem-solving abilities, acquire scientific thinking skills, and follow scientific-technological developments (Pınarbaşı et al., 1998). In recent years, transformations in education and industry have led to radical changes in the content of science courses and an expansion of their scope (Akgündüz & Bağdiken, 2018). Science is a subject that students find increasingly challenging as they progress through grade levels, starting from primary school (Tuncel & Fidan, 2018). Therefore, science instruction should not merely involve the definitional presentation of abstract concepts, but should instead be supported with instructional materials that allow students to visualize and experience these concepts (Kurt, 2006). In order for the science course to achieve its intended outcomes at the highest level, it is essential first to identify and understand students' perspectives towards this subject. This research aims to determine the opinions of the 7th students regarding the science course. By identifying students' thoughts about the science course, the strengths of the course can be reinforced, and its weaknesses can be addressed. For this reason, it is believed that this research can guide future research aimed at improving science course instruction.

2. Method

2.1. Research design

The study employed a survey model. In the survey model, information is collected from individuals participating in the study by having them answer the questions (Böke, 2009). In the survey model, the responses of a large number of participants to structured interview questions are compiled and reported (Büyüköztürk et al., 2008).

2.2. Research participants

A total of 1070 students participated in the study, 120 of whom were studying in the 7th grade of 3 private middle schools, and 950 of whom were studying in the 7th grade of 25 public middle schools located in the center of Kars, participated in the study.

2.3. Data collection tools

"The Interview Form on 7th Grade Students' Opinions Regarding the Science Course", which was prepared by Yazgan Sağ (2016) and consists of five structured interview questions adapted to the science course, was used as the data collection tool in the study. The questions on the form were reviewed by four faculty members who are experts in science education.

The questions on the interview form are as follows:

1. What are your thoughts on the science course?
2. Are there any behaviors or situations that influence the development of positive feelings toward the science course?
3. What behaviors/situations influence your development of positive feelings about science?
4. What behaviors/situations are effective in developing negative feelings about science class?
5. In your opinion, how should the science course be taught?

2.5. Implementation process

First, the necessary permissions for the research were obtained from the ethics committee of the university where one of the researchers worked and from the Provincial Directorate of National Education. Following that, the implementation phase of the research was initiated. The research was conducted over a period of one month. The structured interview form was printed in sufficient quantity to match the number of

students participating in the study. The study was first conducted with students in private middle schools and then with students in public middle schools. Before distributing the interview forms to the 7th grade students in all middle schools, they were informed about the purpose of the study. Students responded to the questions on the distributed interview forms in writing during a 40-minute science lesson. At the end of the lesson, the researcher collected the forms and checked whether the students had answered all the questions. The researcher redistributed the forms to students who did not answer all the questions and asked them to answer the remaining questions. The study was then implemented in both private and public middle schools.

2.6. Data analysis

In the study, the researcher repeatedly read the written responses of 1070 students in private and public middle schools to the questions in the interview form, and attempted to determine the situations using the descriptive-inferential codes that were determined beforehand and emerged during the analysis of the data (Miles & Huberman, 1984). During the data analysis process, the "researcher triangulation technique" was used (Johnson & Christensen, 2004), and the analyses were reviewed by three expert researchers. The experts discussed the reliability and consistency of the data analysis. The consistency percentage among the analyses of the three researchers was found to be 82%. The expert researchers continued discussions on inconsistent data segments until a consensus was reached.

3. Results

In the7th grade students' thoughts on science, the aspects of the course that they find positive and negative, their thoughts on how science should be taught, and the frequencies of these thoughts (f) are presented in tables. Each table is followed by explanatory text related to the data.

The student responses to the question "What are your thoughts about the science course?" and their frequencies are shown in Table 1.

Table 1. Students' opinions about the science course

PRIVATE MIDDLE SCHOOLS		PUBLIC MIDDLE SCHOOLS	
Students' Opinions	f	Students' Opinions	**f**
It is a great/nice course	35	It is a great/nice course	613
The classroom environment is good	18	It is fun	514
It is fun	14	It is my favorite course	497
I like my teacher	13	I feel excited	356
Noisy classroom /distracting	11	I am curious	349
Nothing	9	I learn well	309
It is my favorite course	8	I like my teacher	258
It is difficult	6	It is difficult	179
It is easy	6	I feel happy	158
I am curious	5	Experiments intrigue me	126
I do not like some topics	4	I discover myself	117
I enjoy it	4	It is not taught in an engaging way	115
It is boring	2	I dislike the mathematical aspects	106
I feel happy	2	Noisy classroom/distracting	98
Experiments intrigue me	2	I do not have any feelings	92
I feel excited	2	I feel relaxed	72
I feel relaxed	1	It is boring	67
It is not taught in an engaging way	1	It is easy	65
The lesson does not run smoothly	1	I do not like some topics	48
I learn well	1	I enjoy it	45
		The lesson does not run smoothly	42
		The classroom environment is good	32

An examination of Table 1 reveals that, 35 students studying in private middle schools stated that the course was great/nice, 18 students stated that the classroom environment was good, 14 students stated that the course was fun, 13 students liked their teachers, 11 students stated that they were distracted due to the noise in the classroom, 9 students stated that they did not feel anything about the lesson, 8 students stated that their favorite subject was science, 6 students stated that the course was difficult, 6 students stated that the course was easy, 5 students stated that they were curious about the course, 4 students stated that they did not like some of the subjects, 4 students stated that they enjoyed the course, 2 students stated that they found the course boring, 2 students felt happy in the lesson, 2 students stated that they were intrigued by the science experiments, 1 student stated that the lesson was not taught in an engaging way, 2 students felt excited in the lesson, 1 student stated that he felt relaxed in the lesson, 1

student stated that the lesson did not run smoothly and 1 student stated that they learned the subjects well in the course. According to Table 1, 613 students studying in public middle schools said that the course was a great/nice course, 514 students found the course fun, 497 students thought science was their favorite course, 356 were excited about the course, 349 students were curious about the course, 309 students learned the units/topics well in the course, 258 students liked their teachers, 179 students stated that the course was difficult, 158 students felt happy in the course, 126 students were intrigued by the experiments conducted in the course, 117 students stated that they discovered themselves in the course, 115 stated that the course was not taught in an engaging way, 106 students disliked the topics including mathematical units/aspects, 98 students stated that they were distracted in the course due to the noise in the classroom, 92 students did not have any feelings regarding the course, 72 students felt relaxed in the course, 67 students stated that they found the course boring, 65 students stated that they found the lesson easy, 48 students did not like some of the topics, 45 students enjoyed the course, 42 students stated that they did not think that the course ran smoothly, and 32 students expressed their opinions that the classroom environment was good during the course.

The students' responses and the frequency of their answers to the question "Are there any behaviors or situations that influence the development of positive feelings toward the science course?" are presented in Table 2.

Table 2. Students' opinions on whether there are behaviors/situations that influence the development of positive feelings toward the science course

PRIVATE MIDDLE SCHOOLS		PUBLIC MIDDLE SCHOOLS	
Students' Opinions	f	Students' Opinions	**f**
Yes	71	Yes	585
No	35	No	205
No Idea	3	No Idea	103
Empty	7	Empty	92

An examination of Table 2 reveals that 71 students attending private middle schools reported experiencing positive feelings toward the science course, while 35 students reported negative feelings, and three students did not have any opinions regarding the course. According to Table 2, among students attending public middle schools, 585 expressed positive feelings toward the science course, 205 reported negative feelings toward the science course, and 103 reported that they did not have any feelings regarding

the course. 7 students from private middle schools and 92 students from public middle schools left this question blank.

The student responses to the question, "What behaviors/situations are effective in developing positive feelings about science?" and their frequencies are presented in Table 3.

Table 3. Students' thoughts on behaviors/situations that are effective in developing positive emotions toward the course

PRIVATE MIDDLE SCHOOLS		PUBLIC MIDDLE SCHOOLS	
Students' Opinions	f	Students' Opinions	f
Fun activities	16	Liking the teacher	624
Experiments	15	Experiments	587
Liking the teacher	10	Fun activities	358
Understanding/Learning	5	Projects	254
Teachers' use of humor	3	Curiosity about space	204
Projects	2	Related to daily life	119
Logical reasoning	2	Logical reasoning	94
Solving questions	2	Talking	72
Related to daily life	2	Helps me forget my troubles	64
Microscope	1	Microscope	51
Helps me forget my troubles	1	Understanding/Learning	35
Revision	1	Solving questions	31
		Revision	26
		Teachers' use of humor	21
		I enjoy doing research	16

An examination of Table 3 reveals the behaviors and situations that influence students' development of positive feelings toward the science course, it was revealed that among students attending private middle schools, 16 students reported that they engaged in fun activities in the lesson, 15 students stated that they conducted experiments in the science course, 10 students stated that they liked their teachers, 5 students stated that they understood and learned the topics well, 3 students stated that their teachers used humor in the lessons, 2 students pointed to working on projects in the lesson, 2 students stated that they were able to use logical reasoning in the lesson, 2 students stated that they solved questions in the course, 2 students stated that they established connections between science topics and daily life, 1 student mentioned that they used a microscope in the course, 1 student stated that they did revision in the course and 1 student stated that the lesson helped them forget their troubles. According to Table 3, regarding the behaviors/situations that were effective in developing positive emotions towards science course, it was found that 624 students studying in public middle schools stated that they liked their teachers, 587 students stated that they conducted

experiments in the science course, 358 students stated that they organized fun activities, 254 students cited that they did projects, 204 stated that they had a curiosity about space, 119 students stated that they could establish connections between science units/topics and daily life, 94 students stated that they were able to use logical reasoning in the classroom, 72 students stated that they expressed themselves in class, 64 students forgot about their troubles in the course, 51 students cited that they used a microscope in class, 35 students understood and learned science units/topics, 31 students mentioned that they solved questions in class, 26 students stated that they did revision of units/topics in class, 21 students stated that their teachers used humor in class, 16 students cited that they enjoyed doing research on science units/topics.

The students' responses to the question "What are the behaviors/situations that have influenced your development of negative emotions regarding the science course?" and the frequencies of the responses are presented in Table 4.

Table 4. Students' thoughts on behaviors/situations that contribute to developing negative feelings toward the course

PRIVATE MIDDLE SCHOOLS		PUBLIC MIDDLE SCHOOLS	
Students' Opinions	f	Students' Opinions	f
Some topics are too difficult	13	We write too much, it does not feel like we are in a lesson	385
The classroom is noisy	6	Some topics are too difficult	354
The teacher	6	Failing in exams	246
It is boring	5	The classroom is noisy	219
Not understanding the lesson	4	Not understanding the lesson	201
Failing in exams	3	It is boring	121
We write too much, it does not feel like we are in a lesson	2	Based on rote memorization	87
My question not being answered	1	Teachers	35
Based on rote memorization	1	My question not being answered	24

An examination of Table 4 reveals the behaviors/situations that contribute to student developing negative feeling toward the science course, it was determined that 13 students studying in private middle schools stated that some topics are too difficult, 6 stated that the classroom is noisy from time to time, 6 students cited the teacher factor, 5 students mentioned that the course is boring, 4 students stated that were not able to understand the lesson, 3 students cited failing in the exams, 2 students stated that the course did not feel like a lesson because they wrote a lot, 1 student stated that their questions were not answered by the teacher, and 1 student mentioned that some science units/topics in science are based on rote memorization. Table 3 presents the behaviors/situations that contributed to the development of negative feelings toward science classes, accordingly, 385 students in public middle schools stated that they did not feel like they were in a

lesson because they wrote too much in the science course, 354 students stated that some science units/topics are too difficult, 246 students cited failing in the exams, 219 students mentioned that their classroom is noisy, 201 students were not able to understand the lesson, 121 students stated that the course was boring, 87 students mentioned that some units/topics were based on rote memorization, 35 students cited the teacher factor, and 24 students stated that their questions were not answered by the teacher.

Student responses and frequencies to the question "How do you think science classes should be taught?" are presented in Table 5.

Table 5. Students' opinions on how the course should be taught

PRIVATE MIDDLE SCHOOLS		PUBLIC MIDDLE SCHOOLS	
Students' Opinions	f	Students' Opinions	f
More experiments should be done	19	By making the students take memorable notes instead of writing excessively	613
The topic should be taught, reviewed, and then practiced with tests	14	With experiments	511
Through activities (homework, projects)	13	Through activities (homework, projects)	423
Through technology (smartboard, tablets, etc.)	10	Through games	326
Memorable notes should be taken without excessive writing	6	It can be made more fun	273
Teachers should motivate the students	5	Via the coursebook	214
Through drawing/demonstrating related visuals	5	By using materials	196
Topics should be taught from the textbook	4	In the laboratory	189
Through games	2	Through topics without calculations (not involving mathematical expressions)	182
Through relating them to daily life and concrete events	2	The topic should be taught, reviewed, and then practiced with tests	159
Through the use of materials	1	Teachers should motivate the students	142
The curriculum should not change every year	1	Through technology (smartboard, tablets, etc.)	109
Through creating a competitive environment through contests	1	Through relating them to daily life and concrete events	75
Through topics without calculations (not involving mathematical expressions)	1	Lesson hours should be increased	17
Lesson hours should be increased	1	By maintaining eye contact with students	16
By maintaining eye contact with students	1	The curriculum should not change every year	14

An examination of Table 5 reveals the opinions of students studying in private middle schools on how the science course should be taught, accordingly, it was revealed that 19 students stated that more experiments should be done, 14 students said the topic should be taught reviewed, and then practiced with tests, 13 students mentioned that there should be more activities such as homework or projects in the science course, 10 students stated that technological tools such as a smartboard or tablets should be used more, 6 students stated that more memorable notes should be taken instead of excessive writing,

5 students stated that science teachers should be motivated, 4 students stated that units should be followed from the textbook, 2 students stated that science topics should be taught through games, 2 students mentioned that science units/topics should be made concrete by relating them to daily life, 1 student cited that materials should be used in the lesson, 1 student stated that the curriculum should not change every year, 1 student stated that the course should be taught through drawing/demonstrating related visuals, 1 student cited that a competitive environment should be created by holding competitions in class, 1 student stated that units/topics that do not involve mathematical expressions should be covered the course, 1 student stated that the science class hours should be increased, and 1 student stated that teachers needed to maintain an eye contact while lecturing.

Table 5 presents the opinions of students studying in public middle schools on how the science course should be taught, accordingly, 613 students stated that making the students take short and memorable notes rather than excessive writing was necessary, 511 students stated that more experiments should be conducted in class, 423 students stated that activities such as homework and projects should be done, 326 students cited that science units/topics should be taught through games, 273 mentioned that the lessons needed to be made more enjoyable, 214 mentioned that units/topics needed to be taught via the textbook, 196 stated that materials should be used in the lesson, 189 students stated that the science course should be taught in the laboratory, 182 students mentioned that the topics should be taught without calculations (not involving mathematical expressions), 159 students cited that the topic should be taught, reviewed and then practiced with tests, 142 stated that their teachers needed to be motivated, 109 students mentioned that technological tools such as a smartboard or tablets should be used in the course, 75 students stated that science units/topics should be made concrete by relating them to daily life, 17 students mentioned that the science lesson hours needed to be increased, 16 students stated that teachers needed to maintain an eye contact while lecturing, and 14 students stated that the curriculum should not change every year.

4. Discussion

Some studies with similar results have been found in the literature. Çetin & Şengezer (2013) found that project activities in science classes contribute to middle school students' ability to solve real-life problems. Maya & Bacanak (2013) found that science teachers play a significant role in developing middle school students' scientific literacy. Aktamış & Dönmez (2016) found that middle school students have metaphorical perceptions of science as enjoyable, fun, broad, complex, encompassing many components such as science, experiments, life and the world. Bozdoğan & Kavcı (2016) found that middle school students had positive attitudes towards activities conducted outside the classroom environment, such as laboratories. Uzun & Paliç Şadoğlu (2016) found that 8th grade middle school students believed that science courses were important, necessary and

useful for them, that science courses were focused on understanding daily life and exams, but that the frequency of the experiments was insufficient. Yıldırım et al. (2016) found that 6th and 7th grade middle school students found project-based activities educational and stated that they learned many new things through such activities. Çavuş & Balçın (2017) found that middle school students evaluated the teaching of science topics through games positively. Genç et al. (2017) found that when science lessons are related to daily lives, students find the course educational, beneficial and believe it promotes better learning and enhances academic success. In the study of Güldemir & Çınar (2017), it was revealed that middle school students expressed positive opinions regarding the use of activities in science class. Tuncel & Fidan (2018) found that middle-class students wanted technology to be used predominantly in science lessons and believed that topics/units should be taught through experiments and games. According to Yazıcı & Kurt (2018), the use of laboratories in science classes increased middle school students' attention and interest in the subject and helped make the lesson less boring. In the study of Subaşı (2020), it was determined that gifted students enjoyed science classes, did not have difficulties with the subject, believed that visual materials should be used in science lessons, and that exam questions should not only test factual knowledge but also include items that develop reasoning skills. In their study, Kılıçel & Ertaş Kılıç (2021) concluded that when science topics/units were taught through games, students found the learning process enjoyable and experienced emotions such as fun, happiness, joy and excitement. Soğukpınar & Karışan (2022) reported that 7th grade middle school students perceived science lessons as informative and educational, especially when experiments were conducted and astronomy-related content was included.

5. Conclusions

The findings obtained from the research are presented below.

Regarding their opinions about science, it was determined that most 7th grade middle school students attending private middle schools found science to be a good-nice course, that they found the classroom environment pleasant, that the course was enjoyable, that they liked their teachers, that they sometimes got distracted due to classroom noise, that science was their favorite subject, that they found the course easy, that they disliked some of the topics, and that they enjoyed the course.

Regarding their opinions about science, it was determined that the majority of 7th grade middle school students attending public middle schools found science to be a goodnice course, that it was enjoyable, that science was their favorite subjects, they were excited about the course, that they were curious about the course, that they learned the subjects well, that they liked their science teacher, that the lesson was difficult, that they were happy in the lesson, that the experiments they conducted in the course were interesting, that they discovered themselves in the course, that the course was not taught

in an engaging way and that they disliked units/topics that required mathematical expressions.

It was determined that the majority of 7th grade students in both private and public middle schools developed positive feelings toward science.

Regarding their opinions on the behaviors/situations that are effective in developing positive emotions towards the science course, it was found that the majority of the students studying in private schools cited to organizing fun activities in science class, doing experiments, liking their teachers, understanding the course, learning the subjects, doing projects in class, their teachers being humorous in class, being able to use logical reasoning in class, solving questions, and the lesson being related to daily life.

Regarding their opinions on the behaviors/situations that are effective in developing positive emotions towards the science course, it was found that the majority of the students studying in public schools cited liking their teachers, conducting experiments, organizing fun activities, conducting projects, being curious about space, having units/topics related to the daily life, using logical reasoning, expressing themselves, forgetting their own troubles, using a microscope, understanding the lesson, solving questions and doing revisions.

The study also found that 7th grade students in both private and public middle schools developed negative feelings toward science.

Regarding the question about situations that cause students to develop negative feelings toward the science course, the majority of the students studying in private middle schools cited that some science units/topics are too difficult, the classroom is noisy from time to time, the teacher factor, the course being boring, they could not understand the lesson, they failed in exams, it did not feel like lesson because they wrote a lot, the teacher did not answer their question from time to time and that the course was based on rote-memorization.

Regarding the question about the situations that cause students to develop negative feelings toward the science course, the majority of the students studying in public middle schools cited that the course did not feel like a lesson because they wrote too much, some science topics were too difficult, they failed the exams, they could not follow the lesson because it was noisy in the classroom, the course was boring, the course was based on rote memorization, the teacher factor and their teacher did not answer the questions.

Regarding the question of how science lessons should be taught, the majority of the students studying in private middle schools cited that more experiments should be conducted in science lessons, units/topics should be taught first, then repeated and then practices with tests, there should be more activities such as homework or projects, technological tools such as smart boards and tablets should be used more, science units/topics should be taught through games, teachers should have students write short

and memorable notes, that science topics should be made more concrete by associating them with daily life and materials should be used in the course.

Regarding the question of how science classes should be taught, the majority of the students studying in the public middle schools stated that the teachers should have students write down short and memorable notes, more experiments should be conducted in the lesson, activities such as homework and projects should be done, science units/topics should be taught through games, science units/topics should be taught through engaging the students, units/topics should be taught via the textbook, materials should be used in the lesson, science lessons should be conducted in the laboratory, units/subjects that do not involve mathematical expressions should be covered, units/ topics should be covered first, repeated and practiced with tests, their teachers needed to be motivated, technological tools such as smart boards and tablets should be used more, science topics should be made more concrete by associating them with daily life, lesson hours of science lessons should be increased, teachers should make eye contact with students while lecturing and the curricula should not be changed every year.

The following recommendations can be made based on the results of the study.

1- Studies can be conducted to determine the opinions of middle school students in different provinces of Turkey regarding science courses. This can address deficiencies in science courses.

2- This study identified 7th grade students' opinions on science. Studies could be conducted to determine students' views on science courses at different grade levels (5th, 6th and 8th grade)

3- Studies could be conducted to identify students' views on subjects other than science, such as Social Studies, Mathematics, Turkish and English.

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