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RESEARCH ARTICLE

Examining the Background of Student Questions

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Abstract

This study aimed to examine the questions generated by elementary and secondary school students during 2018-2019 academic year. The study was conducted with 2,100 students from 2nd grade to 8th grade who live in different provinces of Turkey. They were asked to generate at least 1 and at most 4 questions about the Legend of Shahmaran in Anatolia as Turkish class activity, and they generated a total of 7,174 questions. The questions were grouped according to the question classification of Paul and Elder (2016) as type 1, type 2, type 3, and false questions. The research was designed as a case study, which is one of the qualitative research methods, and the data were analyzed by content analysis method. The results indicated that the students asked more single-answer questions and they were knowledge questions; they did not ask high-level questions that could be answered by reasoning. The most questions were produced by the 2nd, 3rd, and 4th grade students and the least questions were produced by the 8th grade students.

Keywords: Asking questions, critical thinking, question classification, student questions

Introduction

In our classes, we teach our students important knowledge and skills so that they can make meaningful touches to their own and others' lives. Over the years, several things about education have changed, such as curricula, materials, methods, and techniques.

However, some basic skills that we aim to provide to our students haven't chnaged at all. The most important one of these basic skills is critical thinking skills.

Critical thinking has been an important skill that has not lost its function and importance since Socrates in 600 BC. Even in the 21st century, critical thinking skills find their place in basic skills that should be found in qualified learners among other skills such as collaboration, communication, and creativity (Partnership For 21st Century Learning, 2007).

One of the comprehensive definitions of critical thinking skill is presented by the California Critical Thinking Disposition Inventory (CCTDI). The 7 features of critical thinking are emphasized with this inventory as follows: truth-seeking, open-mindedness, being analytical, being systematic, self-confidence, being inquisitive, and cognitive maturity (Facione, 1994).

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When groups are formed with these 7 characteristics, it can be said that critical thinking is looking for the truth (truth-seeking, cognitive maturity), rational thinking style (analytical and systematic, cognitive maturity) and an open-mindedness (open-mindedness, curiosity, and self-confidence; Wang et al., 2008).

Drawing attention to the relationship between critical thinking and Socratic inquiry, Paul (2016) states that critical thinking gives students a comprehensive insight into how their minds work in the search for meaning and truth. On the basis of this, Socratic questioning provides a basis for framing questions in this search for meaning and truth. Socratic questioning offers a unique opportunity for teachers to encourage critical thinking with questionsin their students (Keng, 1996). In our classrooms where we wish to improve this skill, questions should be the most important teaching material for teachers. Browne and Vefreeman (2000) listed the characteristics of classrooms dominated by critical thinking as having excitement, attraction of unexpected results, active learning, and frequently asked questions.

Questions Used in the Classroom by Teachers and Students

Regardless of the class, Cotton (1988) defines a question in its simplest definition as any sentence that has an interrogative form or function; in classroom settings, the questions of the teachers are defined as teaching tips or stimuli that give students instructions on the content items to learn and what to do and how to do it. Emphasizing the evaluation and improvement aspects of the questions used in the classroom, Akyol (2001) defined questions as "basic tools used to develop and measure understanding."

Teachers ask questions to students in the classroom at different times and for different reasons. To construct knowledge as a result of a teaching process (Yip, 2004), teachers check whether their students understand the subject or not, if they did not then which parts they did not understand (Şahin et al., 2002), and try to draw their attention to the classes more (Kılıç & Erkuş, 2015). They ask questions for purposes such as eliminating the deficiencies, inaccuracies, and uncertainties in their students' answers (Bozkurt & Polat, 2018).

Types of Questions

There are different classifications in the literature regarding the questions used in classes. The most widely used of these classifications is Bloom's Cognitive domain taxonomy. To measure each level, determined questionnaires are used (Linn & Grounlund, 1995). In the literature, there is also a classification in the form of negotiation questions that the student can find by researching and negotiating the information questions asked to learn the supposed information they know (Nassaji & Wells, 2000). In contrast, they are classified as short-answer and long-answer questions according to their answers. It is stated that long-answer questions are more

efficient in revealing the basic misconceptions of students compared to short-answer questions (Graesser & Person, 1994).

Paul and Elder (2016) classified the questions as knowledge questions, subjective judgment questions, and questions that require reasoning This classification are as follows:

1. Knowledge questions (facts): There is only one answer. The answer is same for everyone. For example, "What is the capital of Turkey?"
2. Subjective judgment questions (preferences): Answers vary from person to person. They include personal convictions and preferences. For example, "Which flower smells the best?"
3. Reasoning questions (judgments): Has multiple and controversial answers. They are the questions that spark important discussions. There is no single answer. Instead, there are good or bad answers with or without good reasons. The answer has a range of possibilities. For example, "Should the death penalty be removed?" or "What kind of balance is there between the commercial interests of the world and environment protection?"

It is important that questions, one of the most important elements of the learning process, are used by both teachers and students in classrooms. When the literature on the questions used in the classroom is examined, it is seen that the studies conducted mostly focus on teacher questions (Altun, 2010; Ayvacı & Şahin, 2009; 1994; Bay, 2011; Baysen, 2006; Beskisiz, 2009; Budak, 2011; Can, 2006; Ceviz-Elgün, 2016; Cumhur, 2018; Dindar & Demir, 2006; Eshach et al., 2014; Graesser & Person, 1994; Inamullah & Khan, 2011; Işıkoğlu Erdoğan & Akay, 2015; Kaya, 2014; Kubat, 2018; Ong et al., 2010; Şanlı, 2019). There are fewer studies on important dimensions of student questions, such as their quantity and quality.

While teachers use questions as an important tool in their classroom, they mostly prefer to ask their own questions. Studies have shown that very few of the classroom questions were asked by students (Kaya, 2014) and they were almost never asked during the class (Brill & Yarden, 2003; Chin, 2001; Cotton, 1988); however, teachers asked more questions than students (Yeşil, 2009), and it was found that unlike student questions, the frequency of teacher questions was quite high and they asked approximately 30 to 120 questions per hour. This means that 96% of the questions asked in a classroom setting are asked by teachers (Dillon, 2004; Flammer, 1981; Kerry, 1987; cited in Graesser & Person, 1994).

Students' encountering qualified questions asked by their teachers in classes and seeking answers to these questions as well as creating their own questions and looking for answers to their own questions will have significant contributions to their learning process.

Dillon (2004) acknowledges that creating questions and finding answers is a learning process and states that when we focus on questions rather than answers, we can hear more student questions in the class, so that students can develop an understanding by building knowledge.

In this context, the process of forming questions is a process of development from structured information to meaningful learning. Chin and Osborne (2008) describe this process as the first step taken by a person to fill their knowledge gaps and satisfy their curiosity. Asking your own questions can also create the motivation to find answers, and, therefore, contribute to students' cognitive development (White & Gunstone, 1992; cited in Brill & Yarden, 2003).

Purpose of this Study

Along with students hearing qualified high-level questions posed by teachers in classroom, creating their own questions will also have significant contributions to the learning process. When students are allowed to create their own questions, they are encouraged to think about their questions and answers. Because the creating a question is the process finding an answer at the same time.

Questions provide students both meaningful learning and the motivation to learn (Schmidt, 1993) and can help them be independent learners (Delcourt & McKinnon, 2011). According to Caram and Davis (2005), students engaging in the questioning process benefit from the clarification of concepts, emergence of key points, and enhancement of problem-solving skills. Using questioning, teachers assess students' knowledge, determine needs for focused reteaching, and encourage students to think at higher cognitive levels (as cited in Zhang,& Patrick, 2012).

Considering the contribution of students asking their own questions to learning processes and critical thinking skills, student questions are an important research area to focus on. Although there is a lot of research on questions and teacher questions in the literature, there is not enough research on student questions yet. Therefore, it is necessary to conduct researches on student questions and to enrich the field. From this point, this study aimed to examine the questions generated by primary and secondary school students and these students' background. In line with this main purpose, answer to the following question was sought: What kind of questions do primary and secondary school students produce?

Method

This research is designed as a case study from qualitative research method. The questions were classified as knowledge questions (type 1), subjective judgment questions (type 2), and reasoning questions (type 3).

Study Group

The data of the study were obtained from 2,100 primary and secondary school students studying in 7 different provinces of a private school in March and April in the 2018-2019 academic year. Table 1 gives a brief overview of the study group students according to their grade levels and the provinces they live in.

Table 1
Grade Levels of the Students in the Study Group and the Provinces they Live in

	Adana	**Ağrı**	**Ankara**	**Antalya**	**İstanbul**	**İzmir**	**Samsun**	**Total**
Grades	**n**	**n**	**n**	**n**	**n**	**n**	**n**	**n**
2nd Grade	35	28	46	36	73	42	40	300
3rd Grade	34	20	45	40	52	58	51	300
4th Grade	31	32	41	40	61	48	47	300
5th Grade	30	22	48	43	67	60	30	300
6th Grade	40	30	50	41	70	40	29	300
7th Grade	20	33	47	42	78	50	30	300
8th Grade	34	28	75	30	63	42	28	300
Total	224	193	352	272	464	340	255	2,100

The study was conducted with 2,100 students from 2nd grade to 8th grade who live in 7 different provinces of Turkey. Random sampling method was used while determining the students to participate in the research. They were asked to generate at least 1 and at most 4 questions about the Legend of Shahmaran in Anatolia as Turkish class activity, and they generated a total of 7,174 questions. Students' questions included in the data analysis process were grouped according to the classification of Paul and Elder using the codes in Table 2.

Table 2
The Codes used in Question Classification

Paul and Elder's question classification	**Code names used in the study**
Knowledge Questions (Facts)	Type 1
Subjective Judgment Questions (preferences)	Type 2
Reasoning Questions (Judgments)	Type 3

In addition to these 3 types of questions, the incorrect questions produced by the students were included in the classification, coded as incorrect questions and analyzed.

Data Collection Tool

The text of Shahmaran legend in the traditional mythology of Anatolian culture was chosen as the data collection tool. A text describing the related legend was rearranged by the researcher according to the number of sentences and words, the complexity of the sentence according to the criteria for each grade level, and adapted according to the class and age levels. Opinions on the texts were obtained from a committee of teachers who teach the grade levels that formed the sample group with the help of an academician specialized in the field. Necessary corrections

were made in line with the opinions received. The edited texts were applied to a group of pilot students that were at the target grade levels. As a result of the observations made during the pilot implementation, the relevant data collection tool was reviewed and made ready for implementation. Thus, the text belonging to the Shahmaran legend was arranged according to the grade levels and all the students participating in the research were enabled to think on the same text and produce questions.

In primary school, the classroom teachers and in secondary school, the Turkish teachers were asked to read the relevant text aloud in the classroom to make students think about the text. Later, the students were asked to share 4 questions about this text with their teachers, starting with the first question that came to mind and then to give them to their teachers in written form

Data Analysis

The data were analyzed by content analysis method. Then, the data were analyzed in accordance with the steps of the content analysis method: coding the data, finding themes, organizing themes, and defining and interpreting the findings (Yıldırım & Şimşek, 2008) (Figure 1).

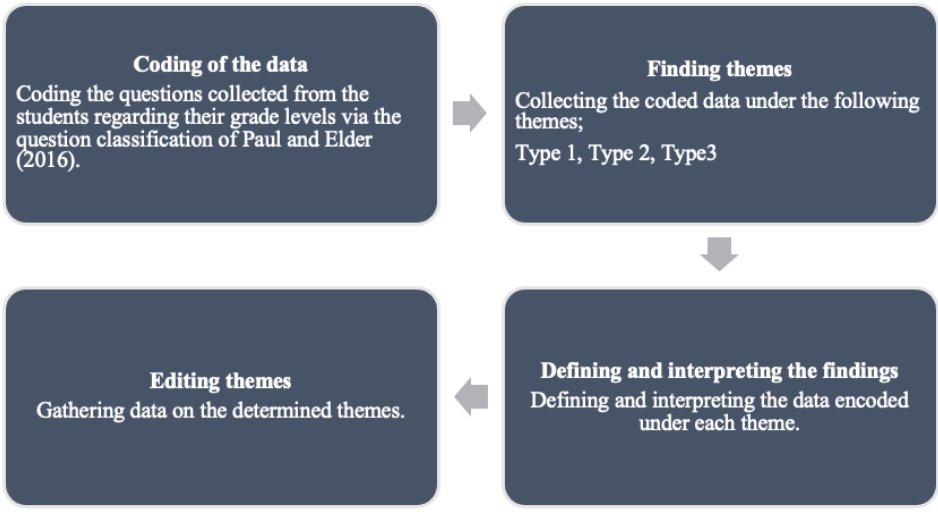

Figure 1.
Data Analysis Process

While analyzing the data, the questions were divided into 3 groups as type 1, type 2, and type 3. In addition, questions outside this classification and related to situations in the text but not suitable for the questionnaire were named as inaccurate questions. Table 3 contains examples of grouping the questions.

Table 3
Examples Written by the Students Regarding the Question Types

Type 1	Type 2	Type 3	Inaccurate question
What's the name of the child?	What do you think will happen at the end of the story?	Why did Camsab* want to get the honey that did not belong him?	What is the legend of Tarsus**?
What did Camsab follow in the well?	What would you do if you saw/went to Shahmaran?	How could Shahmaran* be half human and half snake? Why? How could it be possible?	Tarsus, who saw you first in the world?
What did the Camsab see in the forest?	Do you believe in the legend of Shahmaran?	Since it is known that snakes cannot walk, why did they make it walk in the text?	Are you a snake?
Why did the Camsab go down the well?	What would you write if you wrote a new title for this text?	Does the frightening appearance of Shahmaran prevent Shahmaran from being friendly?	Is this fish?
What did Camsab find in the well?	Which of the characters in the story are close to you?	Does Shahmaran have a connection with people who lived before her? If so, why do you think like that?	Who was sitting?

*Camsab and Shahmaran are the main characters in the text.
**Tarsus is the place where the text takes place.

The questions asked by the students on the basis of the situations in the text and that anyone reading, listening, or having knowledge of the text can give the same answers on the basis of the text, with a single answer, were included in the type 1 group. Again, the questions that were asked on the basis of the situations in the text and the respondents could put forward their personal preferences and opinions on the basis of the text were included in the type 2 group. The questions that were asked on the basis of the situations in the text, but that the respondents can reveal the meanings, inferences, reasoning, have more than 1 answer, and start important discussions, were included in the type 3 group.

The questions that were asked on the basis of the situations mentioned in the text, but not in a question form or that might be difficult to understand were included in the inaccurate questions group. After the question classification was completed, the students who produced the same type or incorrect question 3 or more times in a row were identified. Among these students, a focus student group was formed with those who volunteered to participate in the study. Then, a semistructured interview was held with the focus student group and their teachers. The interviews were recorded with a voice recorder. During the data analysis process, these sound recordings turned into written text and then coded by content analysis. These codes are interpreted under the appropriate themes.

Results

The study was conducted with 2,100 students from 2nd grade to 8th grade that live in 7 different provinces of Turkey. There were 300 students in each of the grade levels in these schools. These students produced a total of 7,174 questions. Table 4 contains number of questions produced by students according to regarding grade levels.

Table 4
Number of Questions Produced by Students According to Grade Levels

Grades	2nd Grade	n	300
		f	1,172
		%	16
	3rd Grade	n	300
		f	1,174
		%	16
	4th Grade	n	300
		f	1,174
		%	16
	5th Grade	n	300
		f	1,027
		%	14
	6th Grade	n	300
		f	951
		%	13
	7th Grade	n	300
		f	968
		%	13
	8th Grade	n	300
		f	708
		%	10
Total		n	2,100
		f	7,174
		%	100

When the questions produced by the students were examined, it was found that 2nd (16%), 3rd (16%), and 4th (16%) graders produced the most questions, and in contrast, 8th (10%) graders produced the least questions. The rate of generating questions decreased from 2nd grade to 8th grade.

When the questions produced by the students were classified, they produced the most type 1 (75%) questions and the least type 3 (7%) questions Students produced inaccurate question (%8) more than type3 question. Table 5 contains the number of questions produced by students according to question types.

Table 5
Number of Questions Produced by Students According to Question Types

Question types	**Type 1**	**Type 2**	**Type 3**	**Inaccurate questions**	**Total**
f	5399	701	472	602	7,174
%	75	10	7	8	100

The questions produced by the students are mostly (75%) knowledge questions with one answer and everyone who answers the question can give the same answers. This finding coincides with the findings of the study that Çakıcı et al. (2012) conducted with 816 elementary and secondary school students who produced more questions at the recall level of Bloom taxonomy.

Looking at the questions on a grade basis: type 1 question was produced the most by 2nd, 3rd, and 4th graders (16%), whereas the least (12%) were produced by 8th graders. The rate of generating single answer type 1 questions decreased from 2nd grade to 8th grade.

It can be stated that as the grade levels of the students increased, they produced deep questions that can be answered by reasoning and initiate important discussions rather than producing single-answer, knowledge questions. Looking at the grade-based perspective, it was seen that 2nd grade students produced questions that would help reveal subjective judgments. It can be stated that there was no systematic increase or decrease in the rate of producing type 2 questions as the grade level progresses. Table 6 contains number of questions produced by students according to questions type.

Table 6
Number of Questions Produced by Students According to Questions Type and Grades

Question types	Grades														Total	
	2nd Grade		3rd Grade		4th Grade		5th Grade		6th Grade		7th Grade		8th Grade			
	f	%	f	%	f	%	f	%	f	%	f	%	f	%	f	%
Type 1	863	16	852	16	841	16	794	15	705	13	692	13	652	12	5,399	100
Type 2	179	16	93	16	112	16	78	15	90	13	122	13	27	12	701	100
Type 3	59	16	89	16	98	21	48	15	56	13	106	13	16	12	472	100
Inaccurate questions	71	16	140	16	123	20	107	15	100	13	48	13	13	12	602	100

Baram-Tsabari and Yarden (2005) analyzed 1,676 questions sent to a television program by Israeli children to classify students' spontaneous interests in science and technology, and the findings of this study overlapped with their findings at certain points. According to this, more than half of the questions were "How many astronauts have been sent to space?" "Factual," a little more than a quarter of the students asked "How do we see these images from the power cable connected to our television?," and 13.5% asked "I am 11 years old and I eat a lot and I do not gain any weight. Is this bad?" or "Even though my dog is not yet one year old, it is big and strong, how should I tame him?" in the "applied" form. It was found that the students asked questions directly related to the subjects in daily life and questioning the subjective opinions of the other person. In contrast, it was found that students' motivation to ask questions shifted with age. Accordingly, the rate of applied questions asked by students between the ages of 6 and 16 gradually decreased.

Type 3 questions were produced the most (21%) by 4th graders, whereas 8th graders produced them the least (12%). It can be stated that 4th graders produced judgment questions that can be answered by reasoning. It is observed that as the grade levels of students increased, they asked questions that required reasoning, but this situation

was interrupted at certain grade levels. A similar finding was included in Bountrogianni's (1983) research on children's reasoning skills. Bountrogianni worked with 45 Greek-Canadian children aged 5 to 11 years and 45 Canadian children aged 5, 8, and 11, whose first language was English. In the study, children's part-whole reasoning skills were assessed via a manipulative set. As a result of statistical analysis, it was stated that as children get older, their reasoning skills increase (as cited in Erbay, 2009).

When inaccurate questions were examined, it was found that while 4th graders produced them the most (20%), 8th graders produced them the least (12%).

Discussion, and Conclusion and Recommendation

On the basis of the findings of this study conducted on the questions produced by elementary and secondary school students, the number of question produced decreased as the grade level increased. Encouraging students to ask questions from the early years and preparing programs to develop their questioning skills will encourage students to ask. In addition, using a dialogue-based communication language that will increase student-teacher interaction in the learning environment will ensure that students' questions are heard more in the classroom. Teachers 'preparation of lesson plans in a way that stimulates students' curiosity will allow more student questions to be heard. In contrast, as the grade level increases, the fact that the learning turns into the students' memorizing the answers by finding the correct answers among the choices is another factor.

It is seen that students mostly produced single-answer questions of knowledge, questions with subjective judgments, and a small amount of good questions that can be answered by reasoning. The rate of students producing inaccurate questions is higher than type 3 questions with depth. Students develop their high-level skills while producing high-level questions. When this finding is combined with the findings that teachers ask more knowledge-level questions in classrooms, it can be said that students model their teachers.

Children are curious by nature and ask questions out of curiosity. Berlyne puts the phenomenon of curiosity on 2 main axes. The first of these axes is perceptual and epistemic curiosity and the other axis is specific and distracting curiosity. Epistemic curiosity can be defined as the desire to reach information, ideas, and facts. Epistemic curiosity is the driving force behind all scientific search and philosophical inquiries (Livio, 2009). In another research Jirout and Klahr (2012) found that there was a positive correlation between curiosity and question asking. In contrast, research on question and curiosity (Kiamanesh, 2004), the question-curiosity relationship is made clear by the finding that curiosity causes children to ask 125

questions daily while it triggers an average of 6 questions among adults with a logical worldview (as cited in Zolfagharia 2011). Teachers should focus on students' epistemic curiosity.

According to the studies conducted in the field, students spontaneously ask high-level questions (Chin & Brown, 2002). It is necessary to listen to students' questions and make these questions a part of the learning process. In the literature, it is agreed on the necessity of creating an "encouraging environment" so that students can ask questions (Dillon, 2004; Shodell, 1995; cited in Brill & Yarden, 2003) as it positively affects their questioning behaviors. One of the techniques suggested to encourage a learning process to ask questions is the discussion method. King (1994) states that the discussion method helps students' questions to be heard as much as teacher questions in the class and encourages students to produce questions (King, 1994; cited in Brill & Yarden, 2003). In addition to the question-ball technique (Memduhoğlu et al., 2017), problem-solving-oriented activities (Chin & Brown, 2002) and activities created by using questions as a message design tool (Korkmaz & Yeşil, 2010) affect students' behaviors of asking questions in the class positively.

Another technique that both encourages students to ask questions and provides the opportunity to hear qualified questions is the Socratic questioning technique. With this technique, questions become a part of the lesson (Bülbül-Hüner, 2021). Students will produce their own questions in learning environments where teachers are exposed to good questions and can model good questioning. Research on students' question-generating behaviors will shed light on the important components of a course, from classroom teaching techniques to materials used.

In this study, the situation of students to generate questions within class was examined. In future studies, families can be included in the research to examine the students' asking questions at home and compare these findings with the situation of asking questions in the class and a deeper background examination of students' question generation situations can be done. In this study, interviews were made with the classroom teachers of the students. In contrast, conducting the research with 7 provinces and 2,100 students cannot be considered as a limitation. However, testing the subject of this research with different students both quantitatively and qualitatively can provide generalizations regarding applications.

This article discussed important ideas on students' ability to ask questions in the classroom. It also provides a new tool for classifying the questions produced by students. It is thought that a small number of student questions in the field will shed light on the researches with their findings.

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