

Identifying the Subjects in Which Sixth-Grade Students Have Difficulty Learning in Science Lessons, as well as the Causes of the Problems and Possible Solutions*

Emre YILDIZ** Umit SIMSEK***

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Abstract: This research aimed to determine the subjects that sixth-grade students have learning problems, the reasons for the problems, and the suggestions for the solution to the problems. The convergent parallel design was adopted in the study. In the 2016-2017 academic year, 1959 sixth-grade students in Erzurum and 141 science teachers who teach at this grade level were studied. The data were collected through the "Identifying Learning Problems" and "Teacher Determining Learning Problems Opinion" questionnaires. Descriptive statistics were used in the analysis of quantitative data, and content analysis was used in the analysis of qualitative data. It was determined that the students experienced the problems in Curriculum System and Force and Motion subjects, learning difficulties, low motivation, increased anxiety, and non-persistent knowledge. It was concluded that this is because the subject is difficult, memorization, confusing concepts, the class/topic is boring, they are stressed, they are not allowed to learn on their own, the teachers themselves explain the subject, and there are not enough activities. It can be suggested that the lessons aimed at solving the learning problems experienced by students are taught with games, creating fun learning environments, simplifying the subject, and having more communication between students and teachers.

Keywords: Learning problems, motivation, anxiety, retention of knowledge.

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**  Corresponding Author: Ataturk University, Türkiye, emre.yildiz@atauni.edu.tr

***  Ataturk University, Türkiye, simsekum@atauni.edu.tr

Introduction

Human beings have made an effort to have knowledge in every period of their existence from the past to the present such as the efforts to make sense of the environment in the early ages, ploughing, cultivating, and ways of achieving greater yields in agricultural societies, the production and maintenance of machines that will produce in industrial societies and ways of making more production, and technology production, marketing and revealing its higher model in technology societies. In today's information societies, they are in an effort to produce information, reach existing information, process information and transform it into new forms. It is important to raise individuals who can adapt to the conditions of the period in every period. For this reason, the educational needs of each period differ from each other. Today's information societies aim to raise individuals who research, question, think critically, produce information, transform existing information into new forms, and learn. For this reason, activities that will develop such skills should be included in the education offered to individuals. The quality of education should be high for individuals to achieve the desired efficiency from education.

Students' problems during learning reduce the quality of education, and the desired efficiency cannot be obtained from education (Yildiz & Simsek, 2020). From the point of view of science learning, students show more interest in some science subjects and learn these subjects more easily. However, not every subject successfully attracts students' attention and students cannot learn every subject at the same level. While learning some subjects, there are more difficulties compared to other subjects, students' motivation decreases, their anxiety levels increase and they cannot acquire permanent knowledge (Cavus, et al., 2011; Karamustafaoglu & Kaya, 2013; Kaya & Elgun, 2015). The difficulties experienced by the students further reduce their motivation and increase their anxiety, and this situation affects each other mutually. These learning problems experienced by students during learning cause misconfiguration of concepts in their minds and, as a result, conceptual difficulties (Baki, 1999). Because students misunderstand concepts and give them new meanings on their own, the foundations of the subjects they will learn in the next level are weak, new concepts are misunderstood, and they have trouble connecting concepts to their everyday lives (Buyruk & Korkmaz, 2016). This situation leads to the emergence of behaviors called misconceptions (Baki, 1999).

It is seen that there are many studies in the literature examining the misconceptions of students. In a study by Bulus-Kırıkkaya and Gullu (2008), it was determined that the fifth-grade students had many misconceptions about heat, temperature, evaporation, and boiling. Again, many studies on this subject have revealed that students have many misconceptions about heat and temperature (Ericson & Tiberghien, 1985; Gonen & Akgun, 2005; Kesidou & Duit, 1993). Students in high school and university had misconceptions about heat and temperature, according to a study done by Aydogan, Günes, and Gulcicek (2003), and it was stressed that if students' early mislearning was not corrected, it would Bacanak, Kucuk, and Cepni (2004), in their study, determined

that fifth and eighth-grade students studying in Trabzon have misconceptions about photosynthesis and respiration. Sensoy, Aydogdu, Yildirim, Usak and Hancer (2005) determined that sixth, seventh and eighth-grade students had misconceptions about photosynthesis. The research conducted by Tekkaya and Balci (2003) revealed that first and third-year high school students have misconceptions about photosynthesis and respiration. Using the Vee diagram technique, Kırılmazkaya and Kirbag Zengin (2016) found that pre-service science teachers have misconceptions about photosynthesis. Koray, Ozdemir, and Tatar (2005) found that sixth, seventh and eighth-grade students had misconceptions even though they learned the concepts of weight and mass in the fourth grade. Similarly, high school students have misconceptions about their strength (Hise, 1988; Kuru & Gunes, 2005; Sadanand & Kess, 1990). Atasoy and Akdeniz (2007) found that pre-service science teachers had misconceptions about Newton's Laws of Motion, while Eryilmaz and Tatli (2000) found that METU first-year students had misconceptions about introduction to mechanics. When looking at the research in the literature, it is clear that students' mislearning in the lower classes leads to misconceptions in the upper grades.. In the given studies, it is seen that the misconceptions are not on a single subject, and there are misconceptions on different subjects. This situation shows that students have wrong learning in different subjects. Therefore, it can be said that students experience learning problems in different subjects during learning.

The common point of these studies is to determine the subjects in which the students' misconceptions are experienced, but not to reveal any results about the reasons and solution suggestions. Literature studies mostly focused on students' misconceptions and studies that identified learning problems that cause these misconceptions remained in the background. To prevent students from having misconceptions, it is important to identify and eliminate the learning problems that cause them. In this regard, it is important to investigate the cause of the problem and determine the issue where the problem is experienced and get suggestions from the people who have the problem for a solution. For this reason, it is thought that this research will make an important contribution to the literature in terms of examining the problem experienced, the reasons for experiencing problems, and solution suggestions as a whole.

This research was carried out in order to determine the problems that secondary school sixth-grade students experience in science lessons, such as difficulty in learning, decrease in learning motivation, increase in learning anxiety, and lack of permanence of knowledge, the reasons for experiencing these problems and solution suggestions. The problem statement of the study was "What are the learning problems such as learning difficulties, decreased motivation to learn, increased learning anxiety, and inability to acquire lasting knowledge in science classes, what are the reasons for learning problems in these subjects, and what are the proposed solutions?" and answers to the following research questions were sought: In which subjects do secondary school sixth-grade students have learning problems in the science lesson and what are the reasons for these problems?

1. In what subjects do teachers think students have learning problems in science classes, and what are the reasons for these problems? What are the teachers' practices in teaching the subjects that students have learning problems and what are their suggestions for the solution to these problems?
2. What are the suggestions for the solution of the learning problems experienced by the students in the science lesson?

Method

The parallel design, which converges from the mixed-method designs, was adopted in the research. This design is a design in which the researcher carries out the quantitative and qualitative data collection process simultaneously, combines the obtained data in general interpretation, and both processes are co-dominant (Creswell & Plano-Clark, 2015/2011). The research aimed to examine the subjects that students have learning problems, the reasons for having problems in these subjects, and the solution proposals, and data collection processes related to these were carried out simultaneously. In addition, quantitative and qualitative data are equivalent to each other. For this reason, the use of this design was preferred since it was thought that the most suitable design for the purpose of the research was the convergent parallel design.

Universe and Sample

The universe of the research consisted of students attending the sixth grade and actively working with science teachers throughout the province of Erzurum in the 2016-2017 academic year. The universe consisted of 4 units: secondary school (SS), imam hatip secondary school (IHSS), regional boarding secondary school (RBSS), and private secondary school (PSS). Of the 13908 (100%) sixth grade students in the population, 10655 (76.55%) had SS, 1391 (9.99%) had IHSS, 1459 (10.48%) had RBSS, and 403 of them (2.90%) continued to PSS. Of the 518 (100%) science teachers in the universe, 405 (78.18) of them were in SS, 45 (8.69%) in IHSS, 47 (9.07%) in RBSS, and 21 (4.05%) of them were working in PSS.

The stratified purposive sampling method was used while selecting individuals for sampling from the universe. First of all, the distribution ratios of the individuals in the universe to SS, IHSS, RBSS, and PSS units were determined. The number of individuals was determined so that the ratios of the unit distributions in the sample were the same as the population unit distribution ratios by paying attention to these ratios while selecting the sample individuals (Buyukozturk, et al., 2015). While determining the sample size for the research, the values calculated by the G-Power program were taken as a basis. According to the calculations made in this program, the sample size is $n=377$ when the population size is $N=20000$, and the sample size is $n=217$ when the population size is $N=500$ (Christensen, et al., 2014/2015). However, the number of individuals included in the sample was increased to increase the sensitivity. Of the 1959 (100%) sixth grade students included in the sample, 1500 (76.55%) had SS, 196 (9.99%) had IHSS, 206 (10.48%) had RBSS, and 57 (2.90%) continued PSS. Of 252 (100%) science teachers

selected for sampling, 196 (78.18%) of them were in SS, 22 (8.69%) in IHSS, 23 (9.07%) in RBSS, and 11 (4.05%) of them were working in PSS. The real identities of the students were kept confidential, and they were coded as S-1, S-2, S-3, etc. Similarly, teachers were coded as Teacher-1, Teacher-2, Teacher-3, etc.

Data Collection Tools

Student learning problems identification questionnaire

The Student Learning Problems Identification Questionnaire was developed by the researchers to identify learning difficulties, low motivation, increased learning anxiety, and a lack of memory retention in sixth-grade secondary school students, as well as the subjects in which they have learning problems, the reasons for their learning problems in these subjects, and science lesson suggestions for solving the problems they face.. The questionnaire was first presented to the opinion of three faculty members working in the Science Education Department and three science teachers working in schools affiliated with the Ministry of National Education. In line with the experts' opinions, some changes were made in the concepts in the questionnaire regarding the content, and arrangements were made regarding the size of the text, the empty spaces reserved for the answers, and the placement of the questions on the page. The pilot application of the questionnaire was carried out with 590 sixth grade secondary school students in the central and rural areas of Erzurum, Tokat, Erzincan, Kars, Agri, Istanbul, and Ankara. The data from the pilot application was analyzed, and it was determined that there were no expressions that caused varied interpretations of the questionnaire items, that the items were interpreted in the same way by the students, and that the questionnaire was appropriate for sixth-grade kids. The questionnaire consists of two parts in which the demographic characteristics of the participants and their views on learning problems are determined. For each learning problem situation, the participants are asked to first select the subject or subjects with which they have learning problems, and then briefly explain the reasons for having problems in the subjects they chose. For all problem situations, after the selection and explanation sections, respectively, the participants are asked to design a science course that would solve the problems they experience.

Teacher learning problems identification opinion questionnaire

The researcher developed the Teacher Learning Problems Identification Opinion Questionnaire to determine the science lesson topics in which the fifth, sixth and seventh-grade secondary school students have learning difficulties, decrease in learning motivation, increase learning anxiety and lack of permanence of information, and to determine the causes of learning problems. The questionnaire was presented to the opinions of three field experts working in the science education department, and in line with the opinions of the experts, formal arrangements were made on issues such as the spaces reserved for the answers and the placement of the questions. The prepared questionnaire was converted into an electronic questionnaire format and shared with the teachers after the final checks. The pilot applications were made by social media tools,

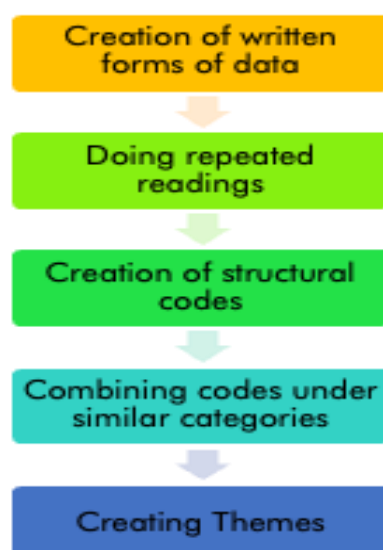
e-mail, one-to-one communication, etc. In this way, 350 teachers were reached across Turkey. The pilot application concluded that the questionnaire items were clear and understandable and did not lead to different understandings. The actual applications of the questionnaire were made through face-to-face communication with the science lesson teachers working in Erzurum province. The questionnaire consists of four parts: the introduction to determine the demographic characteristics of the teachers, the topics that the fifth-grade students have learning problems, the issues that the sixth-grade students have learning problems, and the issues that the seventh-grade students have learning problems. After the participant teachers stated their demographic characteristics, they chose the grade levels they taught in that year and answered the survey questions only for that grade level. In the main sections for each grade level, respectively; Learning problems include learning difficulties, low motivation, increased anxiety, and failure to remember. Under each problem situation, respectively; There are questions in which teachers choose the subjects that their students have problems with, explain why their students have problems with the subjects they mentioned, express the methods and techniques they use in teaching these subjects, and offer solutions.

Analysis of Data

Descriptive statistics (frequency and percentage values) were used in the analysis of quantitative data and content analysis was used in the analysis of qualitative data. Percentage values were calculated over the number of individuals in the sample. In the analysis of the data with content analysis, the steps given in Figure 1 were followed.

Figure 1.

Processes Followed in Content Analysis



The data were analyzed through the NVivo 11 Pro program for ease of analysis. Examples of opinions are given in the tables in the relevant theme.

Validity and reliability studies

To improve the generalizability of quantitative data in the study, data were collected from kids from multiple schools rather than a single school, the sample size was raised, and data were obtained in all groups using the same data collection instrument. The purpose of the study was explained to each participant group, emphasizing the importance of honest responses; those who refused to participate were excluded from the sample; and care was taken to ensure that the data collection environment had a homogeneous structure for all the groups from which the data were collected, with as little interaction between the participants as possible.. To ensure the validity of the qualitative data results, the data were analyzed by two researchers, diversification was ensured by collecting data from teachers and students, the results were supported by direct quotations, regular refereeing of the analyses, and results has been obtained from a field expert, and care was taken not to enter into any expectations or act prejudiced during the data collection and analysis. The researcher analyzed the data at two different times and the percentage of agreement between the analyzes was calculated as 81%. Similarly, the data were analyzed by the second researcher independently of the first researcher and the percentage of agreement with the first researcher was calculated as 77%. It can be said that reliability is achieved if the compliance percentages are 70% or more (Miles & Huberman, 1994).

Findings

Findings of the First Research Question

The findings of the first research question, in which the students have learning problems in the science lesson and the reasons for experiencing these problems, are presented below.

The distribution of the subjects in which students have learning difficulties is given in Table 1

Table 1.
Distribution of Subjects that Students Have Difficulty in Learning

Subjects		Cell		Support and Movement System		Respiratory System		Circulatory System		Force and Motion		Particulate Structure of Matter		Light and Sound		Reproduction, Growth and Development in Plants and Animals		Matter and Heat		Conduction of Electricity		Our Earth, Moon and Sun, Our Source of Life		Have No Difficulty		N	
		f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Type of school	SS	461	30.73	321	21.40	328	21.87	550	36.67	536	35.73	320	21.33	212	14.13	441	29.40	368	24.53	342	22.80	239	15.93	144	9.60	1500	76.57
	IHSS	69	35.20	33	16.84	30	15.31	74	37.76	77	39.29	65	33.16	18	9.18	68	34.69	54	27.55	51	26.02	40	20.41	18	9.18	196	10.00
	RBSS	88	42.72	46	22.33	48	23.30	106	51.46	103	50.00	52	25.24	21	10.19	79	38.35	61	29.61	59	28.64	47	22.82	37	17.96	206	10.52
	PSS	14	24.56	5	8.77	4	7.02	20	35.09	24	42.11	11	19.30	3	5.26	9	15.79	7	12.28	5	8.77	4	7.02	5	8.77	57	2.91
	Total	632	32.26	405	20.67	410	20.93	750	38.28	740	37.77	448	22.87	254	12.97	597	30.47	490	25.01	457	23.33	330	16.84	204	10.41	1959	100
Gender	Female	375	35.48	213	20.15	225	21.29	437	41.34	451	42.67	241	22.80	134	12.68	322	30.46	291	27.53	236	22.33	175	16.56	100	9.46	1057	53.96
	Male	257	28.49	192	21.29	185	20.51	313	34.70	289	32.04	207	22.95	120	13.30	275	30.49	199	22.06	221	24.50	155	17.18	104	11.53	902	46.04
	Tootal	632	32.26	405	20.67	410	20.93	750	38.28	740	37.77	448	22.87	254	12.97	597	30.47	490	25.01	457	23.33	330	16.84	204	10.41	1959	100
Achievement status	85-100	189	38.73	141	28.89	144	29.51	198	40.57	193	39.55	105	21.52	80	16.39	184	37.70	174	35.66	140	28.69	79	16.19	64	13.11	488	24.91
	70-84	269	40.82	137	20.79	141	21.40	296	44.92	304	46.13	144	21.85	73	11.08	205	31.11	158	23.98	147	22.31	86	13.05	78	11.84	659	33.64
	55-69	80	21.28	40	10.64	38	10.11	106	28.19	123	32.71	96	25.53	24	6.38	96	25.53	74	19.68	92	24.47	83	22.07	22	5.85	376	19.19
	45-54	83	29.64	74	26.43	73	26.07	104	37.14	83	29.64	71	25.36	61	21.79	78	27.86	63	22.50	58	21.71	54	19.29	31	11.07	280	14.29
	0-44	11	7.05	13	8.33	14	8.97	46	29.49	37	23.72	32	20.51	16	10.26	34	21.79	21	13.46	20	12.82	28	17.95	9	5.77	156	7.96
	Total	632	32.26	405	20.67	410	20.93	750	38.28	740	37.77	448	22.87	254	12.97	597	30.47	490	25.01	457	23.33	330	16.85	204	10.41	1959	100
Income status	0-500	40	20.51	32	16.41	25	12.82	36	18.46	26	13.33	9	4.62	7	3.59	20	10.26	24	12.31	6	3.08	5	2.56	2	1.03	195	9.95
	501-1000	117	34.01	71	20.64	62	18.02	120	34.88	117	34.01	77	22.38	39	11.34	107	31.10	79	22.97	85	24.71	49	14.24	38	11.05	344	17.56
	1001-1500	153	39.33	97	24.94	108	27.76	152	39.07	149	38.30	93	23.91	60	15.42	139	35.73	102	26.22	87	22.37	73	18.77	54	13.88	389	19.86
	1501-2000	137	26.81	101	19.77	106	20.74	222	43.44	225	44.03	122	23.87	61	11.94	146	28.57	129	25.24	124	24.27	93	18.20	56	10.96	511	26.08
	2001-over	185	35.58	104	20.00	109	20.96	220	42.31	223	42.88	147	28.27	87	16.73	185	35.58	156	30.00	155	29.81	110	21.15	54	10.38	520	26.54
	Total	632	32.26	405	20.67	410	20.93	750	38.28	740	37.77	448	22.87	254	12.97	597	30.47	490	25.01	457	23.33	330	16.84	204	10.41	1959	100
Mother's education level	Not	112	27.86	113	28.11	107	26.62	155	38.56	151	37.56	109	27.11	70	17.41	136	33.83	110	27.36	108	26.87	88	21.89	45	11.19	402	20.52
	Primary	179	36.53	141	28.78	136	27.76	187	38.16	183	37.35	129	26.33	69	14.08	168	34.29	145	29.59	145	29.59	96	19.59	47	9.59	490	25.01
	Secondary	226	39.72	69	12.13	72	12.65	250	43.94	247	43.41	108	18.98	71	12.48	157	27.59	147	25.83	124	21.79	79	13.88	66	11.60	569	29.04
	High	74	24.67	61	20.33	69	23.00	104	34.67	108	36.00	66	22.00	36	12.00	95	31.67	66	22.00	64	21.33	49	16.33	40	13.33	300	15.32
	University	41	20.71	21	10.61	26	13.13	54	27.27	51	25.76	36	18.18	8	4.04	41	20.71	22	11.11	16	8.08	18	9.09	6	3.03	198	10.11
	Total	632	32.26	405	20.67	410	20.93	750	38.28	740	37.77	448	22.87	254	12.97	597	30.47	490	25.01	457	23.33	330	16.84	204	10.41	1959	100
Father's education level	Not	47	25.68	16	8.74	12	6.56	53	28.96	54	29.51	48	26.23	15	8.20	45	24.59	43	23.50	32	17.49	20	10.93	28	15.30	183	9.34
	Primary	71	27.52	44	17.05	44	17.05	90	34.88	89	34.50	74	28.68	40	15.50	79	30.62	63	24.42	74	28.68	53	20.54	33	12.79	258	13.17
	Secondary	124	31.39	71	17.97	70	17.72	120	30.38	117	29.62	84	21.27	54	13.67	113	28.61	96	24.30	78	19.75	66	16.71	39	9.87	395	20.16
	High	137	26.45	109	21.04	111	21.43	209	40.35	204	39.38	103	19.88	62	11.97	159	30.69	138	26.64	124	23.94	97	18.73	45	8.69	518	26.44
	University	253	41.82	165	27.27	173	28.60	278	45.95	276	45.62	139	22.98	83	13.72	201	33.22	150	24.79	149	24.63	94	15.54	59	9.75	605	30.88
	Total	632	32.26	405	20.67	410	20.93	750	38.28	740	37.77	448	22.87	254	12.97	597	30.47	490	25.01	457	23.33	330	16.85	204	10.41	1959	100

* Students made more than one choice

When the results of the analysis given in Table 1 are examined, students who continued IHSS and PSS had learning difficulties in the unit of "Force and Motion" ($f_{IHSS}=77$, $\%=39.29$; $f_{PSS}=24$, $\%=42.10$), and SS and RBSS had similar learning difficulties in the units of "Force and Motion" ($f_{SS}=536$, $\%=35.73$; $f_{RBSS}=103$, $\%=50.00$) and "Circulatory System" ($f_{SS}=550$, $\%=36.67$; $f_{RBSS}106$, $\%=51.46$). Female students had similar learning difficulties in the units "Force and Movement" ($f=451$, $\%=42.67$) and "Circulatory System" ($f=437$, $\%=41.34$), male students had learning difficulties in subject of "Circulatory System" ($f=313$, $\%=34.70$). While students with low, middle, high and very high income levels have similar difficulties in learning about "Force and Motion" unit ($f_{1001-1500}=149$, $\%=38.30$, $f_{1501-2000}=225$, $\%=44.03$; $f_{2001-over}=223$, $\%=42.88$) and "Circulatory System" ($f_{501-1000}=120$, $\%=34.88$, $f_{1001-1500}=152$, $\%=39.07$, $f_{1501-2000}=222$, $\%=43.44$, $f_{2001-over}=220$, $\%=42.31$), students with very low income level have learning difficulties about "Circulatory System" ($f_{0-500}=36$, $\%=18.46$). Students whose mothers were not educated and who were primary and secondary school graduates have similar difficulties in learning about the "Force and Motion" unit ($f_{Not}=151$, $\%=37.56$, $f_{Primary}=183$, $\%=37.35$, $f_{Secondary}=247$, $\%=43.41$) and the "Circulatory System" ($f_{Not}=155$, $\%=38.56$, $f_{Primary}=187$, $\%=38.16$, $f_{Secondary}=250$, $\%=43.94$). Students whose mothers were high school graduates have difficulty in learning about the "Force and Motion" unit ($f_{High}=108$, $\%=36.00$), while students whose mothers were university graduates have difficulty learning about the "Circulatory System" ($f_{University}=54$, $\%=27.27$). According to father's education level, students whose fathers were not educated and who were primary, secondary, high school and university graduates have similar difficulties in learning about the "Force and Motion" unit ($f_{Not}=54$, $\%=29.51$, $f_{Primary}=89$, $\%=34.50$, $f_{Secondary}=117$, $\%=29.62$, $f_{High}=204$, $\%=39.38$, $f_{University}=276$, $\%=45.62$) and the "Circulatory System" ($f_{Not}=53$, $\%=28.96$, $f_{Primary}=90$, $\%=34.88$, $f_{Secondary}=120$, $\%=30.38$, $f_{High}=209$, $\%=40.35$, $f_{University}=278$, $\%=45,35$).

The content analysis results carried out to determine why the students have learning difficulties in the subjects they have mentioned and that they do not experience learning difficulties in any subject are given in Table 2.

Table 2.

Analysis Results of Reasons for Experiencing/Not Experiencing Learning Difficulties According to Students

Theme	Code	f	%	Examples from Student Opinions
The Noise of Classmates	noise	909	51.79	<i>S-572: ... My friends talk unnecessarily in class. I couldn't listen to the teacher because I was distracted too. Even though I couldn't listen to the lesson, I had a hard time learning. ...</i>
Difficulty of Course/Subject	difficult lesson	169	9.63	<i>S-130: The ones I chose are the most difficult subjects of the course. The reason why I have difficulties while learning is because they are very difficult. ...</i>
	difficult subject	961	54.76	
Focus on Memorization	memorization	558	31.79	<i>S-72: I write the subject on paper and memorize it. But I can't remember it because it's too much...</i>
Conceptual Challenges	too many concepts	994	56.63	<i>S-1063: ... There were many subjects that I heard about for the first time in the circulatory system. All of them were things we were unfamiliar with. Blood, veins, and diseases were foreign things that I had difficulty learning. ...</i>
	foreign concept	915	52.14	
	failure to take measurements	358	20.40	
	concepts being confusing	565	32.19	
Lack of Motivation	dislike	487	27.75	<i>S-259: The subject of circulation did not appeal to me at all. I did not love. I didn't learn from it either.</i>
	disinterest	412	23.99	
	distraction	625	35.61	
	boring	781	44.50	
Learning Anxiety	stress	580	33.05	<i>S-805: ... I was very afraid that I would not be able to do it. What if I couldn't, I said, I couldn't.</i>
	fear	325	18.52	
Teacher-Related Problems	no opportunity given	858	48.89	<i>S-1745: We cannot do anything in the lesson. He keeps saying shut up. We cannot do experiments or activities. He doesn't even let us talk in class. Something comes to mind, I raise my hand, but he doesn't let me talk. If he had included us in the lesson to learn, I wouldn't have had such a learning difficulty. ...</i>
	lecture	1015	57.83	
	quick pass	313	17.83	
	lack of communication	336	19.14	
	lack of activity	935	53.28	
N		1755		
Reasons for Not Having Difficulties	doing an activity	65	31.86	<i>S-827: ... I solve lots of questions about what we learned in the lesson. I have question bank books, and I learn easily because I solve the questions in them. I don't have any difficulties.</i>
	frequently repeating	101	49.51	
	problem-solving	99	48.53	
	active learning	29	14.22	
N		204		

* Students expressed more than one opinion.

According to the findings of the analysis presented in Table 2, the most common reasons for students' learning difficulties are: their classmates make noise, the subject is difficult, they tend to memorize, the subject has too many concepts, the concepts are foreign to them, the concepts are confused with each other, they dislike the subject, and the lesson/subject is boring. They showed situations such as being stressed, not being given opportunities for their own learning, teachers constantly telling the subject, and not doing enough activities. Students who do not have learning difficulties stated that this is mostly due to making activities, solving questions, and repeating the subject frequently.

The distribution of science subjects that cause students to lose their motivation is given in Table 3.

Table 1.
The Distribution of the Subjects Students Experienced the Decrease of Motivation

Subjects		Cell		Support and Movement System		Respiratory System		Circulatory System		Force and Motion		Particulate Structure of Matter		Light and Sound		Reproduction, Growth and Development in Plants and Animals		Matter and Heat		Conduction of Electricity		Our Earth, Moon and Sun, Our Source of Life		Don't Experience Decrease of Motivation		N	
		f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Type of school	SS	403	26.87	365	24.33	367	24.47	604	40.27	607	40.47	406	27.07	210	14.00	322	21.47	368	24.53	359	23.93	230	15.33	128	8.53	1500	76.57
	IHSS	53	27.04	48	24.49	48	24.49	79	40.31	80	40.82	53	27.04	27	13.78	42	21.43	48	24.49	47	23.98	30	15.31	15	7.65	196	10.00
	RBSS	55	26.70	50	24.27	50	24.27	83	40.29	84	40.78	56	27.18	29	14.08	44	21.36	50	24.27	49	23.79	32	15.53	33	16.02	206	10.52
	PSS	15	26.32	14	24.56	14	24.56	23	40.35	23	40.35	15	26.32	8	14.04	12	21.05	14	24.56	14	24.56	9	15.79	6	10.53	57	2.91
	Total	526	26.85	477	24.35	479	24.45	789	40.28	794	40.53	530	27.05	274	13.99	420	21.44	480	24.50	469	23.94	301	15.36	182	9.29	1959	100
Gender	Female	284	26.87	257	24.31	258	24.41	426	40.30	428	40.49	286	27.06	148	14.00	227	21.48	259	24.50	253	23.94	162	15.33	98	9.27	1057	53.96
	Male	242	26.83	220	24.39	251	27.83	363	40.24	366	40.58	244	27.05	126	13.97	193	21.40	221	24.50	216	23.95	139	15.41	84	9.31	902	46.04
	Tootal	526	26.85	477	24.35	479	24.45	789	40.28	794	40.53	530	27.05	274	13.99	420	21.44	480	24.50	469	23.94	301	15.36	182	9.29	1959	100
Achievement status	85-100	131	26.84	119	24.39	119	24.39	197	40.37	198	40.57	132	27.05	68	13.93	105	21.52	120	24.59	117	23.98	75	15.37	45	9.22	488	24.91
	70-84	177	26.86	160	24.28	161	24.43	265	40.21	267	40.52	178	27.01	92	13.96	141	21.40	161	24.43	158	23.98	101	15.33	61	9.26	659	33.64
	55-69	101	26.86	92	24.47	92	24.47	151	40.16	152	40.43	102	27.13	53	14.10	81	21.54	92	24.47	90	23.94	58	15.43	35	9.31	376	19.19
	45-54	75	26.79	68	24.29	68	24.29	113	40.36	113	40.36	76	27.14	39	13.93	60	21.43	69	26.64	67	23.93	43	15.36	26	9.29	280	14.29
	0-44	42	26.92	38	24.36	39	25.00	63	40.38	64	41.03	42	26.92	22	14.10	33	21.15	38	24.36	37	23.72	24	15.38	15	9.62	156	7.96
	Total	526	26.85	477	24.35	479	24.45	789	40.28	794	40.53	530	27.05	274	13.99	420	21.44	480	24.50	469	23.94	301	15.36	182	9.29	1959	100
Income status	0-500	44	22.56	43	22.05	41	21.03	80	41.03	80	41.03	49	25.13	21	10.77	35	17.95	37	18.97	45	23.08	26	13.33	14	7.18	195	9.95
	501-1000	72	20.93	60	17.44	60	17.44	104	30.23	104	30.23	75	21.80	28	8.14	63	18.31	66	19.19	59	17.15	31	9.01	26	7.56	344	17.56
	1001-1500	87	22.37	78	20.05	79	20.31	137	35.22	139	35.73	87	22.37	63	16.20	54	13.88	74	19.02	74	19.02	66	19.97	32	8.23	389	19.86
	1501-2000	154	30.14	136	26.61	138	27.01	211	41.29	212	41.49	154	30.14	69	13.50	122	23.87	142	27.78	134	26.22	75	14.68	51	9.98	511	26.08
	2001-over	169	32.50	160	30.77	161	30.96	257	49.42	259	49.81	165	31.73	93	17.88	146	28.08	161	30.96	157	30.19	103	19.81	59	11.35	520	26.54
	Total	526	26.85	477	24.35	479	24.45	789	40.28	794	40.53	530	27.05	274	13.99	420	21.44	480	24.50	469	23.94	301	15.36	182	9.29	1959	100
Mother's education level	Not	106	26.37	96	23.88	97	24.13	172	42.79	174	43.28	110	27.36	52	12.94	73	18.16	98	24.38	87	21.64	60	14.93	41	10.20	402	20.52
	Primary	112	22.86	95	19.39	95	19.39	183	37.35	187	38.16	109	22.24	60	12.24	83	16.94	94	19.18	98	20.00	64	13.06	43	8.78	490	25.01
	Secondary	191	33.57	164	28.82	165	29.00	230	40.42	230	40.42	193	33.92	91	15.99	154	27.07	172	30.23	162	28.47	100	17.57	50	8.79	569	29.05
	High	94	31.33	88	29.33	88	29.33	135	45.00	135	45.00	91	30.33	52	17.33	81	27.00	85	28.33	86	28.67	61	20.33	24	8.00	300	15.31
	University	23	11.62	34	17.17	34	17.17	69	34.85	68	34.34	27	13.64	19	9.60	29	14.65	31	15.66	36	18.18	16	8.08	24	12.12	198	10.11
	Total	526	26.85	477	24.35	479	24.45	789	40.28	794	40.53	530	27.05	274	13.99	420	21.44	480	24.50	469	23.94	301	15.36	182	9.29	1959	100
Father's education level	Not	45	24.59	36	19.67	37	20.22	84	45.90	84	45.90	46	25.14	19	10.38	29	15.85	36	19.67	30	16.39	22	12.02	16	8.74	183	9.34
	Primary	69	26.74	50	19.38	49	18.99	115	44.57	113	43.80	68	26.36	35	13.57	41	15.89	52	20.16	46	17.83	29	11.24	21	8.14	258	13.17
	Secondary	90	22.78	81	20.51	85	21.52	146	36.96	149	37.72	93	23.54	40	10.13	62	15.70	84	21.27	84	21.27	51	12.91	26	6.58	395	20.16
	High	116	22.39	117	22.59	118	22.78	179	34.56	181	34.94	120	23.17	78	15.06	107	20.66	118	22.78	119	22.97	85	16.41	55	10.62	518	26.44
	University	206	34.05	193	31.90	190	31.40	265	43.80	267	44.13	203	33.55	102	16.86	181	29.92	190	31.40	190	31.40	114	18.84	64	10.58	605	30.88
	Total	526	26.85	477	24.35	479	24.45	789	40.28	794	40.53	530	27.05	274	13.99	420	21.44	480	24.50	469	23.94	301	15.36	182	9.29	1959	100

* Students made more than one choice.

When the results of the analysis given in Table 3, students studying in different school types stated that the "Circulatory System" subject ($f_{SS}=604$, $\%=40.27$, $f_{IHSS}=79$, $\%=40.31$, $f_{RBSS}=83$, $\%=40.29$, $f_{PSS}=23$, $\%=40.85$) and the "Force and Motion" unit ($f_{SS}=607$, $\%=40.47$, $f_{IHSS}=80$, $\%=40.82$, $f_{RBSS}=84$, $\%=40.78$, $f_{PSS}=23$, $\%=40.35$) reduced their motivation at similar rates. Similarly, female and male students stated that the "Circulatory System" subject ($f_{Female}=426$, $\%=40.30$, $f_{Male}=363$, $\%=40.24$) and "Force and Movement" unit ($f_{Female}=428$, $\%=40.49$, $f_{Male}=366$, $\%=40.58$) reduced their motivation the most. Students with different achievement rates similarly experienced the problem of low motivation in the "Circulatory System" subject ($f_{85-100}=197$, $\%=40.37$, $f_{70-84}=265$, $\%=40.21$, $f_{55-69}=151$, $\%=40.16$, $f_{45-54}=113$, $\%=40.36$, $f_{0-44}=63$, $\%=40.38$) and "Force and Movement" unit ($f_{85-100}=198$, $\%=40.57$, $f_{70-84}=267$, $\%=40.52$, $f_{55-69}=152$, $\%=40.43$, $f_{45-54}=113$, $\%=40.36$, $f_{0-44}=64$, $\%=41.03$). Students from different income groups similarly experienced low motivation problems in the "Circulatory System" subject ($f_{0-500}=80$, $\%=41.03$, $f_{501-1000}=104$, $\%=30.23$, $f_{1001-1500}=137$, $\%=35.22$, $f_{1501-2000}=211$, $\%=41.29$, $f_{2001-over}=257$, $\%=49.42$) and "Force and Motion" unit ($f_{0-500}=80$, $\%=41.03$, $f_{501-1000}=104$, $\%=30.23$, $f_{1001-1500}=139$, $\%=35.73$, $f_{1501-2000}=212$, $\%=41.49$, $f_{2001-over}=259$, $\%=49.81$). According to the education level of the mother, the students had the most problems of low motivation in the "Circulatory System" subject ($f_{Not}=172$, $\%=42.79$, $f_{Primary}=183$, $\%=37.35$, $f_{Secondary}=230$, $\%=40.42$, $f_{High}=135$, $\%=45.00$, $f_{University}=69$, $\%=34.85$) and "Force and Movement" unit ($f_{Not}=174$, $\%=43.28$, $f_{Primary}=187$, $\%=38.16$, $f_{Secondary}=230$, $\%=40.42$, $f_{High}=135$, $\%=45.00$, $f_{University}=68$, $\%=34.34$). Similarly, according to the education level of the father, the students mostly experienced the problem of low motivation in the "Circulatory System" subject ($f_{Not}=84$, $\%=45.90$, $f_{Primary}=115$, $\%=44.57$, $f_{Secondary}=146$, $\%=36.96$, $f_{High}=179$, $\%=34.56$, $f_{University}=265$, $\%=43.80$) and "Force and Movement" unit ($f_{Not}=84$, $\%=45.90$, $f_{Primary}=113$, $\%=43.80$, $f_{Secondary}=149$, $\%=37.72$, $f_{High}=181$, $\%=34.94$, $f_{University}=267$, $\%=44.13$).

The content analysis results carried out regarding the reasons why the students experienced low motivation in the subjects they stated and did not experience low motivation problems in any subject are given in Table 4.

Table 2.

Analysis Results of Reasons for Experiencing/Not Experiencing Decrease of Motivation According to Students

Theme	Code	f	%	Examples from Student Opinions
The Noise of Classmates	noise	811	45.64	<i>S-1104: My friends talk all the time. I can't give myself to the lesson. ...</i>
The difficulty of Course/Subject	difficult lesson	620	34.89	<i>S-1907: I do not understand the topics, and I cannot do it in the exam. I can't learn because the lesson is very difficult. ...</i>
	difficult subject	1300	73.16	
Focus on Memorization	memorization	60	3.38	<i>S-351: ... It is not nice to have to memorize so much information.</i>
Conceptual Challenges	too many concepts	215	12.10	<i>S-26: There is a lot of information. All new and foreign. It bothers me that I have to learn all of them.</i>
	foreign concept	95	5.35	
	long subject	179	10.07	
	concepts being confusing	525	29.54	
Bored of the lesson	pre-learning	107	6.02	<i>S-721: ... I was very overwhelmed with the force movement. It all came over me. I never wanted to listen to the teacher. I looked out the window because it was overwhelming me.</i>
	boring	644	36.24	
Learning Anxiety	stress	298	16.77	<i>S-106: I was afraid that I would not be able to do it. I was afraid that what if I couldn't answer when the teacher asked or if I didn't know. That's why I couldn't give myself to the lesson. ...</i>
	fear	405	22.79	
Teacher-Related Problems	no opportunity given	155	8.72	<i>S-602: ... The teacher always taught the lesson herself. It was fine at first, but then doing nothing and sitting around listening to it all the time became very bored. I was cold after that. ...</i>
	lecture	942	53.01	
	quick pass	72	4.05	
	lack of communication	286	16.09	
	lack of activity	465	26.17	
N		1777		
Reasons For Not Experiencing Low Motivation	doing an activity	76	41.76	<i>S-1651: ... I listen to my teacher well. I'm asking where I don't understand. When the teacher asks a question, I answer immediately. When something comes to my mind in class, I raise my hand and say what I want to say.</i>
	fun lesson	35	19.23	
	attendance in lesson	89	48.90	
N		182		

* Students expressed more than one opinion.

When the results of the analysis given in Table 4 are examined, it is seen that the reasons for the students stated decrease in their motivation about the subjects they mentioned are the fact that their classmates make noise in the lesson, the subject, and the lesson are difficult for them, the concepts being confusing for them, the subject is boring, they are afraid of not learning the subject, the teacher constantly tells the subject, and the insufficient activity is produced. The students stated that their motivation did not decrease in any subject due to reasons such as doing enough activities, making the lesson fun, and their teachers actively participating in the lesson.

The distribution of science lesson topics that cause students' learning anxiety to increase is given in Table 5.

Table 3.
Distribution of Topics That Increase Students' Learning Anxiety

Subjects		Cell		Support and Movement System		Respiratory System		Circulatory System		Force and Motion		Particulate Structure of Matter		Light and Sound		Reproduction, Growth and Development in Plants and Animals		Matter and Heat		Conduction of Electricity		Our Earth, Moon and Sun, Our Source of Life		Don't Experience Anxiety Rising		N	
		f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Type of school	SS	410	27.33	352	23.47	349	23.27	600	40.00	603	40.20	408	27.20	199	13.27	341	22.73	344	22.93	353	23.53	204	13.60	91	6.07	1500	76.57
	IHSS	56	28.57	49	25.00	50	25.51	59	30.10	58	29.59	58	29.59	41	20.92	47	23.98	58	29.59	60	30.61	46	23.47	27	13.78	196	10.00
	RBSS	57	27.67	51	24.76	53	25.73	99	48.06	97	47.09	61	29.61	34	16.50	59	28.64	60	29.13	63	30.58	33	16.02	35	16.99	206	10.52
	PSS	13	22.81	9	15.79	9	15.79	22	38.60	24	42.11	8	14.04	6	10.53	7	12.28	8	14.04	9	15.79	7	12.28	3	5.26	57	2.91
	Total	536	27.36	461	23.53	461	23.53	780	39.82	782	39.92	535	27.31	280	14.29	454	23.17	470	23.99	485	24.76	290	14.80	156	7.96	1959	100
Gender	Female	198	18.73	233	22.04	235	22.23	378	35.76	382	36.14	247	23.37	134	12.68	229	21.67	223	21.10	246	23.27	137	12.96	94	8.89	1057	53.96
	Male	238	26.39	228	25.28	226	25.06	402	44.57	400	44.35	288	31.93	146	16.19	225	24.94	247	27.38	239	26.50	153	16.96	62	6.87	902	46.04
	Total	536	27.36	461	23.53	461	23.53	780	39.82	782	39.92	535	27.31	280	14.29	454	23.18	470	23.99	485	24.76	290	14.80	156	7.96	1959	100
Achievement status	85-100	131	26.84	108	22.13	115	23.57	189	38.73	190	38.93	126	25.82	78	15.98	99	20.29	117	23.98	119	24.39	84	17.21	23	4.71	488	24.91
	70-84	193	29.29	170	25.80	164	24.89	259	39.30	256	38.85	199	30.20	101	15.33	167	25.34	178	27.01	177	28.86	105	15.93	63	9.56	659	33.64
	55-69	88	23.40	79	21.01	79	21.01	145	38.56	144	38.30	81	21.54	50	13.30	83	22.07	76	20.21	74	19.68	56	14.89	37	9.84	376	19.19
	45-54	79	28.21	66	23.57	61	21.79	120	42.86	120	42.86	82	29.29	40	14.29	51	18.21	73	26.07	79	28.21	31	11.07	25	8.93	280	14.29
	0-44	45	28.85	38	24.36	42	26.92	67	42.95	72	46.15	47	30.13	11	7.05	54	34.62	26	16.67	36	23.08	14	8.97	8	5.13	156	7.96
	Total	536	27.36	461	23.53	461	23.53	780	39.82	782	39.92	535	27.31	280	14.29	454	23.17	470	23.99	485	24.76	290	14.80	156	7.96	1959	100
Income status	0-500	55	28.21	38	19.49	39	20.00	96	49.23	95	48.72	62	31.79	20	10.26	35	17.95	62	31.79	43	22.05	26	13.33	11	5.64	195	9.95
	501-1000	85	24.71	78	22.67	78	22.67	132	38.37	132	38.37	91	26.45	43	12.50	71	20.64	64	18.60	70	20.35	40	11.63	24	6.98	344	17.56
	1001-1500	104	26.74	77	19.79	81	20.82	147	37.79	141	36.25	97	24.94	54	13.88	72	18.51	87	22.37	92	23.65	53	13.62	26	6.68	389	19.86
	1501-2000	133	26.03	114	22.31	115	22.50	198	38.75	206	40.31	132	25.83	80	15.66	113	22.11	102	19.96	118	23.09	85	16.63	41	8.02	511	26.08
	2001-over	159	30.58	154	29.62	148	28.46	206	39.62	208	40.00	153	29.42	83	15.96	163	31.85	155	29.81	162	31.15	86	16.54	54	10.38	520	26.54
	Total	536	27.36	461	23.53	461	23.53	780	39.82	782	39.92	535	27.31	280	14.29	454	23.18	470	23.99	485	24.76	290	14.80	156	7.96	1959	100
Mother's education level	Not	112	27.86	94	23.38	96	23.88	167	41.54	168	41.79	108	26.87	56	13.93	95	25.63	99	24.63	101	25.12	63	15.67	31	7.71	402	20.52
	Primary	130	26.53	122	24.90	123	25.10	188	38.37	190	38.78	136	27.76	74	15.10	126	25.71	130	26.53	129	26.33	76	15.51	43	8.78	490	25.01
	Secondary	161	28.30	143	25.13	148	26.01	223	39.19	220	38.66	160	28.12	88	15.47	134	23.55	140	24.60	146	25.66	90	15.82	59	10.37	569	29.04
	High	92	30.67	63	21.00	63	21.00	124	41.33	126	42.00	84	28.00	38	12.67	71	23.67	71	23.67	68	22.67	35	11.67	17	5.67	300	15.31
	University	41	20.71	39	19.70	31	15.66	78	39.39	78	39.39	47	23.74	24	12.12	28	14.14	30	15.15	36	18.18	26	13.13	6	3.03	198	10.11
	Total	536	27.36	461	23.53	461	23.53	780	39.82	782	39.92	535	27.31	280	14.29	454	23.17	470	23.99	485	24.76	290	14.80	156	7.96	1959	100
Father's education level	Not	47	25.68	33	18.03	33	18.03	64	34.97	66	36.07	49	26.78	15	8.20	30	16.39	34	18.58	37	20.22	13	7.10	4	2.19	183	9.34
	Primary	59	22.87	45	17.44	45	17.44	100	38.76	96	37.21	54	20.93	20	7.75	40	15.50	46	17.83	49	18.99	24	9.30	12	4.65	258	13.17
	Secondary	98	24.81	80	20.25	78	19.75	126	31.90	134	33.92	101	25.57	48	12.15	91	23.04	83	21.01	80	20.25	50	12.66	20	5.06	395	20.16
	High	134	25.87	115	22.20	116	22.39	202	39.00	207	39.96	133	25.68	85	16.41	111	21.43	119	22.97	125	24.13	85	16.41	41	7.92	518	26.44
	University	198	32.73	188	31.07	189	31.24	288	47.60	279	46.12	198	32.73	112	18.51	182	30.08	188	31.07	194	32.07	118	19.50	79	13.06	605	30.88
	Total	536	27.36	461	23.53	461	23.53	780	39.82	782	39.92	535	27.31	280	14.29	454	23.17	470	23.99	485	24.76	290	14.80	156	7.96	1959	100

* Students made more than one choice.

As can be seen from the results of the analysis given in Table 5, the students studying in SS, IHSS and RBSS stated that the "Circulatory System" subject ($f_{SS}=600$, $\%=40.00$, $f_{IHSS}=59$, $\%=30.10$, $f_{RBSS}=99$, $\%=48.06$) and the "Force and Motion" unit ($f_{SS}=603$, $\%=40.20$, $f_{IHSS}=58$, $\%=29.59$, $f_{RBSS}=97$, $\%=47.09$) increase their learning anxiety at similar rates, and the learning anxiety of the students studying at PSS was "Force and Motion" unit ($f_{\text{ÖÖ}}=24$, $\%=42.11$) the most. Female and male students stated that the "Circulatory System" subject ($f_{\text{Female}}=378$, $\%=35.76$, $f_{\text{Male}}=402$, $\%=44.57$) and the "Force and Motion" ($f_{\text{Female}}=382$, $\%=36.14$, $f_{\text{Male}}=400$, $\%=44.35$) unit increase their learning anxiety the most. Students with high, good, medium and low achievement levels stated that the "Circulatory System" subject ($f_{85-100}=189$, $\%=38.73$, $f_{70-84}=259$, $\%=39.30$, $f_{55-69}=145$, $\%=38.56$, $f_{45-54}=120$, $\%=42.86$) and the "Force and Motion" unit ($f_{85-100}=190$, $\%=38.793$, $f_{70-84}=256$, $\%=38.85$, $f_{55-69}=144$, $\%=38.30$, $f_{45-54}=120$, $\%=42.86$) increase their learning anxiety at similar rates. Students with a very low level of achievement experienced learning anxiety the most in the "Force and Motion" unit ($f_{0-44}=72$, $\%=46.15$). Students with very low, low, middle and high income levels stated that the "Circulatory System" subject ($f_{0-500}=96$, $\%=49.23$, $f_{501-1000}=132$, $\%=38.37$, $f_{1001-1500}=147$, $\%=37.79$, $f_{2001-\text{over}}=206$, $\%=39.62$) and the "Force and Motion" unit ($f_{0-500}=95$, $\%=48.72$, $f_{501-1000}=132$, $\%=38.37$, $f_{1001-1500}=141$, $\%=36.25$, $f_{2001-\text{over}}=208$, $\%=40.00$) increase their learning anxiety at similar rates. On the other hand, students with very high income levels experienced learning anxiety the most in the unit "Force and Motion" ($f_{1501-2000}=206$, $\%=40.31$). Students whose mothers have different education levels have the most learning anxiety in the "Circulatory System" subject ($f_{\text{Not}}=167$, $\%=41.54$, $f_{\text{Primary}}=188$, $\%=38.37$, $f_{\text{Secondary}}=223$, $\%=39.19$, $f_{\text{High}}=124$, $\%=41.33$, $f_{\text{University}}=78$, $\%=39.39$) and "Force and Motion" unit ($f_{\text{Not}}=168$, $\%=41.79$, $f_{\text{Primary}}=190$, $\%=38.78$, $f_{\text{Secondary}}=220$, $\%=38.66$, $f_{\text{High}}=126$, $\%=42.00$, $f_{\text{University}}=78$, $\%=39.39$). While the students whose fathers were not educated and who were secondary school graduates experienced learning anxiety in the "Force and Motion" unit ($f_{\text{Not}}=66$, $\%=36.07$, $f_{\text{Secondary}}=134$, $\%=33.92$), the students whose fathers were primary school, high school and university graduates stated that the "Circulatory System" subject ($f_{\text{Primary}}=100$, $\%=38.76$, $f_{\text{High}}=202$, $\%=39.00$, $f_{\text{University}}=288$, $\%=47.60$) and the "Force and Motion" unit ($f_{\text{Primary}}=96$, $\%=37.21$, $f_{\text{High}}=207$, $\%=39.96$, $f_{\text{University}}=279$, $\%=46.12$) increase their learning anxiety at similar rates.

The content analysis results conducted to determine the reasons for the students' increased learning anxiety in the subjects they mentioned and the reasons for not experiencing any learning anxiety in any subject are given in Table 6.

Table 4.

Analysis Results of the Reasons for Experiencing/Not Experiencing Learning Anxiety

Theme	Code	f	%	Examples from Student Opinions
The difficulty of Course/Subject	difficult lesson	496	27.51	<i>S-259: ... Circulation and strength were the most difficult units in science. That's why I couldn't do them, and my anxiety increased. ...</i>
	difficult subject	689	38.21	
Focus on Memorization	memorization	411	22.80	<i>S-942: I tried to memorize what we learned in the lesson by writing it down on paper. Since it was difficult to memorize, my anxiety increased. ...</i>
Conceptual Challenges	too many concepts	436	23.83	<i>S-466: We had a lot of things to learn. There were so many veins, blood, and diseases that my anxiety rose in case I did not learn. ...</i>
	foreign concept	242	13.42	
	long subject	206	11.43	
	concepts being confusing	545	30.23	
Teacher-Related Problems	no opportunity given	218	12.10	<i>S-28: ... We went through the subject before we even understood it. I was afraid I wouldn't learn because we did it too fast.</i>
	quick pass	291	16.14	
	lack of activity	424	23.52	
N		1803		
Reasons for Not Experiencing Learning Anxiety	high achievement	71	45.51	<i>S-368: I do all my lessons very well. The grades in my science class are also very high. I'm the best science grader in our class. I love science class, and I am very successful. I have nothing to fear for him. ...</i>
	fun lesson	53	33.97	
	confidence	27	17.31	
N		156		

* Students expressed more than one opinion.

According to the results of the analysis given in Table 6, students mostly experience learning anxiety because they think that the lesson and subjects are difficult, they tend to memorize instead of meaningful learning, the excess of concepts in the subject, concepts being confusing, and not doing enough activities. The students who stated that they did not experience learning anxiety stated that this was due to their high success rate, fun lessons, and self-confidence.

The distribution of the least memorable topics according to the students is given in Table 7.

Table 5.
Distribution of Less Memorable Topics by Students

Subjects		Cell		Support and Movement System		Respiratory System		Circulatory System		Force and Motion		Particulate Structure of Matter		Light and Sound		Reproduction, Growth and Development in Plants and Animals		Matter and Heat		Conduction of Electricity		Our Earth, Moon and Sun, Our Source of Life		Have No Problem With Permanence		N	
		f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Type of school	SS	443	29.53	369	24.60	390	26.00	573	38.20	566	37.73	430	28.67	222	14.80	388	25.87	388	25.87	382	25.47	220	14.67	41	2.73	1500	76.57
	IHSS	32	16.33	35	17.86	30	15.31	80	40.82	80	40.82	44	22.45	15	7.65	24	12.24	28	14.29	36	18.37	12	6.12	26	13.27	196	10.00
	RBSS	54	26.21	31	15.05	30	14.56	95	46.12	89	43.20	60	29.13	16	7.77	40	19.42	46	22.33	49	23.79	15	7.28	33	16.02	206	10.52
	PSS	11	19.30	15	26.32	10	17.54	24	42.11	21	36.84	16	28.07	7	12.28	8	14.04	13	22.81	18	31.58	3	5.26	20	35.0	57	2.91
	Total	540	27.57	450	22.97	460	23.48	772	39.41	756	38.59	550	28.08	260	13.27	460	23.48	475	24.25	485	24.76	250	12.76	120	6.13	1959	100
Gender	Female	250	23.65	215	20.34	447	42.29	378	35.76	384	36.33	276	26.11	126	11.92	212	20.06	244	23.08	259	24.50	123	11.64	47	4.45	1057	53.96
	Male	290	32.15	235	26.05	228	25.28	394	43.68	372	41.24	274	30.38	134	14.86	248	27.49	231	25.61	226	25.06	127	14.08	73	8.09	902	46.04
	Total	540	27.57	450	22.97	460	23.48	772	39.41	756	38.59	550	28.08	260	13.27	460	23.48	475	24.25	485	24.76	250	12.76	120	6.13	1959	100
Achievement status	85-100	125	25.61	99	20.29	103	21.11	188	38.52	208	42.62	134	27.46	80	16.39	114	23.36	102	20.90	120	24.59	76	15.57	32	6.56	488	24.91
	70-84	211	32.02	223	33.84	219	33.23	272	41.27	260	39.45	203	30.80	92	13.96	202	30.65	225	34.14	201	30.50	90	13.66	39	5.92	659	33.64
	55-69	98	26.06	56	14.89	61	16.22	146	38.83	138	36.70	101	26.86	31	8.24	73	19.41	64	17.02	80	21.28	28	7.45	28	7.45	376	19.19
	45-54	57	20.36	40	14.29	43	15.36	105	37.50	96	34.29	62	22.14	33	11.79	41	14.64	47	16.79	47	16.79	30	10.71	13	4.64	280	14.29
	0-44	49	31.41	32	20.51	34	21.79	61	39.10	54	34.62	50	32.05	24	15.38	30	19.23	37	23.72	37	23.72	26	16.67	8	5.13	156	7.96
	Total	540	27.57	450	22.97	460	23.48	772	39.41	756	38.59	550	28.08	260	13.27	460	23.48	475	24.25	485	24.76	250	12.76	120	6.13	1959	100
Income status	0-500	49	25.13	32	16.41	33	16.92	74	37.95	70	35.90	51	26.15	15	7.69	28	14.36	31	15.90	35	17.95	13	6.67	9	4.62	195	9.95
	501-1000	94	27.33	76	22.09	79	22.97	135	39.24	132	38.37	97	28.20	38	11.05	77	22.38	82	23.84	84	24.42	35	10.17	18	5.23	344	17.56
	1001-1500	96	24.68	84	21.59	86	22.11	142	36.50	135	34.70	98	25.19	42	10.80	83	21.34	85	21.85	84	21.59	40	10.28	23	5.91	389	19.86
	1501-2000	149	29.16	130	25.44	134	26.22	207	40.51	208	40.70	154	30.14	70	13.70	135	26.42	136	26.61	137	26.81	73	14.29	30	5.87	511	26.08
	2001-over	152	29.23	128	24.62	128	24.62	213	40.96	211	40.58	150	28.85	95	18.27	137	26.35	141	27.12	145	27.88	89	17.12	40	7.69	520	26.54
	Total	540	27.57	450	22.97	460	23.48	772	39.41	756	38.59	550	28.08	260	13.27	460	23.48	475	24.25	485	24.76	250	12.76	120	6.13	1959	100
Mother's education level	Not	140	34.83	111	27.61	122	30.35	180	44.78	175	43.53	142	35.32	63	15.67	115	28.61	125	31.09	128	31.84	60	14.93	22	5.47	402	20.52
	Primary	153	31.22	138	28.16	130	26.53	194	39.59	191	38.98	154	31.43	68	13.88	138	28.16	139	28.37	137	27.96	66	13.47	29	5.92	490	25.01
	Secondary	159	27.94	140	24.60	143	25.13	227	39.89	226	39.72	160	28.12	91	15.99	144	25.31	147	25.83	146	25.66	90	15.82	48	8.44	569	29.05
	High	50	16.67	38	12.67	41	13.67	102	34.00	99	33.00	54	18.00	24	8.00	42	14.00	41	13.67	47	15.67	24	8.00	15	5.00	300	15.31
	University	38	19.19	23	11.62	24	12.12	69	34.85	65	32.83	40	20.20	14	7.07	21	10.61	23	11.62	27	13.64	10	5.05	6	3.03	198	10.11
	Total	540	27.57	450	22.97	460	23.48	772	39.41	756	38.59	550	28.08	260	13.27	460	23.48	475	24.25	485	24.76	250	12.76	120	6.13	1959	100
Father's education level	Not	35	19.13	15	8.20	12	6.56	51	27.87	50	27.32	32	17.49	7	3.83	12	6.56	16	8.74	24	13.11	6	3.28	4	2.19	183	9.34
	Primary	51	19.77	30	11.63	36	13.95	97	37.60	95	36.82	57	22.09	15	5.81	34	13.18	37	14.34	40	15.50	12	4.65	12	4.65	258	13.17
	Secondary	54	13.67	37	9.37	38	9.62	112	28.35	108	27.34	61	15.44	23	5.82	39	9.87	41	10.38	42	10.63	20	5.06	21	5.32	395	20.16
	High	180	34.75	158	30.50	162	31.27	226	43.63	222	42.86	183	35.33	114	22.01	167	32.24	169	32.63	167	32.24	111	21.43	34	6.56	518	26.44
	University	220	36.36	210	34.71	212	35.04	286	47.27	281	46.45	217	35.87	101	16.69	208	34.38	212	35.04	212	35.04	101	16.69	49	8.10	605	30.88
	Total	540	27.57	450	22.97	460	23.48	772	39.41	756	38.59	550	28.08	260	13.27	460	23.48	475	24.25	485	24.76	250	12.76	120	6.13	1959	100

* Students made more than one choice.

As presented in Table 4, the subjects that are least memorable for the sixth-grade students studying in SS and IHSS were the "Circulatory System" subject ($f_{SS}=573$, $\%=38.20$, $f_{IHSS}=80$, $\%=40.82$) and the "Force and Motion" unit ($f_{SS}=566$, $\%=37.73$, $f_{IHSS}=80$, $\%=40.82$). The subject that was the least memorable for the students studying at RBSS and PSS is the "Circulatory System" ($f_{RBSS}=95$, $\%=46.12$, $f_{PSS}=24$, $\%=42.11$). While female students acquired permanent knowledge at least on the "Circulatory System" ($f=378$, $\%=35.76$) and the "Force and Motion" unit ($f=384$, $\%=36.33$), the subject that was least memorable for male students is the "Force and Motion" unit ($f=384$, $\%=36.33$). For students with a high achievement rate, the subject that was least memorable is the "Force and Motion" unit ($f_{85-100}=208$, $\%=42.62$), and for students with good, medium, low and very low achievement levels, the subject that was least memorable is "Circulatory System" ($f_{70-84}=272$, $\%=41.27$, $f_{55-69}=146$, $\%=38.33$, $f_{5-54}=105$, $\%=37.50$, $f_{0-44}=61$, $\%=39.10$). For students with very low- and middle-income levels, the subject that was least memorable is the "Circulatory System" ($f_{0-500}=74$, $\%=37.95$, $f_{1001-1500}=142$, $\%=36.50$). Students with low, high- and very high-income levels acquired permanent knowledge at least in the "Circulatory System" subject ($f_{501-1000}=135$, $\%=39.24$, $f_{1501-2000}=207$, $\%=40.51$, $f_{2001-over}=213$, $\%=40.96$) and "Force and Motion" unit ($f_{501-1000}=132$, $\%=38.37$, $f_{1501-2000}=208$, $\%=40.70$; $f_{2001-over}=211$, $\%=40.58$). The subjects that were least memorable for the students whose mothers did not receive education and who graduated from primary, secondary and high school stated that they acquired permanent knowledge in the unit "Circulatory System" ($f_{Not}=180$, $\%=44.78$, $f_{Primary}=194$, $\%=39.59$, $f_{Secondary}=227$, $\%=39.89$, $f_{High}=102$, $\%=34.00$) and "Force and Motion" ($f_{Not}=175$, $\%=43.53$, $f_{Primary}=191$, $\%=38.98$, $f_{Secondary}=226$, $\%=39.72$, $f_{High}=99$, $\%=33.00$), and students whose mothers were university graduates at least in the "Force and Motion" unit ($f_{University}=69$, $\%=34.85$). For students whose fathers had different education levels, the subjects that are least memorable are the "Circulatory System" subject ($f_{Not}=51$, $\%=27.87$, $f_{Primary}=97$, $\%=37.60$, $f_{Secondary}=112$, $\%=28.35$, $f_{High}=226$, $\%=43.63$, $f_{University}=286$, $\%=47.27$) and the "Force and Motion" unit ($f_{Not}=50$, $\%=27.32$, $f_{Primary}=95$, $\%=36.82$, $f_{Secondary}=108$, $\%=27.34$, $f_{High}=222$, $\%=42.86$, $f_{University}=281$, $\%=46.45$).

According to the students, the content analysis results conducted to determine the reasons for the low memorability of the topics they mentioned are given in Table 8.

Table 6.

The Reasons for the Low Retention of the Subjects Students Mentioned Results of the Analysis

Theme	Code	f	%	Examples from Student Opinions
Time Passing on the Subject	time passing	197	10.71	<i>S-11: It's been a long time since these issues, I forgot for it. ...</i>
Not Repeating The Subject	not repeating	716	38.93	<i>S-247: ... There are too many units. I can't study old ones instead of working on new learnings. I can't remember because I've never done old topics again.</i>
Difficulty of Course/Subject	difficult subject	309	16.80	<i>S-803: ... Science course is already a difficult course. These subjects I have chosen are also the most difficult ones. ...</i>
Focus on Memorization	memorization	123	6.69	<i>S-1058: ... I memorized the subjects. I did very well at first, but then I started to forget it all.</i>
Failing to learn	not learning	246	13.38	<i>S-1726: I never learned the subjects I mentioned before. I had to have learned it for it to stick in my mind. I can't remember since I didn't learn. ...</i>
Conceptual Challenges	too many concepts	271	14.74	<i>S-1452: ... The issues in circulation were mixed. While I was learning, I always mixed it up. Since it was mixed, I couldn't remember which was which.</i>
	concepts being confusing	642	34.91	
Learning Motivation Problems	boring	235	12.78	<i>S-1377: ... I didn't like them at all. They were so boring. ...</i>
Learning Anxiety Problems	stress	37	2.01	<i>S-5: I thought that I could not do it and got into trouble. I guess they just didn't remember it.</i>
	failure	49	2.66	
Teacher-Related Problems	no opportunity given	235	12.78	<i>S-903: ... We could not train the subjects, so the teacher immediately explained the subjects I chose and passed. I don't have any in mind for that.</i>
	quick pass	247	13.43	
	lack of activity	87	4.73	
N		1839		
Reasons Why Information Is Permanent	doing activity	38	31.67	<i>S-56: ... I repeat my lessons daily. I am also working on the things we have worked on before. I remember most of what I learned. I don't have a problem with it being out of my mind.</i>
	fun lesson	13	10.83	
	to repeat often	76	63.33	
N		120		

* Students expressed more than one opinion.

According to the results of the analysis given in Table 8, the students are most stated that they could not obtain permanent information because time passed on the subject, lack of repetition habits, the subject is difficult, they cannot learn the subject, the concepts are too many, the concepts are confused with each other, the subject is boring and does not attract their attention, they remain passive while learning and the subject are quickly processed and passed.

Findings of the Second Research Question

The results of the second research question, which investigated students' learning problems in science classes and the reasons for these problems, are presented below according to teachers' statements.

The distribution of the subjects in which the students have difficulties in learning according to the teachers is shown in Table 9.

Table 7.

Distribution of Subjects that Students Have Difficulty in Learning According to Teachers

Subjects	Having Difficulty		Low Motivation		Learning Anxiety		Lack of Permanent Knowledge	
	f	%	f	%	f	%	f	%
Cell	43	30.50	9	6.38	12	8.51	27	19.15
Support and Movement System	22	15.60	9	6.38	10	7.09	32	22.70
Respiratory System	22	15.60	18	12.77	10	7.09	32	22.70
Circulatory System	97	68.79	50	35.46	61	43.26	55	39.01
Force and Motion	98	69.50	59	41.84	62	43.97	64	45.39
Particulate Structure of Matter	80	56.74	45	31.91	41	29.08	50	35.46
Light and Sound	21	14.89	23	16.31	17	12.06	4	2.84
Reproduction, Growth and Development in Plants and Animals	14	9.93	27	19.15	16	11.35	9	6.38
Matter and Heat	11	7.80	5	3.55	14	9.93	4	2.84
Conduction of Electricity	23	16.31	23	16.31	16	11.35	9	6.38
Our Earth, Moon and Sun, Our Source of Life	11	7.80	9	6.38	11	7.80	4	2.84
N	141		141		141		141	

* Teachers made more than one choice.

When the results of the analysis given in Table 9, the science teachers teaching at the sixth-grade level reported that students have learning difficulties mostly in the units of "Force and Motion" (f=98, %=69.50) and the "Circulatory System" (f=97, %=68.79). According to the teachers, students' motivation decreases the most in the "Force and Motion" unit (f=59, %41.84). According to the teachers, students have similar learning anxiety in the "Circular System" (f=61, %=43.26) unit and in the "Force and Movement" (f=62, %=43.97) unit. According to the teachers, the retention rate of the knowledge acquired in the "Force and Motion" unit (f=64, %=45.39) is low.

According to the teachers, the content analysis results conducted to determine why their students have learning difficulties are given in Table 10.

Table 10.

Results of Analysis of Reasons for Experienced Learning Difficulties by Students According to Teachers

Theme	Code	f	%	Examples from Teachers' Opinions
Conceptual Challenges	abstract concept	35	24.82	<i>Teacher-78: Since there is no visible phenomenon in the circulatory system, the child cannot fully grasp the forms of circulation and blood cells. Topics remain abstract. They have a hard time understanding. ...</i>
	concepts being confusing	24	17.02	
	too many concepts	27	19.15	
Difficulty of Subject	difficult subject	32	22.70	<i>Teacher-116: ... Topic distribution and concepts were too much and heavy. Therefore, it was very difficult and he had difficulties in learning. Of course, his success in the exam fell because the child could not comprehend much. ...</i>
Failure to Practice Active Learning	active learning	22	15.60	<i>Teacher-59: We are having problems in raising the subjects. That's why we can't do a lot of activities.</i>
	insufficient activity	54	38.30	
Lack of Motivation	indifference	14	9.93	<i>Teacher-24: The biggest reason is the student's indifference to the lesson. ...</i>
Low Level of Readiness	prior-knowledge	10	7.09	<i>Teacher-1: There are difficulties in unit conversions operations and graphic interpretations, especially regarding speed. I think the main reason for this situation is the failure in numerical operations. ...</i>
	mathematical calculations	20	14.18	
	incomprehension	5	3.55	
	inability to relate	11	7.80	
N		141		

* Teachers expressed more than one opinion.

According to the results of the analysis in Table 10, teachers indicated that students have learning difficulties mainly because the concepts are abstract and too numerous, because they confuse the concepts with each other, because the subject is difficult for them, because active learning cannot be fully implemented, and because students have difficulties in mathematical calculations.

According to the teachers, the results of the content analysis, which aimed to identify the reasons for the students' decreasing motivation to learn, are shown in Table 11.

Table 11.

Analysis Results of the Reasons for the Decreased Motivation of the Students According to the Teachers

Theme	Code	f	%	Examples from Teachers' Opinions
Excess Number of Students in Class	number of students	11	7.80	<i>Teacher-60: The classroom is very crowded. I cannot follow the student who has dropped out of the course because it makes it difficult to follow the student. ...</i>
	failure	15	10.64	<i>Teacher-12: ... Students have a great fear of making mistakes. They are afraid of not being able to do both in exams and in the questions asked in the lesson. Although we did not get angry when they did wrong, we still could not get over this situation. This fear of making mistakes in students also negatively affects their interest in the lesson.</i>
Feeling of Inadequacy	fear of not being able	23	16.31	
	lack of prior-knowledge	19	13.48	
Short Attention Span	attention span	8	5.67	<i>Teacher-104: ... The duration of the lesson is also long for the child. Since their attention span is short, after a while, breakouts begin.</i>
	boring	8	5.67	
Conceptual Challenges	confusing of concepts	19	13.48	<i>Teacher-113: The number of concepts in the subject is too many. This leads to a decrease in student interest.</i>
	too many concepts	15	10.64	
	abstract concept	8	5.67	
	incomprehension	15	10.64	
	memorization	19	13.48	
Failure to Practice Active Learning	insufficient activity	31	21.99	<i>Teacher-133: Unfortunately, we cannot do most of the experiments and activities in the classroom because of our limited opportunities. Therefore, the course is generally teacher-centered. Of course, this reduces the motivation of the students to the lesson. ...</i>
	lecture	46	32.62	
Difficulty of Subject	difficult subject	31	21.99	<i>Teacher-138: ... He conditions himself to be difficult even before the subject starts. Of course, you cannot draw the child to the subject no matter what you do.</i>
Overconfidence	confidence	3	2.13	<i>Teacher-82: The child has an explosion of excessive self-confidence. He's sure he knows everything. As such, he is not interested in the lesson. ...</i>
Lack of Individual Goals	aimlessness	11	7.80	<i>Teacher-90: ... Students do not set a goal for themselves. They experience great uncertainty. The family also has no plans for their children. Therefore, they do not have any anxiety about learning. Since they do not have goals, they do not feel the need to learn. This naturally lowers their motivation to learn.</i>
N		141		

* Teachers expressed more than one opinion.

As shown in Table 11, teachers indicated that the decline in their students' motivation was primarily due to fear of not succeeding, lack of prior knowledge, confusing concepts, focus on memorization, inadequacy of activities, teacher-centered instruction, and the subject being difficult for students. According to the teachers, the content analysis results conducted to determine the reasons for the increase in the learning anxiety of their students are given in Table 12.

Table 12.

Analysis Results of the Reasons for Students' Learning Anxiety According to Teachers

Theme	Code	f*	%	Examples from Teachers' Opinions
Feeling of Inadequacy	failure	11	7.88	<i>Teacher-16: Students despair at their first failure.</i>
	fear of not being able	30	21.28	<i>Fear of failure is too great. ...</i>
	lack of prior-knowledge	15	10.64	
Conceptual Challenges	confusing of concepts	33	23.40	<i>Teacher-82: The concepts are not suitable for the student's level. It remains very abstract. Since their concretization skills are not developed, they cannot learn and they worry.</i>
	too many concepts	18	12.77	
	abstract concept	41	29.08	
	incomprehension	20	14.18	
	memorization	25	17.73	
Failure to Practice Active Learning	insufficient activity	31	21.99	<i>Teacher-115: ... One of the reasons they experience anxiety is that we do not teach the lessons in such a way that they will be active. The fact that I teach the lesson and that the activities and experiments in which they are active are not done enough cause them to worry.</i>
	lecture	45	32.91	
Difficulty of Subject	difficult subject	55	39.00	<i>Teacher-47: ... Circulatory system, force and motion are among the most difficult subjects for students. When the subject is difficult, naturally the level of anxiety is high.</i>
N		141		

* Teachers expressed more than one opinion.

When the results of the analysis are given in Table 12, the teachers stated that their students experience learning anxiety due to the fear of not being able to do it, the confusion of concepts, abstract concepts, insufficient activity, teacher-centered lecture, and the difficulty of the subject.

According to the teachers, the content analysis results conducted to determine the reasons for the low memorization of the subjects stated by their students are given in Table 13.

Table 13.

Analysis Results of the Reasons why the Subjects Specified by the Teachers Are Less Memorable for Students

Theme	Code	f	%	Examples from Teachers' Opinions
Lack of Regular Repetition	not repeating	32	22.70	<i>Teacher-20: Because there is no general repetition and it is in the first unit and they do not repeat the first topics due to the intensity of the topic. ...</i>
Feeling of Inadequacy	failure	12	8.51	<i>Teacher-140: In general, their knowledge on the subjects they have failed in is very weak. ...</i>
Motivation Problems	indifference	4	2.84	<i>Teacher-3: The students' interest in these subjects was very weak. Therefore, the recall rate was low.</i>
Conceptual Challenges	too many concepts	16	11.35	<i>Teacher-58: ... Unfortunately, it is not remembered because the information about the subjects is intense.</i>
	abstract concept	12	8.51	
	incomprehension	21	14.89	
	memorization	32	22.70	
Failure to Practice Active Learning	insufficient activity	24	17.02	<i>Teacher-119: ... The more senses involved in learning, the higher the recall rate. Unfortunately, we talk in the learning environment, the student listens. Therefore, the recall rate decreases.</i>
	lecture	36	25.53	
Study for Only Exam	exam	4	2.84	<i>Teacher-118: ... Students study completely for the exam. Maybe he does it in the exam, but he doesn't remember anything about the subject after that.</i>
Inability to Relate to Daily Life	inability to relate	12	8.51	<i>Teacher-182: ... There are also difficulties in associating the concept with daily life. This reduces the recall rate.</i>
N		141		

* Teachers expressed more than one opinion.

As shown in the analysis results in Table 13, teachers indicated that their students' knowledge is not durable because students do not repeat the material regularly, they memorize instead of learning meaningfully, they do not understand the material, the activities are insufficient, and the lecture is teacher-centered.

Findings of the Third Research Question

The results of the third research question, which deals with teachers' practices in teaching subjects in which students have learning problems and their suggestions for solving these problems, are presented below. Table 14 shows the distribution of methods-techniques and practices that teachers used while teaching the subjects their students have difficulty learning.

Table 14.

Practices of Teachers in Teaching the Subjects that Students Have Difficulty Learning

Theme	Code	f	%	Examples from Teachers' Opinions
Method-Techniques	5E	16	11.35	<i>Teacher-82: ... I make explanations supported by posters and concept maps. I try to attract students' attention in lectures. ...</i> <i>Teacher-31: ... I often do questions and answers during lectures. I both see their shortcomings and help reinforce the lectures. ...</i>
	lecture	64	45.39	
	question-answer	40	28.37	
Applications with Students Active	experiment	24	17.02	<i>Teacher-139: ... I have questions about the subject solved. I distribute tests and have the questions done in order. When they make mistakes, I make explanations and complete the deficiencies. ...</i>
	question/problem solving	20	14.18	
	smartboard	20	14.18	
N		141		

* Teachers expressed more than one opinion.

According to the results of the analysis given in Table 14, the teachers stated that they mostly use the lecture and question-answer technique in teaching the subjects that their students have difficulty in learning; they do experiments, solve questions/problems and benefit from the smartboard applications to involve students in the lesson.

The content analysis results of the teachers' suggestions for solving the learning difficulty problem experienced by their students are given in Table 15.

Table 15.

Teacher Recommendations for Solving the Learning Difficulty Problems Students Experience

Theme	Code	f	%	Examples from Teachers' Opinions
Smart Board Applications Should Increase	smartboard	42	29.79	<i>Teacher-62: ... More attention should be given to visuality. In particular, pictures, videos and fun activities can be done on the smart board. ...</i>
	EBA	11	7.80	
	Video	11	7.80	
	animation	7	4.96	
Increasing the Level of Motivation	interest	20	14.18	<i>Teacher-29: ... Students should be motivated to the lesson. Must be willing to learn. ...</i>
Considering Student Needs	need	16	11.35	<i>Teacher-84: Learning environments should be designed according to the needs of children. ...</i>
Downgrading to Student Level	simplification	49	34.75	<i>Teacher-120: ... It can be solved by concretizing the subjects and appealing to more sense organs.</i>
	concretization	38	26.95	
Students Learn by Doing	active learning	42	29.79	<i>Teacher-44: The most important solution is to activate the student. There are so many good methods-techniques that will enable the student to learn that they should be utilized.</i>
	activity	42	29.79	
N		141		

* Teachers expressed more than one opinion.

As presented in Table 15, the teachers suggested increasing the smartboard applications, explaining the subject more simply and concretely, using active learning methods more, and increasing the number of activities to solve the learning difficulty problem experienced by their students.

Table 16 shows the distribution of methods-techniques and practices that teachers use in teaching the subjects that cause the decreasing level of students' motivation.

Table 16.

Practices of Teachers in Teaching the Subjects that Students Experience Low Motivation

Theme	Code	f	%	Examples from Teachers' Opinions
Method-Techniques	5E	19	13.48	<i>Teacher-141: Although the constructivist approach has been adopted, unfortunately, the lessons are taught in the center of the teacher, since the class size is large, the school facilities are limited, there is no laboratory, and we cannot provide experiments materials. Even though I use slides, models, and posters in class, we do not get beyond the techniques of lecture, question-answer, and discussion.</i>
	lecture	42	29.79	
	question-answer	23	16.31	
	demonstration	42	29.79	
	concept map	3	2.13	
	discussion	3	2.13	
Applications with Students Active	doing activity	46	32.62	<i>Teacher-35: ... After explaining the subject, we do the activities in their books. I also reproduce and distribute the beautiful activities I find in between. Sometimes we do activities in the form of puzzles. ...</i> <i>Teacher-99: ... Smartboard applications are very well prepared. Experiments, videos, and activities are very good. I'm showing the experiments. We are talking about them. I make activities to reinforce the subject. ...</i>
	observation	3	2.13	
	question/problem solving	15	10.64	
	smartboard	46	32.62	
N		141		

* Teachers expressed more than one opinion.

When the results of the analysis given in Table 16, the teachers stated that they mostly use lecture, question-answer and demonstration techniques, do the activities in the textbooks, and benefit from the smartboard applications in teaching the subjects that cause the students' motivation to decrease.

Teachers' suggestions for solving the problem of low motivation experienced by their students are given in Table 17.

Table 17.

Teacher Suggestions for Solving the Problem of Low Motivation Experienced by Students

Theme	Code	f'	%	Examples from Teachers' Opinions
Smart Board Applications Should Increase	smartboard	15	10.64	<i>Teacher-42: ... Smartboard activities such as coloring, story, and activity can be made to entertain the students. ...</i>
	video	15	10.64	
Increasing the Level of Motivation	interesting	15	10.64	<i>Teacher-42: Lessons should be made more student-friendly. It should be made more interesting and fun. ...</i>
	funny	19	13.48	
Considering Student Needs	need	3	2.13	<i>Teacher-14: We do not consider the needs of the students when planning. We need to pay more attention to this. ...</i>
Downgrading to Student Level	simplification	19	13.48	<i>Teacher-134: ... Topics are difficult for students. It should be explained in a more simplified manner according to their level. ...</i>
	concretization	15	10.64	
Students Learn by Doing	active learning	15	10.64	<i>Teacher-6: The thing that students are most interested in, having fun and enjoying is playing games. When the game is played, they both have fun and stay in their minds more. More enjoyment from games. ...</i>
	activity	26	18.44	
	group work	8	5.67	
	game	19	13.48	
N		141		

* Teachers expressed more than one opinion.

According to the results of the analysis given in Table 17, the teachers stated that to increase the learning science motivation of their students, the lessons should be taught in a more fun way, the subject should be conveyed in a simpler way, and activities should be done, and games should be used. The methods-techniques used by the teachers in teaching the subjects that cause the students' anxiety to increase and the practices they perform are given in Table 18.

Table 18.

Practices of Teachers in Teaching the Subjects of which Students Experience Learning Anxiety

Theme	Code	f'	%	Examples from Teachers' Opinions
Method-Techniques	5E	17	12.06	<i>Teacher-134: ... I'm doing a question and answer. I ask the question and ask a random person from the class to answer it. When he can't answer, I try to help him find the answer by giving hints. If he still can't answer, I have one of the volunteer students answer.</i>
	lecture	50	35.46	
	question-answer	44	31.21	
	demonstration	28	19.86	
	discussion	5	3.55	
Applications with Students Active	doing activity	35	24.82	<i>Teacher -48: ... I take care to have the activities suggested for the subject done. Even though we can't do some of them due to insufficient materials, I try to have different activities done..</i> <i>Teacher-69: ... I had a lot of problems solved on the subject. We have solved many and different styles of questions. ...</i>
	observation	3	2.13	
	question/problem solving	33	23.40	
	smartboard	38	26.95	
N		141		

* Teachers expressed more than one opinion.

As shown in the analysis results in Table 18, teachers indicated that they mainly use lectures, question-answering and demonstration techniques, do the activities in the textbooks, solve the questions/problems, and use the Smartboard applications in teaching the subjects in which their students have learning difficulties. Teachers' suggestions for the solution of the learning anxiety problem experienced by their students are given in Table 19.

Table 19.

Teacher Suggestions for Solving the Learning Anxiety Problem of Students

Theme	Code	f	%	Examples from Teachers' Opinions
Smart Board Applications Should Increase	smartboard	12	8.51	<i>Teacher-67: ... Students' anxiety can be reduced with smart board activities in different styles. Experiments, puzzles, etc. More activities should be done. ...</i>
	video	9	6.38	
Increasing the Level of Motivation	interesting	18	12.77	<i>Teacher-15: If we support the students with activities that they will enjoy more, their anxiety will decrease.</i>
	funny	21	14.89	
Downgrading to Student Level	simplification	18	12.77	<i>Teacher-127: ... Also, the topics remain abstract. Applications should be made to embody the concepts.</i>
	concretization	16	11.35	
Students Learn by Doing	active learning	19	13.48	<i>Teacher-54: ... Game activities will be beneficial in making students happy and reducing their anxiety. After explaining the subject, games can be played to reinforce or evaluate.</i>
	activity	22	15.60	
	group work	29	20.57	
	game	38	26.95	
N		141		

* Teachers expressed more than one opinion.

As shown in Table 19, teachers suggested that lessons should be more fun, that a suitable environment for active learning should be created, that more activities should be conducted, that group work should be increased, and that games should be played in class to reduce students' learning anxiety. Table 20 shows the methods-techniques used by the teachers and the practices they performed in teaching the subjects that they stated to be less memorable for their students.

Table 20.

Practices of Teachers in Teaching Subjects that are Less Memorable for Students

Theme	Code	f	%	Examples from Teachers' Opinions
Method-Techniques	5E	28	19.86	<i>Teacher-134: I create concept maps and explain the subject through them. ...</i> <i>Teacher-82: ... Since the classrooms are crowded, I mostly do it as a demonstration. While doing it, I both make explanations, get the students' ideas, and ask questions. ...</i>
	lecture	52	36.88	
	question-answer	44	31.21	
	demonstration	40	28.37	
	concept map	4	2.84	

	discussion	4	2.84	
Applications with Students Active	doing activity	16	11.35	<i>Teacher-26: ... Sometimes I write poems and stories. I'm singing. They both have fun and the stories are reinforced. ...</i>
	observation	8	5.67	
	question/problem solving	24	17.02	
	smartboard	36	25.53	
N		141		

* Teachers expressed more than one opinion.

According to the results of the analysis in Table 20, teachers indicated that they mainly use lectures, question-answer techniques, demonstration techniques, 5E teaching model, solve questions/problems related to the subject, and use smartboard applications when teaching the subjects in which students' retention of knowledge is low. The teachers' suggestions for the solution to the problem of low memorability of the subjects for their students are given in Table 21.

Table 21.

Teachers' Suggestions for Solving the Memorability Problem of Students

Theme	Code	f	%	Examples from Teachers' Opinions
Regular Repetition	repetition	73	51.77	<i>Teacher-115: Students should be given the habit of repeating regularly. They should repeat daily, weekly and monthly. ...</i>
Relate to Daily Life	associate	40	28.37	<i>Teacher-9: ... It is necessary to establish the relationship between what is told and daily life. In this way, the student learns to adapt what he has learned to life and what is learned becomes permanent.</i>
Students Learn by Doing	active learning	77	54.61	<i>Teaching-48: Methods and techniques in which students are active should be used more. ...</i>
	activity	56	39.72	
N		141		

* Teachers expressed more than one opinion.

As can be seen from the analysis results given in Table 21, the teachers suggested that the students repeat the subject regularly, explain the subject in relation to daily life, use the methods and techniques in which the students will be active, and conduct activities on the subject to increase the retention level of the students' knowledge.

Findings of the Fourth Research Question

The findings of the fourth research question, in which the students' suggestions for the solution of the learning problems they experienced in the science lesson were investigated, are presented below.

The students' thoughts on the solution to the learning problems they experienced are given in Table 22.

Table 22.

Student Views on Solving Learning Problems

Theme	Code	f	%	Examples from Teachers' Opinions
Lesson Activities	game	104	53,07	<i>S-79: Our teacher played a game once and it was very entertaining. Everything in the game is still in my mind I have never forgotten. I used to play such fun, teaching games. ...</i>
	fun	108	55,39	
	experiment	898	45,82	<i>S-841: ... I used to have different activities like this done. I would have posters and models made. I used to do projects. I would teach everything we learned by actually getting it done.</i> <i>S-1920: ... I used to show the things I told while teaching my lessons. Maybe I'd make them watch videos or something. I would tell from posters and models.</i>
	applied	400	20,44	
	material	672	34,29	
visual	472	24,07		
Simplification of Subject	simplification	974	49,70	<i>S-566: I would simplify the difficult subjects and process them in a way that suits us. ...</i>
Teacher-Student Communication	communication	689	35,15	<i>S-118: ... I would value us more. I used to pay attention to what we wanted a little bit in the lessons. For example, I would not lecture all the time. Or I wouldn't have watched a video even though I didn't want it all the time during a lesson.</i>
N		195	9	

* Students expressed more than one opinion.

Looking at the results of the analysis in Table 22, it can be seen that students indicated that lessons should be designed with games, that a fun learning environment should be created, that experiments should be conducted, that materials should be simplified, and that communication between students and the teacher should be improved to solve the learning problems they experience.

Discussion, Conclusion, and Suggestions

In this study, which investigated students' learning problems, reasons for the problems, and proposed solutions, a convergent parallel design of mixed research types was adopted, 1959 students and 141 science teachers at this grade level were studied, and the results shown below were obtained. According to the research results, students have the most learning difficulties in the "Circulatory System" subject and the "Force and Motion" unit. It has been determined that students have learning difficulties because the students' classmates make noise, the subject is difficult, they tend to memorize, there are too many concepts in the subject, the concepts are foreign to them, the concepts are confused with each other, they do not like the subject, the lesson/subject is boring, they are stressful, they are not given the opportunity for their own learning, the teachers constantly tell the subject themselves and they do not have enough activities.

The subjects that cause students' learning motivation to decrease are the "Circulatory System" subject and the "Force and Motion" unit. It was determined that the students' learning motivation decreased due to the fact that their classmates make noise in the lesson, the subject and the lesson are difficult for them, the concepts are confusing for them, the subject is boring, they are afraid of not learning the subject, the teacher constantly explains the subject, and activities are insufficient. It was determined that the subjects that cause students to experience learning anxiety are the "Circular System" subject and the "Force and Motion" unit. It was determined that the students have learning anxiety because they think that the course and the subjects are difficult, they tend to memorize instead of meaningful learning, the excess of concepts in the subject, the confusion of concepts, and the lack of activities. It was determined that the permanence of the students' knowledge is low in the "Circulatory System" subject and the "Force and Motion" unit. It was determined that the students cannot acquire permanent information due to the time passing on the subject, the lack of repetition habits, the difficulty of the subject, the inability to learn the subject, the excess of concepts, the confusion of concepts, the subject is boring and do not attract their attention, they remain passive while learning and the subject is processed quickly. Similarly, Akinci, Uzun, and Kisoglu (2015) concluded that students experience problems due to their thoughts about the difficulty of the science lesson and their negative attitude towards the lesson, as a result of their study with science teachers. In the same way, Balbag, Leblebicier, Karaer, Sarikahya, and Erkan (2016) attributed the learning problems experienced by students to negative attitudes, lack of motivation, dislike of learning, beliefs that the lesson is difficult, and teachers' use of traditional methods and techniques in teaching. In parallel, it is stated in the literature that traditional classrooms with one-way information flow are becoming less attractive for students with many information channels outside the classroom, and this situation causes learning problems to increase (Ouyang, et al., 2019).

According to the science teachers teaching at the sixth-grade level, students have the most difficulty in learning about the "Circulatory System" subject and "Force and Motion" unit. The teachers stated that the most common reasons students have learning difficulties are that the concepts are abstract and a lot in number, students confuse about concepts, the subject is difficult for students, active learning cannot be applied fully, and students have difficulties in mathematical calculations. According to the teachers, the subject that causes the learning motivation of their students to decrease is the "Force and Motion" unit. The teachers indicated that the students' motivation to learn decreased due to the fear of not being able to do, lack of prior knowledge, confusing the concepts, tendency to memorize, the inadequacy of activities, teacher-centered lectures and the subject being difficult for them. According to the teachers, it was determined that the subjects that caused the increase of students' learning anxiety are the "Circulatory System" subject and the "Force and Motion" unit. The teachers stated that the fear of not being able to do the subject, the confusion of concepts, abstract concepts, insufficient activity, teacher-centered teaching, and the subject's difficulty cause the students to experience learning anxiety. According to the teachers, the students' retention of knowledge is low in the unit of "Force and Motion". The teachers indicated that the students' knowledge is

not permanent because students do not repeat the subject regularly, memorize instead of meaningful learning, do not understand the subject, inadequacy of activities, and teacher-centered lecture. The learning problems that students experience while learning in lower grades cause the concepts to be misconfigured in their minds, resulting in wrong learning. Students' misconfiguration of concepts and their attribution of some meanings in their own way lead to weak foundations of the subjects they will learn in the next education stages, to experience difficulties in placing the concepts in daily life, and to misconfiguration of new concepts (Buyruk & Korkmaz 2016). As a result of students' false beliefs and experiences, behaviors that emerge as misconceptions will be observed (Baki, 1999). In the studies conducted in the literature, it is stated that students experience conceptual difficulties in the subjects they have problems with, they have misconceptions, and they have difficulties in associating them with daily life (Beeth, 1998; Candan, et al., 2006; Cetinkaya & Erol, 2016; Ecevit & Simsek, 2017; Fancovicova & Prokop, 2019; Ormanci & Özcan, 2012; Ozgur, 2013; Tasdemir & Demirbas, 2010; Yesilyurt & Gul, 2012). It was determined that students experience different learning problems on similar subjects. In this case, it can be said that a learning problem experienced by students while learning the subject causes other learning problems to emerge.

It was detected that the teachers mostly use the lecture and question-answer techniques. They do experiments to make the students active, solve the questions/problems, and benefit from the smartboard applications in teaching the subjects that their students have difficulty in learning. To address their students' learning issues, the teachers propose that smart board apps be enhanced, the subject be explained more clearly and concretely, active learning methods be utilized more frequently, and the quantity of activities be raised. It was discovered that teachers mostly employ lecture, question-and-answer, and demonstration tactics, as well as textbook exercises and smartboard applications, while teaching subjects that cause students' interest to wane. It was found that the teachers suggest that the lessons should be taught in a more fun way, the subject should be conveyed in a simpler way, activities should be done and games should be used in order to increase the motivation of their students in learning science. It was reached that teachers use lecture, question-answer, and demonstration techniques, do activities in textbooks, solve questions/problems, and benefit from smartboard applications in teaching the subjects that their students have learning anxiety. Teachers suggested making lessons more engaging, creating a suitable environment for active learning, conducting more activities, encouraging group work, and incorporating games into lessons to reduce students' learning anxiety. It was reached that teachers use lecture, question-answer, demonstration techniques, and the 5E teaching model, solve questions/problems related to the subject, and benefit from smart board applications in teaching subjects where students' retention of knowledge is low. It was determined that the teachers suggest that the students should repeat the subject regularly, explain the subject in relation to daily life, use the methods and techniques in which the students will be active, and carry out activities related to the subject to increase the permanence level of the students' knowledge. Studies in the literature indicate that teachers are effective on students' learning (Oqvist & Malmstrom 2017; Wilkie, & Tan, 2019). It has been observed that teachers mainly use traditional learning methods and techniques in the

teaching of subjects with learning problems, but they suggest the use of active learning methods and techniques for the solution of learning problems and activities that will make students active. Studies have shown that using active learning strategies in lessons helps to increase students' motivation and achieve more positive learning outcomes (Gonzalez-Gomez, et al., 2019). However, studies show that teachers are more inclined to use traditional methods (Akçay, et al., 2016; Aydede, et al., 2006; Demirkan & Saracoglu, 2016; Dogru & Aydogdu, 2003; Onen, et al., 2008; Sahin & Guven, 2016; Simsek, et al., 2012; Taskaya & Surmeli, 2014; Yildirim, 2011). It can be said that for the use of active learning methods and techniques, teachers make more effort, prepare extra materials, the application takes time and the desired results are not always achieved, the class sizes are crowded, the school infrastructure is not sufficient, there are no laboratories or there are limited opportunities, teachers prefer traditional learning methods and techniques more due to reasons such as the need to complete them until the end. It is thought that supporting teachers with appropriate training and coaching systems will help increase the use of active learning methods and techniques in lessons (Otara, et al., 2019).

In order to solve students' learning problems, it was suggested to design lessons with games, create a fun learning environment, experiment, use materials, simplify the subject, and improve communication between students and teachers. When the students' suggestions for solving the difficulties are considered, it may be concluded that learning environments in which they can learn by doing, take responsibility for their learning, and study in a simpler, more entertaining, and concrete context suited for their age will be useful. In the next step of this research, which looks at the subjects where students have trouble learning, why they have trouble, what applications teachers use to teach these subjects, and what solutions students and teachers suggest, it can be seen if these applications will solve the problems by putting together applications based on what students and teachers suggest.

Ethics Committee Approval: The research was carried out within the scope of the permission of Erzurum Provincial Directorate of National Education, dated 06.10.2017 and numbered 36648235-605.01.E.16089927. Atatürk University Social and Human Sciences Ethics Committee's document dated 26.10.2016 and numbered 48553601-000-E.1600268066 shows that none of the "Actions Contrary to Scientific Research and Publication Ethics" were carried out in the research.

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Authors**Contact**

Emre YILDIZ
Educational Game, Cooperative Learning,
Educational Technology.

Assoc. Prof. Dr. Emre YILDIZ,
AtaturkUniversity Kazim Karabekir Education Faculty,
Department of Science Education 25240 Yakutiye /
ERZURUM

E-mail: emre.yildiz@atauni.edu.tr

Umit SIMSEK
Cooperative Learning, Educational
Technology.

Prof. Dr. Umit SIMSEK,
AtaturkUniversity Kazim Karabekir Education Faculty,
Department of Science Education 25240 Yakutiye /
ERZURUM

E-mail: simsekum@atauni.edu.tr