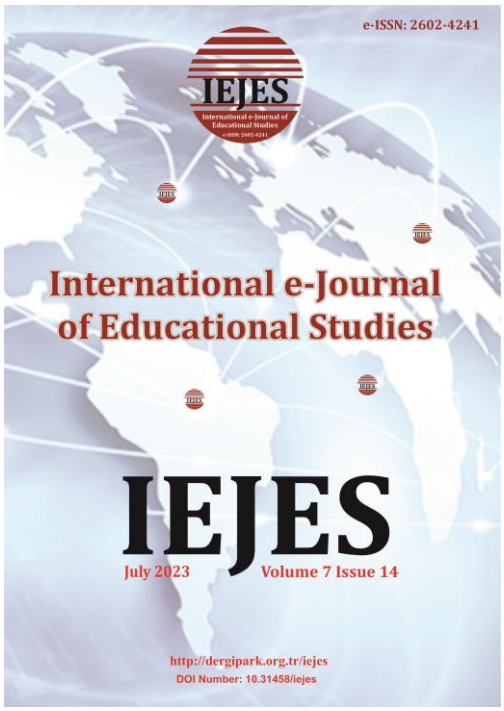

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Abstract

One of the primary objectives of today's teaching is to prioritize students' thinking skills as a path to become lifelong learners. Those skills are improved by enabling students to learn actively. Role of teacher in the active learning environment is to facilitate students' learning, and questions asked by students are important in the process. Based on the relevant considerations, this study aimed to identify questioning attitudes of secondary school students in mathematics courses and investigate their questioning behaviors in line with teacher and student views. The study utilized the partially mixed sequential equal status design. The study group was composed of 15 teachers working at five secondary schools in a city center of a rural province and 690 students. The data were collected through the Attitude Scale Toward Asking Questions, written view forms, semi-structured interviews, and observations. Exploratory statistical techniques were used to analyze quantitative data, and qualitative data were subjected to a content analysis. According to the results from anxiety about questioning subscale of Attitude Scale Toward Asking Questions, the students were anxious above moderate levels although they had high levels of questioning attitudes. Furthermore, it was concluded that number of questions asked by the students increased with higher grade levels, but they asked questions less frequently. In addition, it was determined that about half of the students refrained from asking questions, due to frustration and fear.

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Research Article

Secondary School Students' Attitudes and Teacher-Student Views on Questioning in Mathematics Course *

İlknur ÖZPINAR [1]

Abstract

One of the primary objectives of today's teaching is to prioritize students' thinking skills as a path to become lifelong learners. Those skills are improved by enabling students to learn actively. Role of teacher in the active learning environment is to facilitate students' learning, and questions asked by students are important in the process. Based on the relevant considerations, this study aimed to identify questioning attitudes of secondary school students in mathematics courses and investigate their questioning behaviors in line with teacher and student views. The study utilized the partially mixed sequential equal status design. The study group was composed of 15 teachers working at five secondary schools in a city center of a rural province and 690 students. The data were collected through the Attitude Scale Toward Asking Questions, written view forms, semi-structured interviews, and observations. Exploratory statistical techniques were used to analyze quantitative data, and qualitative data were subjected to a content analysis. According to the results from anxiety about questioning subscale of Attitude Scale Toward Asking Questions, the students were anxious above moderate levels although they had high levels of questioning attitudes. Furthermore, it was concluded that number of questions asked by the students increased with higher grade levels, but they asked questions less frequently. In addition, it was determined that about half of the students refrained from asking questions, due to frustration and fear.

Keywords: Student questions, mathematics course, questioning attitude, teacher

1. INTRODUCTION

The shift from a teacher-oriented education to a student-oriented one has brought about a new perspective to questioning approaches in the classroom. Today, researchers emphasize the importance of student questions both in teaching and learning processes (Almeida, 2012; Chin & Brown 2002; Etkina & Harper 2002; Madhu, 2015). When hearing or reading student questions, teachers can identify common misconceptions, answer some of the individual questions and adjust their next teaching with knowledge of students' learning (Chin & Osborne 2008; Etkina & Harper 2002; Harper, Etkina, & Lin, 2003; Kubat, 2018; Watts, Alsop, Gould & Walsh, 1997). Student questions can provide elucidative information about their reasoning, what they do or do not know and what they want to know (Black, Harrison, Lee, Marshall, & Wiliam, 2002; Chin & Osborne, 2008). For students, generating their questions is the first step to fill in the information gaps. Questioning allows students to understand a new subject and associate it with other opinions even when expressing their existing knowledge. Moreover, other than being a cognitive and metacognitive tool, questions are an indispensable part of self-questioning and self-evaluation (Chin & Osborne, 2008). In particular, student questions are critical in problem solving on the metacognitive level. Furthermore, different and creative answers depend on asking good questions to reveal them (Almeida, 2012; Shodell, 1995).

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One of the primary objectives of today's teaching is to prioritize students' thinking skills as a path to become lifelong learners in the learning and teaching process. Those skills are improved by enabling students to learn actively. Teacher's role is to facilitate student learning in an active learning environment where questions are the main element (Almeida & Neri de Souza, 2010). Institutions of education are among the environments where individuals will learn the questioning attitudes and behaviors effectively and acquire and improve questioning skills (Yeşil, 2008). However, studies have shown that the majority of questions in the classroom setting are not asked by students but teachers (Almeida, 2012; Dillon, 2004; Harper, Etkina & Lin, 2003; Madhu, 2015; Singh, Shaikh, & Haydock, 2019). Questions asked by students are not well-structured in general (Dillon, 1988; Good, Slavings, Harel & Emerson, 1987; Graesser & Person, 1994). These questions seem to be shallow and tend to have short answers; in other words, few of the student questions are advanced questions that involve inferences, multi-tiered reasoning, and implementation of a new idea into a new area of knowledge, synthesis of a new idea from several information sources or critical evaluation of a request (Graesser & Person, 1994). Surprisingly, teachers are not aware of the said situation (Dillon, 1981; Susskind, 1979). However, asking questions means thinking; therefore, thinking manifests itself as questions (Santoso, Yuanita & Erman, 2018). When students try to combine their preliminary knowledge and new information in their attempt to understand a given situation, questions also help them guide their learning (Almeida, 2012; Chin, 2001; Dillon, 1988, 2004). Other than being a learning method, questioning is also an important skill for the development of scientific thinking for students (Chin, 2001). The following answer provided by the Nobel laureate physicist Isidor Isaac Rabi to the question of how he became a scientist is a good example for this: "*My mother made me a scientist without ever intending it. Every other Jewish mother in Brooklyn would ask her child after school: 'So? Did you learn anything today?' But not my mother. 'Izzy' she would say, 'did you ask a good question today?' That difference - asking good questions - made me a scientist.*" (Sheff, 1988, p. 26). This explanation by Isidor. I. Rabi suggests that thinking skills cannot be developed without developing question-asking skills first (Şenşekerci & Bilgin, 2008).

Although educators attach importance to the role of student questions in learning (Almeida, 2012; Almeida & Neri de Souza, 2010; Dillon, 1981; Leikin, Koichu, Berman & Dinur, 2017), it is observed in the literature that teacher questions are in the focus rather than student questions (Chin & Osborne, 2008). Moreover, majority of studies on student questions are not current (Dillon, 1981, 1988; Graesser & Person, 1994; Pearson & West, 1991). In the literature, studies on student questioning have focused on i) students' questioning strategies (Yang, 2017), ii) ways of encouraging students to ask questions (Hofstein, Navon, Kipnis, & Mamlok Naaman, 2005), iii) questioning frequencies (Dillon, 1988; Graesse & Natalie Person, 1994; Pearson & West, 1991), and iv) classification of student questions (Chin & Brown, 2002; Leikin et al., 2017; Marbach Ad & Sokolove, 2000; Watts et al., 1997). Nevertheless, there are limited number of studies on students' questioning attitudes, perceptions and behaviors (Doğan, 2018; Singh, 2019). Pearson and West (1991) investigated questions of undergraduates in the communication course and concluded that all of the students asked only 3.3 questions per hour. Similarly, Graesser and Person (1994) made observations and found 0.17 question per student to be asked in a class hour. Doğan (2018) aimed to identify questioning attitudes of primary fourth-grade students and developed a scale. In the said research, the students were found to have high levels of openness to questioning and low levels of anxiety about questioning. Singh (2019) aimed to comprehend the nature and dynamics of questioning process that middle school students go through and how it is effective in learning and science. To that end, he examined student discourses both in- and out-of-classroom contexts. As found by the researcher, the students tended to talk and ask in the informal contexts more. Another finding of the research is that the students mostly asked authentic questions in the informal contexts, and a great amount of these questions were investigable. Moreover, as for classroom discourse that was teacher-

oriented or based on textbook questioning, the students rarely had meaningful participation and engagement in the discourse.

Almeida and Neri de Souza (2010) state that research is required on questioning attitudes and behaviors of students in today's classrooms. Similarly, Dillon (1988, 2004) states that so little is known about why students do not ask questions. Studies performed with different educational levels note that students avoid asking questions (Almeida, 2012). Indeed, classroom observation studies conducted for several courses and grades in different countries show that students globally ask very few questions (Dillon, 1988; Good et al., 1987; Graesser & Person, 1994; Singh, 2019). There is no current study on questioning frequencies of students (as reviewed by Chin & Osborne, 2008; Singh, Shaikh, & Haydock, 2019), and no study is observed in the literature on how secondary school students ask questions. Every course undoubtedly has a great importance in students' academic life which shape their future. However, mathematics course plays a particular role as almost all kinds of occupations require mathematics, especially mathematical thinking, more or less today. Questioning skill is also effective in the development of problem solving, decision making, creative, and advanced thinking skills which are important for mathematics course (Chin & Osborne, 2008). Based on these justifications, it is critical to conduct studies that examine the current status of students regarding questioning in mathematics courses, the perceptions of student questions, the effects of teaching experiences in the development of questioning skill, and students' level of questioning skills. Based on the relevant considerations, it was attempted with this study to identify questioning attitudes of secondary school students (fifth, sixth, seventh, and eighth grades) in mathematics courses and investigate their questioning behaviors in line with teacher and student views. To that end, the following questions were answered:

1. What are secondary school students' levels of questioning attitudes?
2. Do secondary school students' levels of questioning attitude in mathematics course differ by gender?
3. What are the questioning frequencies of secondary school students and teachers in mathematics course by grade levels?
4. What are secondary school students' views on questioning in mathematics course?
5. What experiences do secondary school students have about questioning?
6. What are secondary school teachers' views on students' questioning?

2. METHOD

2.1. Research Design

This study utilized the mixed method, and as the research design, the partially mixed sequential equal status design. The said design is used in studies in which quantitative and qualitative data are given equal weight to and collected consecutively. In this design, quantitative and qualitative data are separately analyzed and combined in the interpretation stage (Leech & Onwuegbuzie, 2009).

2.2. Research Group

The study group was composed of fifteen mathematics teachers (eight women and seven men) working at five secondary schools in a city center of a rural province in Turkey and six hundred ninety students of those teachers in six fifth-grade, seven sixth-grade, five seventh-grade, and six eighth-grade classes. The participation was on a voluntary basis, and the participants were selected with convenience sampling. Of the participant teachers, two had six-ten years of service, six had eleven-fifteen years of service, five had sixteen-twenty years of service, and two had twenty years of service and longer. Demographic characteristics of the students are shown in the table below.

Table 1. Distribution of students by gender and grade level

Gender	Grade Level				
	5	**6**	**7**	**8**	**Total**
Female (%)	72 (42.35)	95 (43.58)	67 (50.00)	78 (46.43)	312 (45.22)
Male (%)	98 (57.65)	123 (56.42)	67 (50.00)	90 (53.57)	378 (54.78)
Total (%)	170 (24.64)	218 (31.60)	134 (19.42)	168 (24.34)	690 (100)

Table 1 shows that the study group consisted of 170 fifth-grade, 218 sixth-grade, 134 seventh-grade and 168 eighth-grade students. As seen in the table, there were 312 (45.22%) female and 378 (54.78%) male students in the study group. In order to keep the identities of the participants confidential, student names were coded as S1, S2, S3 … and teacher names were coded as T1, T2, T3,…

2.3. Data Collection Tools

The study data were collected with quantitative and qualitative measures. The Attitude Scale Toward Asking Questions (ASTAQ), written view forms, semi-structured interviews, and observations were utilized in data collection.

2.3.1. Attitude scale toward asking questions (ASTAQ)

It is a 24-item, 5-point Likert scale developed by Doğan (2018) and composed of 2 subscales (*openness to questioning* and *anxiety about questioning*). The subscale *anxiety about questioning* involves items such as "*I feel uneasy when I ask a question.*" and "*I do not ask questions because I am embarrassed.*" whereas *openness to questioning* involves items such as "*I ask questions about topics of my interest.*" and "*I feel more confident when I ask a question.*" In the reliability analysis, reliability coefficients were found to be .77 for *anxiety about questioning*, .76 for *openness to questioning*, and .81 for the full scale. As a result of the reliability analysis, Cronbach's alpha reliability coefficient was found to be .83 for the whole scale. A Cronbach Alpha coefficient between .60 and .69 indicates an acceptable level of reliability, and a value between .70 and .89 indicates a good level of reliability (George & Mallery, 2003). These findings reveal that the reliability of the scale is at an acceptable level.

2.3.2. Written view forms and semi-structured interviews

These measures were prepared based on the literature (e.g. Dillon, 1981, 2004; Doğan, 2018; Marksberry, 1979) and submitted to the opinion of two experts who specialize in mathematics education. Questions of written view forms and semi-structured interview aimed to learn about teacher and student views on the need for and importance of questioning, situations or behaviors that hinder and support questioning skills, and reflections on the questioning process. While written view forms were implemented to the students, semi-structured interviews were performed with the teachers. In addition to the questions in written view forms, for exploring to what extent their academic experiences had been effective in the development of their questioning skills, the students were asked to write down anecdotes in the format prepared by Dillon (1981) as follows: *"I remember once when I was in (...), I/someone asked the question (...), and the teacher (...). I felt (...) and I thought or said to myself: (...)"*

2.3.3. Observation

Quantitative observations were used in the study as it included standardization of all required observational processes to obtain reliable research information (Johnson & Christensen, 2014). Event recording technique, which is the most appropriate recording technique, was used in cases where the information obtained to solve a problem in the observations was evaluated together and detailed

information about an event was desired. Since the most important characteristic of observable events is the repetitive occurrence of behaviors, these behaviors were measured throughout the recording during the observations. The measurements are presented by calculating the frequency and percentage of the observed behavior (Yalçıner, 2006). Unattended quantitative observation was performed for 48 hours in total; each class was observed for two hours (12 hours in fifth-grade classes, 14 hours in sixth-grade classes, 10 hours in seventh-grade classes, and 12 hours in eighth-grade classes) for questioning frequencies and behaviors of teachers and students in the classroom setting.

2.4. Data Analysis

SPSS 22.0 statistical package program was used in the analysis of quantitative data. Normality test was applied to determine whether the test results obtained before the analysis of the data showed a normal distribution. In the normality test, the kurtosis and skewness values of the data groups were examined. The groups whose skewness and kurtosis coefficients have values between -1.5 and +1.5 are considered to have normal distribution (Tabachnick & Fidell, 2013). When the data for the applied tests were examined, it was concluded that results showed a normal distribution. Thus, it was deemed appropriate to use parametric tests in the analyses. In the analysis of quantitative data from the study, independent samples t-test and analysis of varyans (ANOVA) of exploratory statistical techniques and frequency, percentage, mean, and standard deviation values of descriptive statistics were utilized. Independent samples t-test was used for independent groups in pairwise comparisons, and ANOVA test was used in multiple comparisons. Tukey test was used to determine the difference between groups in multiple comparisons and the significance level (p) was taken as .05 in this study.

13 of the items in the ASTAQ are (positive) statements that reflect the state of being open to asking questions. 11 of the items consist of (negative) expressions expressing anxiety. Negative items in the scale were reverse coded and included in the analysis. The maximum score that can be taken from the sub-dimension of *openness to questioning* is 65, the maximum score that can be taken from the sub-dimension of being *anxiety about questioning* is 55, and the maximum score that can be taken from the whole scale is 120. Higher scores from the scale mean that the student is open to ask questions while lower scores mean that the student is not open to ask questions and has high levels of anxiety about questioning (Doğan, 2018).

Content analysis technique was utilized to analyze qualitative data. Although qualitative data analysis can be performed using several methods and practices, the Miles-Huberman model is usually used for implementation and interpretation, which involves three steps of data reduction, data display, and conclusion: drawing/verifying (Miles & Huberman, 1994). This model was used in this study. Student and teacher views were included in the study to support the findings obtained through content analysis from written view forms and semi-structured interviews. The qualitative data from the study were coded individually by two experts. The coding by the experts were compared by the list of codes and themes; agreements and disagreements were identified and discussed to make required adjustments. Inter-rater reliability was calculated as 91% which is an acceptable rate (Miles & Huberman, 1994).

3. FINDINGS

Findings of the research are presented under separate headings in line with the subproblems.

3.1. Findings concerning the First Sub-problem of the Research

The first subproblem of the research is *"What are secondary school students' levels of questioning attitudes?"*. Descriptive statistics about the students' levels of questioning attitudes by grade levels are presented in Table 2.

Table 2. Students' mean scores of ASTAQ by grade levels

Grade Level	N	$\overline{X}$	S
5	170	95.80	12.68
6	218	91.78	12.99
7	134	92.19	14.54
8	168	94.58	14.62
Total	690	93.53	13.71

According to the table, the students' general mean score of questioning attitudes was found to be $\overline{X}$ =93.53 out of 120 points, which is a high score. By grade level, students' mean scores of questioning attitudes were found to be $\overline{X}$ =95.80, $\overline{X}$ =91.78, $\overline{X}$ =92.19, and $\overline{X}$ =94.58, respectively. The fifth-grade students were observed to have the highest mean score while the sixth-grade students had the lowest mean score from ASTAQ.

It was also investigated whether levels of questioning attitude among the students varied by grade level. The analysis results are given in Table 3.

Table 3. ANOVA results of students' ASTAQ scores by grade level

Subscales	Source of Variance	Sum of Squares	Sd	Mean of Squares	F	p	Significant Difference	Effect Size
Anxiety about Questioning	Between Groups	565.948	3	186.649	2.639	.051	None	
	Within Groups	49033.072	686	71.477				
	Total	49599.020	689					
Openness to Questioning	Between Groups	719.442	3	239.814	3.318	.020*	5-6	.014
	Within Groups	49588.339	686	72.286				
	Total	50307.781	689					
Total	Between Groups	1985.508	3	661.836	3.558	.014*	5-6	.015
	Within Groups	127622.412	686	186.039				
	Total	129607.920	689					

*p< 0.05

Whether the students' mean subscale scores of ASTAQ differed by grade level was examined with ANOVA, and Tukey's test was performed to find out between which grade levels the differences, if any, were (see Table 3). Analysis results indicated that there was a significant difference among students' levels of questioning attitude by grade level [$F_{(3-686)}$ = 3.558, p<.05]. In other words, students' questioning attitudes significantly differed by their grade levels. As shown by Table 3, students' questioning attitudes did not differ by grade level in the anxiety about questioning subscale whereas their attitudes significantly differed in the openness to questioning subscale. It was understood from the result of Tukey's test that this difference was due to the fifth-grade students' higher mean score than the sixth-grade students' mean score [$F_{(3-686)}$ =3.318, p<.05]. A similar evaluation was made for the subcategories of the scale, and the analysis results are shown in Table 4.

Table 4. Descriptive statistics for ASTAQ and its subscales

Subscales	Grade Level	N	$\overline{X}$	S
Anxiety about Questioning	5	170	44.93	8.32
	6	218	43.54	8.36
	7	134	43.48	8.94
	8	168	45.60	8.30
	Total	690	44.37	8.48
Openness to Questioning	5	170	50.87	7.54
	6	218	48.22	8.08
	7	134	48.72	8.64
	8	168	48.99	9.75
	Total	690	49.16	8.54

According to Table 4, the students were anxious above moderate levels with a mean score of $\overline{X}$ =44.37 out of 55 points in the anxiety about questioning subscale. As for the openness to questioning subscale, the students had high levels of questioning with a mean score of $\overline{X}$ =49.16 out of 65.

3.2. Findings concerning the Second Sub-problem of the Research

This section attempts to find an answer to the second subproblem of the research, which is "*Do secondary school students' levels of questioning attitude differ by gender?*". The relationship between the students' questioning attitudes and their genders was analyzed using the independent samples t-Test. Table 5 presents the findings about whether the student attitudes differed by gender.

Table 5. t-Test results for ASTAQ scores by gender

Gender	N	$\overline{X}$	S	Sd	t	p
Female	312	94.04	13.32	688	.898	.370
Male	378	93.10	14.17			

*p< 0.05

Questioning attitudes of the students did not differ significantly by gender and were found to be on a high level [$t_{(688)}$ = .898, p<.05]. The mean scores of questioning attitudes were $\overline{X}$ =94.04 for the female students and $\overline{X}$ =93.10 for the male students. It can be inferred from this finding that there was no significant difference between questioning attitude and gender.

3.3. Findings concerning the Third Sub-problem of the Research

The third subproblem of the research is *"What are the questioning frequencies of secondary school students and teachers in mathematics course by grade levels?"*. This section provides the frequency and percentage values obtained in the analysis of the questions asked by the mathematics teachers and students based on the 48-hour observation.

Table 6. Questioning frequencies of teachers and students in mathematics course

Questioning	Grade Level				
	5	**6**	**7**	**8**	**Total**
Teacher (%)	398 (93.87)	501 (93.82)	610 (96.06)	1078 (94.23)	2587 (94.52)
Student (%)	26 (6.13)	33 (6.18)	25 (3.94)	66 (5.77)	150 (5.48)
Total	424	534	635	1144	2737

As seen in Table 6, the teachers asked more questions with higher grade levels. According to the observation, a total of 2737 questions were asked; 94.52% of these questions were asked by the teachers while 5.48% were asked by the students. Considering the grade levels, the sixth-grade students (6.18%) asked more questions than the students in any other grade level. Furthermore, the fifth-, sixth-, seventh-, and eighth-grade grade students were observed to ask 2.16, 2.35, 2.50, and 5.50 questions on average in a class hour, respectively. In total, notably, the students asked an average of 3.12 questions. As for the teacher questions, the teachers asked 33.16 questions in the fifth grade, 35.78 questions in the sixth grade, 61 questions in the seventh grade, and 89.83 questions in the eighth grade on average. In other words, both the students and teachers asked more questions in the secondary school mathematics courses with higher grade levels.

3.4. Findings concerning the Fourth Sub-problem of the Research

This section presents the findings achieved for the fourth subproblem of the research, which is *"What are secondary school students' views on questioning in mathematics course?"*. It was aimed with this problem to explore the students' questioning attitudes and perceptions of questioning in mathematics course. First, the students were asked in which course they asked more questions, and it was found that they asked the highest number of questions in mathematics (54.20%) and science (41.30%) courses. Next, the students were asked to express what questioning meant for them. The answers included an effort to learn about the unknown (42.46%), the purpose of learning the unknown from someone who knows about it (22.17%), the desire to satisfy their curiosity (9.85%), a way of learning (9.42%), looking for answers (1.74%), the desire to solve the confusion in their mind (0.87%), and an indicator of participating in the course (0.43%). Statements of some of the students on the topic are given below:

> *"I think that questioning is to ask something we are curious about in a subject."* (S14, Fifth-grader)
> *"I think that questioning is some kind of learning tool for something you do not understand or with which I can say, 'Could it be like this as well?'"* (S383, Sixth-grader)
> *"Consulting someone to find a way of solution."* (S389, Seventh-grader)
> *"It is to ask about something you do not know or understand to the teacher or someone else who knows about it."* (S411, Seventh-grader)

Majority of the students thought that questioning is important and necessary. Themes and codes derived from the analysis of the participant justifications for their views on why it is important to question in mathematics course are given in Table 7.

Table 7. Student views on the importance of questioning in mathematics course

Themes	Codes	5		6		7		8		Total	
		f	%	f	%	f	%	f	%	f	%
Importance of Course	Mathematics is an important course	35	20.59	31	14.22	25	18.66	17	10.12	108	15.65
	Mathematics is necessary in all areas of life	22	12.94	14	6.42	6	4.48	20	36.90	62	8.98
	Mathematics is a course that is hard to understand	19	11.18	26	11.93	16	11.94	13	7.74	74	10.72
	Mathematics is a cumulative course	-	-	-	-	7	5.22	4	2.38	11	1.59
Learning	Learning the unknowns	75	44.12	80	36.70	56	41.79	44	26.19	255	36.96
	Preventing confusion in the mind	4	2.35	6	2.75	-	-	1	0.59	11	1.59
	Not mislearning	3	4.28	7	3.21	2	1.49	1	0.59	13	1.88
	The idea that teacher thinks something is understood if no question is asked	2	1.18	3	1.38	-	-	-	-	5	0.72
	Curiosity	2	1.18	1	0.46	-	-	-	-	3	0.43
Achievement	Being successful	31	18.23	9	4.13	9	6.72	11	6.55	60	8.69
	Possibility that a question will be asked about it in the exam	23	13.53	12	5.50	7	5.22	12	7.14	54	7.82
	High coefficient of mathematics questions in High School Entrance Exam (HSEE)	-	-	5	17.86	3	2.34	13	7.74	21	3.04
	For mathematics grade in report card	-	-	1	0.46	-	-	-	-	1	0.14
	Not to fall behind peers	-	-	1	0.46	-	-	2	1.19	3	0.43

According to Table 7, three themes of *importance of course, learning* and *achievement* were derived about the importance of questioning in mathematics course. In the theme of the *importance of course*, the most emphasized justifications were 'mathematics is an important course' (15.65%) and 'mathematics is a course that is hard to understand' (10.72%). In addition, the students thought that questioning is important in mathematics course because 'mathematics is necessary in all areas of life' (8.98%) and 'mathematics is a cumulative course' (1.59%). Student views on the relevant topic can be found below:

> *"We will see this course in every area of life. My mathematics need to be good to get somewhere in future. So, it is very important for me to ask questions in mathematics course."* (S14, Fifth-grader)

> *"Of course, it is very important to question. Because if we miss even one subject in this course, it will be very difficult to understand it later; it will be hard for you to learn. And mathematics is used a lot in everyday life."* (S585, Seventh-grader)

In the theme *learning*, as understood from Table 7, the most emphasized justifications were 'learning the unknowns' (36.96%) and 'not mislearning' (1.88%). The following is the student opinions on the topic:

> *"It is important to question in mathematics. If we did not understand it, we should learn it because its HSEE coefficient score is high."* (S191, Sixth-grader)

> *"It is important. Because mathematics is important in every area. I think we cannot learn if do not question."* (S638, Eighth-grader)

Regarding the theme *achievement*, the most expressed justifications were found to be 'being successful' (8.69%), 'possibility that a question will be asked about it in the exam' (7.82%) and 'high coefficient of mathematics questions in HSEE' (3.04%). The students expressed their views as below:

> *"I think it is important; in the end, it is a difficult course and the subjects are really interesting. Now, if you do not understand one of the subjects and not ask about it, you cannot understand the subject and have difficulty in exams."* (S383, Sixth-grader)

> *"I think it is so much important. Because mathematics point coefficient is high in HSEE and almost all points come from mathematics."* (S636, Eighth-grader)

As stated by the students, 335 (48.55%) refrained from asking their mathematics teachers questions while 355 (51.45%) of them did not. In the analysis of student views on why they did not ask questions, two themes which are *frustration* and *fear* and three subthemes were obtained. Relevant themes and codes are presented in Table 8.

Table 8. Student views on why they did not ask their mathematics teachers questions

Themes		Codes	5		6		7		8		Total	
			f	%	f	%	f	%	f	%	f	%
Frustration	Teacher-oriented	Teacher is busy or delays answering the question	115	67.65	128	58.71	71	52.98	105	62.50	419	60.72
		Teacher does not want any question	60	35.29	53	24.31	26	19.40	36	21.43	175	25.36
		Teacher does not have the time	-	-	11	5.04	11	8.21	13	7.74	35	5.07
	Peer-oriented	Peer pressure	10	5.88	8	3.67	4	2.98	13	7.74	35	5.07
		Peers ask too many questions	2	1.18	5	2.29	3	2.24	3	1.78	13	1.88
	Student-oriented	Not wanting to interrupt the course	86	50.59	109	50.00	85	63.43	97	57.74	377	54.64
		Disliking the course	1	0.59	-	-	-	-	-	-	1	0.14
		Thinking that he/she will learn later	-	-	5	2.29	10	7.46	-	-	15	2.17
		Not liking asking questions	-	-	4	1.83	5	3.73	6	3.57	15	2.17
		Distrust in himself/herself	-	-	3	1.38	3	2.24	3	1.78	9	1.30
Fear	Teacher-oriented	Teacher finds the question unnecessary or simple	58	34.12	110	50.46	50	37.31	65	38.69	283	41.01
		Negative effect of previous questioning experiences	50	29.41	77	35.32	43	32.09	49	29.17	219	31.74
		Teacher becomes angry	14	8.23	38	17.43	17	12.69	8	4.76	77	11.16
		Teacher mocks the question	4	2.35	-	-	1	0.75	-	-	5	0.72
	Peer-oriented	Thinking that the question can be easily answered or is unnecessary	64	37.65	89	40.82	54	40.30	58	34.52	265	38.40
		Others mock the question	52	30.59	93	42.66	50	37.31	44	26.19	239	34.64
		Embarrassment	22	12.94	42	19.27	20	14.92	21	12.50	105	15.22
	Student-oriented	Thinking that the friends will not understand it	57	33.53	108	49.54	61	45.52	59	35.12	285	41.30
		Thinking that he/she will ask an incorrect or unimportant question	16	9.41	12	5.50	10	7.46	9	5.36	47	6.81
		Thinking that he/she will disgrace himself/herself	-	-	9	4.13	4	11.76	3	1.78	16	2.32

It is seen in Table 8 that the students frequently emphasized the reasons 'teacher is busy or delays answering the question' (60.72%), 'student does not want to interrupt the course' (54.64%) and 'teacher does not want any question' (25.36%) in the *frustration* theme. Student views on the *frustration* theme are given below:

> *"[…] I refrain from asking, do not want to interrupt the course and distract my friends."* (S378, Sixth-grader)
>
> *"I sometimes cannot find the teacher, and sometimes I am embarrassed if the question I will ask is a simple one. […] I am sometimes afraid that the teacher will mock me."* (S389, Seventh-grader)

Regarding the *teacher-oriented* subtheme of the *fear* theme, the most mentioned justifications of the students included 'teacher finds the question unnecessary or simple' (41.01%) and 'negative effect of previous questioning experiences' (31.74%). The students expressed their views in this theme as follows:

> *"I am afraid to ask questions. I am afraid that I will say something unnecessary."* (S18, Fifth-grader)

> *"I am afraid and embarrassed to ask questions. […] Because some subjects I am not good at are easy, and therefore, I am afraid that my mathematics teacher will get angry with me when I question."* (S247, Sixth-grader)

> *"[…] Because I would be afraid that my teacher would get angry with me because I did not understand and could not ask some of my questions."* (S608, Eighth-grader)

The justifications in *the peer-oriented* subtheme of the fear theme included 'thinking that the question can be easily answered or is unnecessary' (38.40%), 'others mock the question' (34.64%), and 'embarrassment' (15.22%) as seen in Table 8. Student views on the topic can be found below:

> *"[…] I am sometimes embarrassed and afraid that they will mock me. And I ask my teacher in private most of the time in case my friends will mock me."* (S89, Fifth-grader)

> *"[…] I am embarrassed. I am afraid that they will judge and criticize me. And I cannot ask questions even if I want to."* (S506, Seventh-grader)

In the *student-oriented* subtheme, 'thinking that the friends will not understand it' (41.30%), 'thinking that he/she will ask an incorrect or unimportant question' (6.81%) and 'thinking that he/she will disgrace himself/herself' (2.32%) were among the codes derived from the student views. The student views regarding the topic are given below:

> *"[…] I mean, because my friends will mock me. They would say, 'You do not know anything at all'".* (S363, Sixth-grader)

> *"Sometimes I find my questions ridiculous and become embarrassed in case they will say that I do not know anything about this course. […] I am afraid to ask questions; I do not understand the mathematics course."* (S636, Eighth-grader)

Regarding whether students ask their friends questions, 84 (49.41%) of the fifth-graders, 110 (50.45%) of the sixth-graders, 75 (55.97%) of the seventh-graders and 114 (67.85%) of the eighth-graders mentioned that they asked their friends questions. The students tended to ask their friends more questions with higher grade levels. Notably, majority of the students justified their status of questioning. The themes and codes obtained in the analysis of the student views about their justification of asking their peers questions are given below.

Table 9. Student views on why they ask their peers questions

Themes		Codes	5		6		7		8		Total	
			f	%	f	%	f	%	f	%	f	%
Asking a peer question	Not being able to ask the teacher question	Being shy	6	3.53	11	5.04	4	2.98	1	0.59	22	3.19
		Failure to reach the teacher	2	1.18	9	4.13	-	-	-	-	11	1.59
		Teacher is busy	-	-	-	-	2	1.49	5	2.98	7	1.01
	Learning from a peer	Enabling learning together	44	25.88	53	24.31	36	26.86	54	32.14	187	27.10
		Receiving opinions	10	14.28	3	1.38	3	2.24	13	7.74	29	4.20
		Asking question without being afraid	-	-	7	3.21	-	-	1	0.59	8	1.16
		Asking question without being shy	-	-	5	2.29	3	2.24	7	4.17	15	2.17
		Having a better understanding of what they tell	-	-	-	-	4	2.98	2	1.19	6	0.87
Not asking a peer question	Not trusting the peer	Teacher explains better	23	13.53	34	15.60	17	12.69	11	6.55	85	12.32
		Thinking that they do not know it	14	8.23	10	4.59	7	5.22	7	4.17	38	5.51
		Thinking that he/she knows better than the peers	3	1.76	3	1.38	2	1.49	1	0.59	9	1.30
		Thinking that they cannot explain well	-	-	1	0.46	-	-	1	0.59	2	0.29
	Being shy of peer	Embarrassment	4	2.35	3	1.38	-	-	2	1.19	9	1.30
		Not wanting to disturb them	2	1.18	2	0.92	-	-	3	1.78	7	1.01
		They do not want to answer	2	1.18	-	-	-	-	-	-	2	0.29
		Possibility that they get mad	-	-	3	1.38	-	-	2	1.19	5	0.72
		Not wanting them to think that they know better	-	-	-	-	5	3.73	9	5.36	14	23.33
	Teacher's negative reaction	Teacher wants to be the only one who is asked questions	13	7.65	15	6.88	-	-	-	-	28	4.06
		Teacher gets angry when they ask a friend question	-	-	2	0.92	3	2.24	2	1.19	7	1.01

According to Table 9, the theme asking a peer question had two subthemes which are not being able to ask the teacher question and learning from a peer. The most repeated justifications in the theme asking a peer question were 'enabling learning together' (27.10%) and 'receiving opinions' (4.20%). The student views on the topic are provided below:

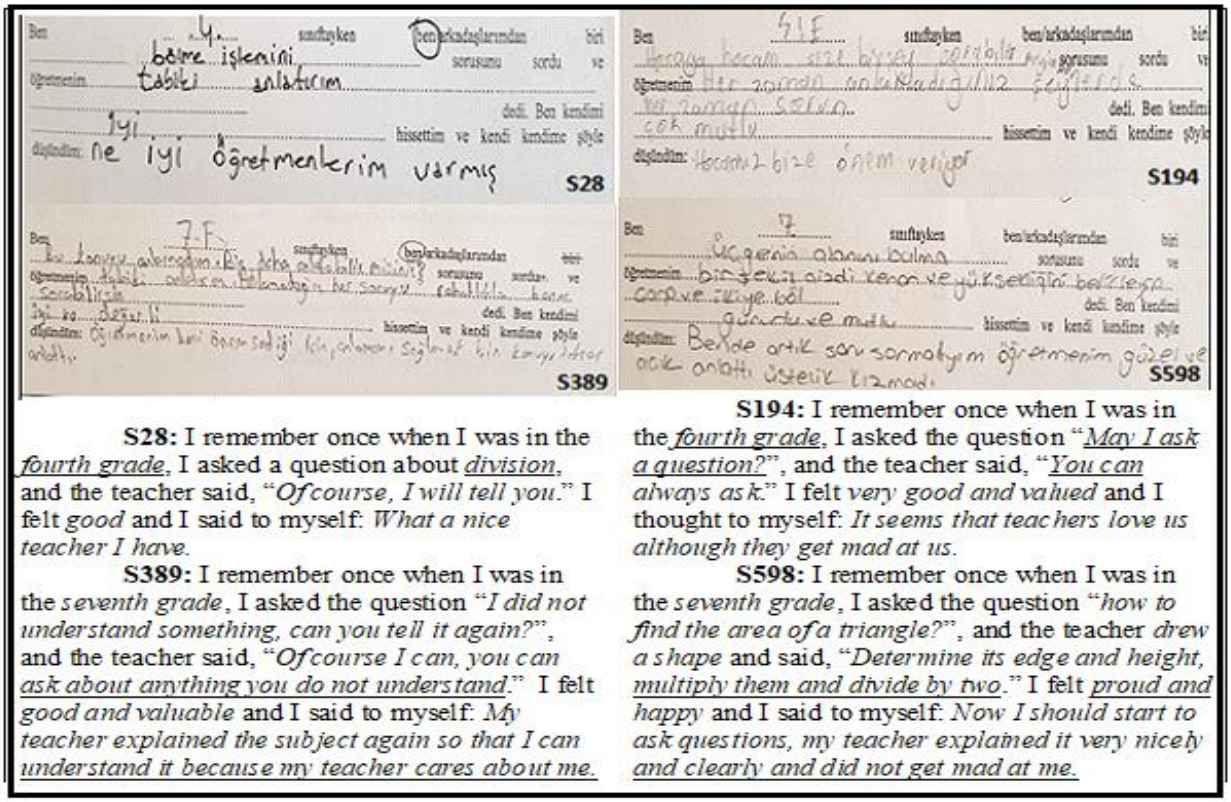
> *"Our teacher says, 'Consult your friends with questions. If they cannot answer your question, come to me altogether."* (S14, Fifth-grader)
>
> *"I ask my friends questions. I exchange information with my friends, we learn together."* (S598, Eighth-grader)

In the theme *not asking a peer question*, three themes were obtained, which are *not trusting the peer*, *being shy of peer* and *teacher's negative reaction*. Student views regarding this theme can be found below:

> *"I do not ask my friends any question. Because they look down at me or do not care about me, saying 'Is this the question you did not understand?'"* (S585, Eight-grader)

3.5. Findings concerning the Fifth Sub-problem of the Research

The fifth subproblem of the research is *"What experiences do secondary school students have about questioning?"*. This section presents positive and negative anecdotes provided by the students about their past experiences of mathematics course. Positive anecdotes provided by the students about their questioning experience are given below:



S28: I remember once when I was in the *fourth grade*, I asked a question about *division*, and the teacher said, "*Of course, I will tell you.*" I felt *good* and I said to myself: *What a nice teacher I have.*

S194: I remember once when I was in the *fourth grade*, I asked the question "*May I ask a question?*", and the teacher said, "*You can always ask.*" I felt *very good and valued* and I thought to myself: *It seems that teachers love us although they get mad at us.*

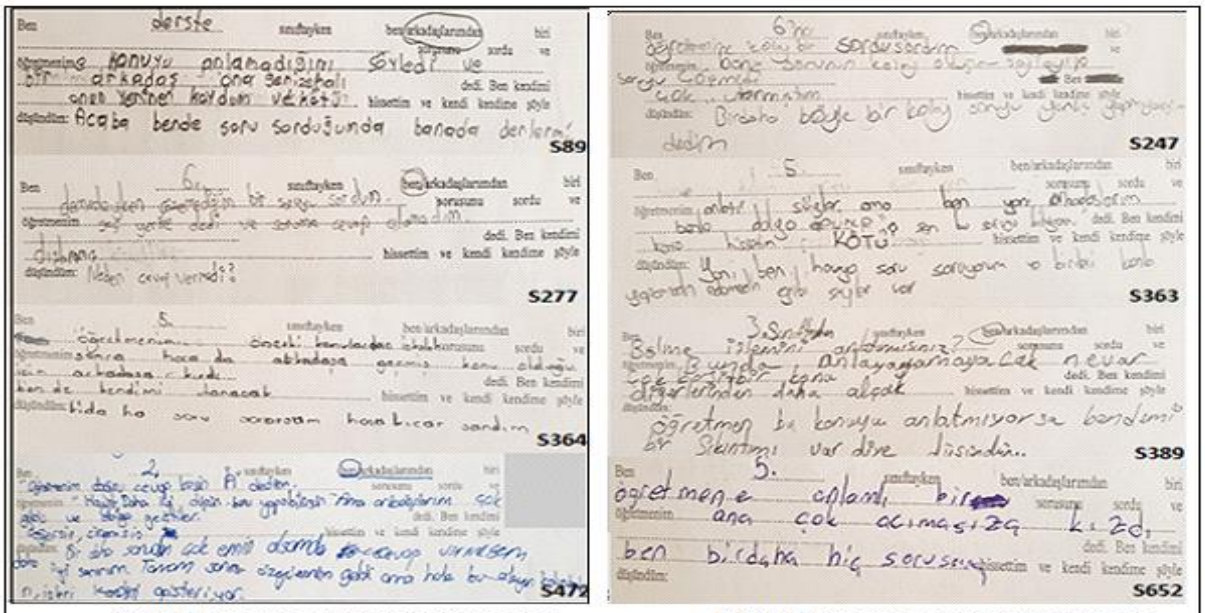
S389: I remember once when I was in the *seventh grade*, I asked the question "*I did not understand something, can you tell it again?*", and the teacher said, "*Of course I can, you can ask about anything you do not understand.*" I felt *good and valuable* and I said to myself: *My teacher explained the subject again so that I can understand it because my teacher cares about me.*

S598: I remember once when I was in the *seventh grade*, I asked the question "*how to find the area of a triangle?*", and the teacher *drew a shape* and said, "*Determine its edge and height, multiply them and divide by two.*" I felt *proud and happy* and I said to myself: *Now I should start to ask questions, my teacher explained it very nicely and clearly and did not get mad at me.*

Figure 1. Student anecdotes about their positive experiences in mathematics course

As seen in Figure 1, students' positive attitudes about asking their teachers questions made them feel good, valuable and cared about and made them not be shy of asking questions in the future.

It was noted that the students mentioned more negative experiences (58.40%) in their anecdotes of questioning. Figure 2 presents anecdotes of some of the students about their negative experiences.



S89: I remember once when I was in a *lower grade*, one of my friends asked a question *because he/she did not understand the subject*, and one of the friends called him/her *stupid*. I *put myself in his/her shoes* and I felt *bad* and I thought to myself: *Would they call me that if I asked a question?*

S247: I remember once when I was in the *sixth grade*, I asked *my teacher a simple question*, and my teacher *told me that the question was simple and did not answer it*. I felt *very embarrassed* and I thought to myself: *I will never make the same mistake again by asking such a simple question.*

S277: I remember once when I was in the *sixth grade*, I *asked my teacher a question that I could not answer*, and my teacher told me to *go to my desk* and I *could not get an answer to my question*. I felt *excluded* and I thought to myself: *Why did not he/she answer?*

S363: I remember once when I was in the *fifth grade* and *asked a question*, my teacher *explained it*, but said, *"Is this the question you could not answer?" when my friends mocked me*. I felt *bad*. I felt *very embarrassed* and I thought to myself: *I ask the teacher a question and they say I could not do it.*

S364: I remember once when I was in the *fifth grade*, one of my friends asked the teacher a question *about previous subjects*, and my teacher *get mad at* my friend because *the question was about a previous subject.* I felt *embarrassed* and I thought to myself: *If I ask a question too, the teacher will become angry.*

S389: I remember once when I was in the *third grade*, I asked my teacher the question "*Can you explain the division?*", and my teacher said, "*Why on earth you could not understand it? It is a very easy subject.*" I felt *I was on a lower level than my friends* and I thought to myself: *If the teacher will not explain the subject again, there must be something wrong with me.*

S472: I remember once when I was in the *second grade*, I *asked my teacher if the right answer was the option A*, and my teacher said, *"No, think better, you can do it." But my friends laugh at me so much and mocked me.* I felt *worthless and unimportant* and I thought to myself: *I think it is better not to answer even if I am sure of my question and that my answers are right. Okay, I regained my confidence later, but I am still under the influence of this incident.*

S652: I remember once when I was in the *fifth grade*, one of my friends *asked the teacher a very logical question and the teacher got angry with him/her ruthlessly*. I felt like *I would never ask anyone a question again.*

Figure 2. Student anecdotes about their negative experiences in mathematics course

In Figure 2, it can be observed that the students felt embarrassed, excluded, bad and worthless, and consequently, blamed themselves or decided not to ask any question again as a result of reactions given by their teachers. Unlike others, 9 of the students who wrote about their negative experiences provided examples through the reactions of peers. This was exemplified with the anecdotes of S89, S363 and S472 in Figure 1. It is understood from the relevant anecdotes that peers insulted and mocked them when they asked a question, the students felt bad and worthless, and therefore, they started to refrain from questioning.

3.6. Findings concerning the Sixth Sub-problem of the Research

The sixth subproblem of the research is *"What are secondary school teachers' views on students' questioning?"*. This section examines teacher perceptions of student attitudes toward questioning, and these are supported by direct quotes. With the views of the mathematics teachers, it was observed that they mentioned the importance of student questioning, the purposes of their questions, and the reasons why they did not ask question. Table 10 presents teacher views on the importance of student questioning.

Table 10. Mathematics teacher views on the importance of student questioning

Themes		Codes	Teacher-
From student's perspective	Learning	It facilitates a better understanding of the subject	T1, T7, T9, T13, T14
		It helps identify the points that are not understood	T2, T3, T7, T10
		It provides reinforcement	T2, T8, T12, T13
		Mathematics is a cumulative discipline	T6
		It provides active learning	T8
		It satisfies their curiosity	T8
		It is a good instructor	T15
	Skills	It improves critical thinking skills	T3, T11
		It improves mathematical thinking skills	T7, T11
		It improves reasoning skills	T5
		It improves problem-solving skills	T9
		It improves communication skills	T14
		It improves creativity	T15
From teacher's perspective	Teaching	It provides self-evaluation	T4, T5, T13
		It provides exchange of ideas	T5
		It provides information about student's learning and knowledge level	T13
		It enables a student-centered teaching	T15
	Motivation	It indicates that there is interest in the course	T4, T5, T14
		It encourages one to lecture eagerly	T3
		It provides a distance from monotonous teaching	T3

Two themes were derived from the analysis of teacher views, which are from *student's perspective* and *teacher's perspective*. While the importance of questioning was addressed within the scope of *learning* and *skills* from *student's perspective*, it was evaluated within the scope of *teaching* and *motivation* from *teacher's perspective*. It is understood from Table 9 that the most emphasized codes were related to the *learning* subtheme. Teacher views on the relevant topic are presented below:

> *"[…] It indicates student interest in the course. It also shows us the points we miss when explaining a given concept to students."* (T4)
> *"When there is a question, subject or problem that students do not understand, they may have trouble with future subjects as there will be disconnection due to the nature of mathematics […]."* (T6)

Another topic emphasized by the teachers was the purposes of student questions. The teachers discussed students' questioning within two themes which are *for learning* and *for hindering the course*, and the themes and codes derived are provided in Table 11.

Table 11. Mathematics teacher views on the purposes of student questions

Themes	Codes	Teacher-
For learning	Comprehension	T2, T3, T6, T7, T10, T11, T12, T13, T15
	Reinforcement	T4, T5, T13, T14
	Developing different perspectives of subject and having their accuracy confirmed	T2, T7, T9
	Making up their deficiencies	T8, T13
	Resolving the contradiction so that there is no misconception	T7
For hindering the course	Interrupting or hindering the course	T1, T2, T3, T4, T8, T9, T11, T14, T15
	Drawing attention	T3, T7, T8, T9, T14

As seen in Table 11, the purposes most emphasized by the teachers were 'comprehension' in the theme *for learning* and 'interrupting or hindering the course' in the theme for *hindering the course*. Teacher views on the topic can be found below:

> *"Most student questions are for disrupting the class. Albeit in minority, there are students who ask about something they do not understand, for proposing a different solution and having its accuracy confirmed and take the question to the next step and ask about its implementations in different subjects."* (T2)
> *"[…] They ask about the things they do not understand, yes, but they can sometimes ask questions to stand out unnecessarily and interrupt the course."* (T3)

As a remarkable finding of the study, all of the teachers thought that their students could ask them questions conveniently. The teachers expressed their opinions on this topic as follows:

> *"I think they ask questions easily most of the time. But they sometimes cannot do it. That may be my mistake. I am sometimes obliged to go fast to explain the subjects in time. When going fast, I notice that they do not ask any question."* (T2)
> *"I think the students can ask their questions. Because I answer patiently."* (T6)
> *"I think the children finds the confidence in me to ask questions, they can ask conveniently."* (T10)
> *"[…] It depends on the nature of students. Some ask without hesitating while some are influenced by their friends, become shy and cannot ask. I always repeat to minimize this situation. I explain this situation."* (T12)
> *"[…] Absolutely, they can ask conveniently. I remind them, "You can always ask questions." In the class, we also answer the questions in workbooks which they could not answer."* (T13)

Another point deliberated by the teachers was the reasons why students did not ask questions. The teachers described the reasons why students did not ask questions as being *student-*, *peer-* and *teacher-oriented*. Relevant themes and codes are given in the table below.

Table 12. Mathematics teachers' views on why their students cannot ask questions

Themes	Codes	Teacher-
Student-oriented	Not caring about the course	T2, T6, T8, T13
	The thought that "I do not understand mathematics, so I do not have to bother"	T1, T2, T7
	Not studying	T13
Peer-oriented	Embarrassment and refrainment	T7, T10
	Others mock the question	T3, T5
	Peer pressure	T2, T10
Teacher-oriented	Fear	T1, T2, T3, T5, T8, T9, T11, T12, T14
	Being shy	T2, T4, T6, T12, T15

It can be understood from Table 12 that the most emphasized theme was *teacher-oriented* regarding the reasons why students did not ask questions. Finally, the teachers were asked what they did for encouraging students to question. Majority of them said that they told them to ask questions if they have any during the class. Unlike others, T2 and T12 provided the following statements:

> *"I ask them. I compel them to ask question to make a progress. I encourage them, saying, "You can do it", so they ask about what they do not understand. I also want them to ask their friends questions. I ask prize questions and ensure that they get my help by asking questions to answer it. […]"* (T2)

> *"I divide the question into parts. I constantly ask them whether they understand it to a certain point. When it is gradual like this, students can determine what they do not understand and can ask questions."* (T12)

4. DISCUSSION and CONCLUSION

In this era that orientate towards the criticism of the modern world, raising individuals who have acquired questioning skills is getting even more important; therefore, the greatest task falls to the education (Aslan, 1994; Singh, 2019). Several roles of question can be mentioned in education. However, it is an obligation to focus on student questions rather than teacher questions and to value student questions rather than highlighting student answers so that higher thinking levels of students can be supported (Almeida, 2012; Dillon, 1981). Based on the said rationale, teacher and student attitudes toward questioning and their perceptions of questioning were examined in this study.

First, ASTAQ was implemented to the students; in light of the mean scores, the students were found to have high levels of questioning attitudes in mathematics course, and the fifth-graders had the highest mean score while the sixth-graders had the lowest mean score. In parallel with the results of the present study, Doğan (2018) investigated the questioning attitudes of fourth-grade students and concluded that they had high levels of attitudes. Whereas the students had high scores in the *openness to questioning* subscale of ASTAQ, the results from *anxiety about questioning* subscale indicated that they were anxious above moderate levels. Similarly, Doğan (2018) found the students to have a high mean score in the *openness to questioning* subscale; nevertheless, the students were anxious below moderate levels in the *anxiety about questioning* subscale, which contradicts the relevant finding in the present study. Considering the relevant results together, one can argue that students' levels of anxiety about questioning increased once they progressed to the secondary school. It was also found that there was no significant difference between questioning attitude and gender. Similarly, Good et al. (1987) concluded that the female and male students asked the same number of questions with older age. Jones, Howe and Rua (2000) observed in the science course that the male students were less afraid of asking questions than the female students.

Despite the educational importance of student questioning, researches in different educational levels and contexts indicate that students avoid questioning or ask very few questions (Madhu, 2015; Singh, Shaikh, & Haydock, 2019). In the present study, it was found that the sixth-graders asked questions more frequently than the students in other grade levels. This finding contradicts students' mean scores of ASTAQ by grade level. When explaining the reason, the students stated that they had to ask questions because mathematics course is of critical importance although they were afraid. As for the average number of questions asked by the students per hour in total, it was observed that number of questions increased with higher grade levels, and it was noted that the students asked an average of 3.12 questions in a class hour, which means that the students asked very few questions. In parallel with this result of the study, there are studies in the literature which found student questions to be very infrequent (Almeida & Neri de Souza, 2010; Dillon, 1988; Good et al., 1987; Graesser &

Person; 1994; Pearson & West, 1991). Although there have been many years since the said studies were conducted; in other words, prevalence and importance of student questioning have been increasingly emphasized, this study indicates questioning frequencies of students are still very low in today's mathematics classes. The primary reason for this might be the fact that appropriate conditions are not provided for students to ask questions. Indeed, Watts et al. (1997) state that students will ask questions when they have high confidence and self-esteem in terms of learning and know that their questions are valued. Yet, unlike the student questions, frequency of teacher questions was found to be quite high in all grade levels in the study. It was accordingly found that the frequency of teacher questioning in a class hour increased with higher grade levels. Similarly, Graesser and Person (1994) argued that teachers asked 30 to 120 question on average in a class hour.

Questions are one of the most powerful and easiest tools that can be used to make meaning of information by students who are curious, think and do research (Dillon, 2004; Doğan, 2018; Singh, 2019). The students were asked to state in which courses they asked more questions and what questioning meant for them. It was found that the students asked the highest number of questions in mathematics and science courses. Student questions suggest that they think about the ideas they are presented with and try to associate those ideas with other things they know. Source of student questions is a gap or inconsistency in students' knowledge or the desire to expand their knowledge toward a certain direction (Almeida & Neri de Souza, 2010; Chin & Osborne, 2008; Dillon, 1981). In this study, in parallel with the considerations in the literature, the students defined questioning as an effort to learn about the unknown, the purpose of learning the unknown from someone who knows about it, the desire to satisfy their curiosity, a way of learning, looking for answers, the desire to solve the confusion in their mind, and an indication of participating in the course. Regarding the student views on the importance of questioning in mathematics course, the most emphasized justifications were 'learning the unknowns' and that 'mathematics is an important course'. As stated by the students, the reason was exams of transition between educational levels such as the HSEE. It is known that academic skills in mathematics and science are essential to national and international exams of academic achievement monitoring, and there is a focus on improving these courses. These results suggest that secondary school students believe in the necessity and importance of questioning particularly in a mathematics course. It coincides with the philosophy of constructivist education. Active participation of a learning individual, how they interact with what is being learned and use questioning to make meaning of the information are important elements for the realization of learning (Aguiar, Mortimer, & Scott, 2010; Doğan, 2018).

About half of the students stated that they refrained from asking their teachers questions. Indeed, above-moderate scores from the *anxiety about questioning* subscale of ASTAQ reinforce this result. While students have so many questions, they usually do not ask them (Good et al., 1987). Dillon (1981) explained the reasons why students do not ask their questions to be the fact that their questions may not be clear or they think their questions are not important enough to be asked, and they are prevented from asking their questions and afraid of asking questions. Aslan (1994) articulated that individuals are afraid both of being asked and asking questions throughout their academic lives. For children, the questioning period starts with the age of 2-3 and peaks at the age of 6 which is the primary school age. In other words, students start their school lives as having been motivated to ask questions (Aslan, 1994). Yet, as they grow up, they start to ask fewer questions (Singh, Shaikh, & Haydock, 2019). Unfortunately, children's insatiable desire to question at early ages are suppressed and turned into fear for several reasons (Aslan, 1994). Like in the literature, it was found in this study that the participants refrained from asking questions due to *frustration* and *fear*. Regarding one of the reasons, *frustration*, the most emphasized justifications were that 'teacher is busy or delays answering the question' and that 'student does not want to interrupt the course'. Dillon (1981) stated that students are usually afraid of asking questions and frustrate themselves due to negative reactions of teachers

and other students. In this study, within the scope of the theme of *fear*, the most highlighted justifications provided by the students were that 'teacher finds the question unnecessary or simple' and 'thinking that the friends will not understand it'. Along with these justifications, factors such as the fact that teacher gets mad, others mock the question, peers think that students can be easily answered; embarrassment; thinking that friends do not understand the question, thinking that he/she asked a wrong or unimportant question and thinking that he/she will disgrace himself/herself represent hindrance for student questioning. There are studies in the literature which coincide with these results (Chin & Osborne 2008; Dillon, 1981, 2004; Doğan, 2018; Good et al., 1987; Madhu, 2015; Singh, 2019).

As for how students asked their friends questions, it was observed that the students tended to ask their friends more questions with higher grade levels. Justifications of students who asked their peers questions in this study were categorized in two themes which are not being able to ask the teacher question and learning from a peer, and some of the students stated that they did not refrain from their peers but the teacher and could ask them questions more easily because they were not afraid of them. Considering the students' views on why they did not ask their friends questions, three themes were derived, which are not trusting the peer, being shy of peer and teacher's negative reaction. The reason for this situation may be that students think that when they ask for help, it means revealing themselves as academically incompetent. As a matter of fact, it is stated in the literature that the more a student sees seeking help as a sign of weakness, the less likely he is to seek help (Karabenick & Gonida, 2018; Micari & Calkins, 2021). These results coincide with the results achieved by Madhu (2015).

One of the factors that affect student questions is their experiences (Almeida, 2012; Dillon 1981). In this study, the studies were asked to write down anecdotes to explore their questioning experiences, and the analyses notably showed that most of the anecdotes were about negative experiences. Indeed, regarding the reasons why the students did not ask questions, the negative effect of previous questioning experiences and students' above-moderate scores from the *anxiety about questioning* subscale of ASTAQ reinforce this result. In line with the results obtained, one can argue that one of the reasons why most of the students did not ask questions was experiences in their previous academic lives, which would most likely blunt their questioning behaviors. These results coincide with the results obtained by Dillon (1981) and Madhu (2015). Another conclusion from the anecdotes is that the students had several feelings such as happiness, fear, refrainment, anxiety, and excitement at the same time when asking questions. Thus, in consideration of this situation, it is important for teachers to create environments where students will feel safe about asking questions (Aguiar, Mortimer & Scott, 2010).

Student questions not only assist their learning but also improve creativity and motivate students to participate in classroom activities. Student questions can reveal several aspects of student thinking and comprehension. Some questions suggest that students think of the given concepts and opinions or try to relate them to other concepts they already know about (Chin & Osborne, 2008; Marbach Ad & Sokolove, 2000; Watts et al., 1997). Student questions inform teachers about topics for which students have difficulty in learning and also provide useful feedback for planning their future teaching (Chin, 2001). Furthermore, they help teachers ensure reflective thinking and student participation (Almeida, & Neri de Souza, 2010; Chin & Osborne, 2008; Doğan, 2018). In this study, teacher perceptions of and attitudes toward student questioning were examined, as well. As for the teacher views on the importance of student questioning, it was observed that the teachers developed several skills in parallel with the literature and contributed to the learning-teaching process. As inferred from the teacher views on the purpose of student questions, they believed that the students asked questions *for learning* but also *for hindering the course*. The teachers argued that the greatest reason why students did not ask them questions was the teachers themselves, students were *afraid of* and *refrained from* asking them

questions, which is another remarkable result of the study. However, this result contradicts the teachers' statements that their students could ask them questions conveniently. In addition, teacher behaviors that prevented students from asking them questions have similarities with the students' views.

In summary, it was found in the study that the students were anxious above moderate levels according to the results from the *anxiety about questioning* subscale of ASTAQ although they had high levels of questioning attitudes. It was also concluded that the number of questions asked by the students increased with higher grade levels, but they asked questions less frequently. In addition, about half of the students refrained from asking their teachers questions, which was due to *frustration* and *fear*. In parallel with the study by Dillon (1981), the greatest fear stated by the students was mathematics teacher's negative reaction rather than classmates' reactions. As for how students asked their friends questions, it was observed that the students tended to ask their friends more questions with higher grade levels. Considering both teacher and student views together, teacher behaviors that prevented questioning had similarities. Based on these results, teacher behaviors that hinder and support questioning can be observed in the classroom setting to take precautions. Teachers should implement activities that will enable students to question and work with their peers and exhibit behaviors which will support their questioning. Once appropriate learning environments where teachers attach importance to student thoughts, opinions and perspectives have been created to encourage students' questioning behaviors, student questions have been observed to be highly more cognitive (Edwards & Bowman, 1996; Marbach Ad & Sokolove, 2000) and better, meaningful and scientifically sounder (Hofstein et al., 2005). Hence, for eliminating the fear and frustration in terms of questioning in mathematics courses, students need to be provided with an educational environment where they feel comfortable, and teachers and peers should not exhibit judgmental and sarcastic attitudes and behaviors. Moreover, teachers can include students' questioning behaviors in the assessment criteria to support their questioning.

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