Journal of Anatolian Education Research

https://dergipark.org.tr/tr/pub/jaer
e-ISSN: 2651-4389

JAER

Research Article

Evaluation of Mathematics Sample Questions Published for LGS According to the Opinions of Secondary School Students

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Abstract: In this study, it is aimed to evaluate the mathematics sample questions published for LGS according to the opinions of secondary school students. Therefore, this research used a case study, one of the qualitative research approaches, which aims to determine the views of secondary school students on the mathematics sample questions for LGS, which is defined as the "new generation question" published by the Ministry of National Education. Interview method in qualitative research techniques was adopted as the data collection method of the study. The interview form developed by the researchers was used. The data obtained in this research were analyzed with the descriptive analysis method. Evaluation of the mathematics sample questions published for LGS according to the opinions of secondary school students, the result obtained in the related research; It can be said that there are opinions that are suitable in daily life but are more difficult than the old question types, that they are made difficult by participating in a plot, that there are question types that they are not accustomed to, that they affect them psychologically because they are difficult to solve. It was observed that the emergence of these unfamiliar question types increased the anxiety level of the student, caused a loss of motivation, and some students stated that they were hopeless. In line with the results of the study, it is thought that the positive effects of the new generation questions will be explained in detail and the attitudes in this direction and the students' development of their own solution techniques while solving the new generation mathematics questions will have positive effects.

Keywords: LGS; mathematics sample questions; student opinions

Citation: Vardı, M., Özdemir, S., Turğut, B., Akbaş, F., Eliaçik, F., & Uslu, O. (2023). Evaluation of mathematics sample questions published for LGS according to the opinions of secondary school students. Journal of Anatolian Education Research, 7, 1-5.

Received: 12 January 2023

Accept: 21 January 2023

Early online publication

Published Online: 30 December 2023

1. Introduction

The measurement-evaluation made for the process of revealing the results of the education has a very important feature for education. It is a determining factor for exams, which is especially important in terms of individual ranking and measuring educational success (Kaya and Göktürk, 2019). There are also math exams that take place around the world.

To be implemented in the 2017-2018 academic year, the transition to secondary education system was changed again in 2017, TEOG, which had been implemented since 2014, was abolished and replaced by LGS. The High School Entrance System, which started to be implemented in 2018, is an exam that measures the logic and reasoning ability, which is based on the questions like in the TIMSS and PISA exams. With the new application, schools are divided into two categories: secondary education institutions that will admit students to high schools by exam and secondary education institutions that will accept students based on addresses. Secondary education institutions that will accept students by central examination are stated as Science High Schools, Social Sciences High Schools, and Secondary Education Institutions Implementing Special Programs and Projects. In this new application, where students can take the exam if they wish, a two-session multiple-choice exam consisting of a total of 90 questions in two areas, verbal and numerical, covering the content of the eighth grade curriculum, will be applied to the eighth grade students. Turkish, Social Studies, English and Religious Culture and Moral Knowledge courses consist of 50 questions in total and the exam duration is 75

minutes; There are 40 questions in total in the numerical area created by the Mathematics and Science courses, and the exam duration is specified as 60 minutes, and it is stated that the correction formula (3 wrongs make a right) will be applied in the exam (MEB, 2018).

In Turkey, exams for the transition to high school were based on questions at the level of knowledge, understanding and perception until LGS (Batur, Ulutaş, and Beyret, 2019). İlber, Tuna, Uysal, and Kabuklu (2018) found that LGS, which started to be implemented in 2018, is distinctive compared to the previous exams and requires intellectual thinking skills (interpretation, synthesis, analytical thinking, inference, etc.). With the regulations made by the Ministry of National Education, the institution responsible for preparing LGS questions, on January 21, 2018, the primary education curriculum was changed and these curricula were announced by the Ministry of National Education Board of Education and Discipline. 8th grade students are educated in their schools according to this curriculum throughout the year, and the Ministry of National Education prepares new generation sample LGS questions within the scope of the achievements of this curriculum. According to Sanca et al., (2021), new generation questions are used by Wijaya et al., (2014) are known as questions that allow him to associate the current situation of the problem with his own experiences, and are used to measure high-level thinking skills, which are difficult to measure with familiar objective items.

When it is seen, it is difficult for students because of its length or visual. This bias causes the brain to perceive those new generation math questions as difficult, which has a bad effect on the psychology of students. If the psychology of the student is bad, there is an increase in mistakes due to the fact that the questions seem difficult to them both in the practice exams and in the exams organized by the Ministry of National Education. It has been determined that the reason why teachers and students have difficulty with these questions is that the mathematics questions in the exams and the achievements in the curriculum are not compatible, in addition, the textbooks do not provide guidance for new generation questions (Sen and Ünal, 2021).

This increase in errors can be eliminated by seeing and solving more new generation question types. The reason for this is that when you see and solve the more feared question types, there is an immunity to that question type. While the teachers stated that the new generation questions were one of the positive aspects of the program, both teachers and students stated that they had difficulties with such questions. It has been determined that the students are aware that the subjects they learn in the mathematics lesson will be useful in their daily, school and future life (Sen and Ünal, 2021).

1.1. Purpose of the research

The aim of this study is to evaluate the mathematics sample questions published for LGS according to the opinions of secondary school students. In accordance with the purpose, how does the research and how does the mathematics sample questions published for LGS affect the views of secondary school students? It is determined in the form. The sub-problems of the research are;

What do the students think about the Mathematics Sample Questions Published for LGS and how do they compare the difficulties of the old style and new generation questions?

• How do the students think that the Mathematics Sample Questions Published for LGS contributed to them and how do they think it relates to their daily lives?

• Did the students create their own solution techniques while solving the Mathematics Sample Questions Published for LGS and how do they think it changed their perspective on mathematics lessons?

• How do students think that Published Mathematics Sample Questions for LGS affect their success in mathematics?

2. Research Method

In this study, a case study, one of the quantitative research designs, was used. Case studies aim to reveal how the factors related to a situation affect the situation or how they are affected by the related situation by investigating with a holistic approach. (Lightning and Simsek, 2011). Data were collected using semi-structured interview technique and descriptive analysis was used to analyze the data.

3. Bulgular

This research was conducted with 15 eighth grade students in the 2022-2023 academic year. In this respect, it can be said that the study group was determined by purposive sampling method. In the findings section, the names of the students were kept confidential within the scope of research ethics while the opinions of the students were stated and the students were coded as “T1, T2, T3…”.

4. Data Collection Tools

A semi-structured interview form was prepared to determine the views of secondary school students on the mathematics sample questions published for LGS. In the process of preparing the interview form, within the scope of the validity and reliability study; The relevant literature was searched, open-ended questions were prepared in the light of the information obtained, and the opinions of three field experts and participant confirmation were taken for internal validity. The form, which received expert opinion for content validity, was arranged in line with the opinions of the expert in the field of Turkish teaching, and a preliminary application was made by two teachers (except for the research group). In the pre-application, it was determined that the questions were understood by the participants. The obtained data were compared with the literature, the accuracy was checked and the final form of the form was given. During the data collection phase, the participants working in different settlements were asked 4 different open-ended questions specified in the purpose of the research, and data were tried to be obtained.

5. Data Collection and Analysis

Descriptive analysis, one of the qualitative data analysis techniques, was used to analyze the opinions of secondary school students on the mathematics sample questions published for LGS. The data obtained in the descriptive analysis are summarized and interpreted according to the predetermined themes. Direct quotations are frequently included in order to reflect the views of the interviewees in a striking way. The purpose of descriptive analysis is to present the findings to the reader in an organized and interpreted form. The data obtained for this purpose are first described in a systematic and clear way. Afterwards, the descriptions are explained, interpreted and finally some conclusions are reached (Yıldırım and Şimşek, 2011).

6. Results

In this part of the study, information on the opinions of secondary school students on the mathematics sample questions published for LGS are presented respectively. The data obtained were evaluated with descriptive analysis, one of the qualitative evaluation methods, and the frequency and percentage values of the opinions obtained were given and explained in tables.

Table 1 presents the results of the opinions regarding what the students think about the Mathematics Sample Questions Published for LGS and how they compare the difficulties of the old-style and new generation questions.

Table 1. Frequency and percentage values of opinions on what students think about the mathematics sample questions published for lgs and how they compare the difficulties of old-style and new generation questions.

Opinions	f	%
Pozitive	1	5
Negative	14	95
Total	15	100

According to Table 1, "What do the students think about the Mathematics Sample Questions Published for LGS and how do they compare the difficulties of the old-style and new-generation questions? Please explain." While 14 students gave a negative answer to the question, 1 student gave a positive answer. Below are some quotations from the answers of the teachers who think that they are related to the place of duty:

T1: "The questions are usually given in a very long paragraph or like a story."

T5: "Previous questions were easier because they were based on knowledge, new generation questions were difficult because we were not used to them."

T6: "In the old-style exams, he asked the information/process directly, but in LGS he gives the information in the problem and asks you to solve the problem using the information."

T12: "Old questions only measure knowledge, new generation questions measure interpretation."

T14: "They give the question statements too long and it is not clear what they want."

The results of the opinions related to how the students think that the Mathematics Sample Questions Published for LGS contribute to them and how they think it relates to their daily lives are presented in Table 2.

Table 2. Frequency and percentage values of opinions related to the effect of mathematics sample questions published for LGS on how they think it contributes to them and how it relates to their daily lives.

Opinions	f	%
Pozitive	-	-
Negative	15	100
Total	15	100

According to Table 2, all participating students answered the second question "It has an effect on daily life." replied as. Most of the students stated that the mathematics sample questions published for LGS were related to daily life.

Table 3 shows the results of the opinions about whether the students created their own solution techniques while solving the Mathematics Sample Questions Published for LGS and how they changed their perspectives on mathematics lessons.

Table 3. Frequency and percentage values of the opinions regarding how they changed their solution techniques and their perspectives on mathematics lessons while solving the mathematics sample questions published for LGS.

Opinions	f	%
Pozitive	12	80
Negative	3	20
Total	15	100

According to Table 3, 12 students answered the question “Did the students create their own solution techniques while solving the Mathematics Sample Questions Published for LGS and how do they think it changed their perspective on mathematics lessons?” as ideas that we can assume as positive. Below are the answers given by some students:

T2: “I practice by solving more new generation questions”

T5: “I re-examine the questions I have solved and their solutions.”

T9: “I read the question over and over again, trying to understand, but I don't understand.”

T10: “After I understand what I need to do, I start the transactions.”

T14: “I read books to improve my understanding.”

The results of how the Mathematics Sample Questions Published for LGS affected their success in the mathematics course are presented in Table 4.

Table 4. How the students' mathematics sample questions published for LGS affect their success in mathematics course, frequency and percentage values of related opinions.

Opinions	f	%
Pozitive	-	-
Negative	15	100
Total	15	100

4. Conclusion, Discussion and Recommendations

In this section, the results of the study were presented by making use of the findings obtained from the study, and comments were made by making comparisons with similar studies. One of these results is that students emphasize the necessity of using cognitive skills such as understanding, interpreting, applying and analyzing the mathematics sample questions published for LGS. In addition, students stated that long paragraphs and stories were used in the problems of mathematics sample questions published for LGS. Because of these features, it is among the findings that students describe the mathematics problems in LGS as difficult and complex.

In studies on students' problem solving processes and approaches, it is known that students are exposed to routine problems, which are mostly only one solution and can generally be solved with simple operations (Artut and Tarım, 2006; İncebacak and Ersoy, 2016; Kaya, Kablan and Rice, 2014). . Therefore, LGS may be difficult for students because it contains question types that students are not accustomed to and requires certain mental skills (Kaya and Kablan, 2018). As a matter of fact, one of the results obtained is the findings about the difficulties experienced by the students in problem solving. These findings provide information that students have difficulties in using information, using time and psychologically. It can be said that while this situation causes some students to lose their motivation, it also creates an opportunity for some students to make more effort. So much so that in this study, some students had statements that they developed their own methods and tried different methods to be successful in LGS. In this direction, the methods developed by the students in their general approaches and problem solutions; strategizing, trying different solutions and searching for the effective ones, practicing and familiarizing with solving more similar problems, re-examining problems and their solutions, reading books and thinking logically. It is a remarkable detail that these methods are basically based on understanding the problem. Therefore, these findings show that the "understanding" skill, which was also mentioned in the teacher's opinions, comes to the fore on the basis of the approaches developed by the students to overcome the difficulties and problems they experience.

As a result, it can be said that LGS includes problems that require high-level cognitive skills such as understanding, reasoning, application, interpretation, analysis, including daily life situations, and mathematical concepts and information are given with a certain fiction. Due to these characteristics, teachers and students liken these problem situations, which they describe as a new generation, to non-routine problems. It can be said that LGS mathematical problems are similar to non-routine and context-based problems (Ahmed and Pollitt, 2007; Heller and Hollabaug, 1992) in terms of using real life situations and requiring certain cognitive skills. However, it was concluded from the students' views that they see every problem that is associated with daily life and consists of textually long content as a non-routine problem. In other words, it is seen that teachers and students treat problems that may be routine as well as non-routine problems. At this point, it cannot be said that every long problem associated with daily life is a non-routine problem. With these features, it can be said that the problems that require high-level cognitive skills to solve the problem are similar to the non-routine problems (Kablan and Bozkuş 2021). As a result, it can be said that teachers' awareness levels about LGS mathematics problems are high. However, it is seen that some of the perceived instructional approaches of the teachers are not compatible with the ideal approaches that should be. As a matter of fact, it is seen that some teachers approach LGS problems with non-routine problem characteristics as routine problems, in other words, they tend to explain and show the solutions to the students. It can be said that this approach is not an effective method for developing the defined cognitive skills in students.

As a result, it was stated that students mostly had negative opinions about the mathematics sample questions published for LGS. Among the reasons, it has been shown that there are question types that they are not accustomed to, and that they are long and complex. As a result of this study, the following recommendations are presented:

• It is thought that explaining the positive effects of new generation questions to students in detail, displaying positive attitudes and enabling students to develop their own problem solving strategies while solving new generation math questions are thought to have positive effects.

• Teachers need to adopt teaching approaches that provide an environment where students can develop their own problem-solving strategies and where more students will be active in teaching with mental activities.

• In this context, workshops can be conducted showing how teachers can guide students in problem solving and what kind of work they can do with students at this point.

• This study was limited to 15 students. It can be studied with a larger sample group.

• In addition, the study was conducted by taking the opinion of secondary school students. Obtaining the opinions of teachers working in secondary schools may be the subject of another study.

Conflicts of Interests

Authors declare that there is no conflict of interests

Statement contribution of the authors

This study's experimentation, analysis and writing, etc. all steps were made by the authors.

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