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# An Investigation of Mathematics Teachers' views on the 2018 High School Entrance Exam (LGS)[1]

# Matematik Öğretmenlerinin 2018 Liselere Geçiş Sınavı (LGS)'na İlişkin Görüşlerinin İncelenmesi

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***Abstract:*** The purpose of this research; was aimed to determine the opinions of middle school mathematics teachers regarding the High School Entrance Exam (LGS), which was put into practice in 2018, according to the demographic characteristics of the teachers. In this study, in which quantitative research approach was adopted, the relational screening model was used. This study was carried out with 471 middle school mathematics teachers who are working in different regions of Turkey. In the study, the data collection tool, consisting of 23 questions, was developed by the researcher. As a result of the study, the most accepted opinions by the teachers are that LGS system increased the need for self-renewal and development of the teachers and the visualization of the questions facilitated the students' understanding. Among the least accepted opinions by teachers, it was determined that the questions were similar to the written exam questions, the duration of the exam was sufficient for solving the questions, the questions were aimed at measuring the knowledge level of the students. Finally, LGS system increased the competition among students.
**Keywords:** LGS system, teaching math, exams, teacher opinions

***Öz:*** Bu araştırmanın amacı; ortaokul matematik öğretmenlerinin 2018 yılında uygulamaya konulan Liselere Giriş Sınavı (LGS)' na ilişkin görüşlerinin öğretmenlerin demografik özelliklerine göre belirlenmesi amaçlanmıştır. Nicel araştırma yaklaşımının benimsendiği bu çalışmada ilişkisel tarama modeli kullanılmıştır. Türkiye'nin farklı bölgelerinde görev yapmakta olan 471 ortaokul matematik öğretmeni ile çalışma yürütülmüştür. Çalışmada veri toplama aracı olarak araştırmacılar tarafından geliştirilen ve 23 sorudan oluşan bir ölçek kullanılmıştır. Çalışmanın sonucunda, LGS sistemi öğretmenlerin kendilerini yenileme ve geliştirme ihtiyacını arttırdığı ve soruların görselleştirilmesi öğrencilerin anlamasını kolaylaştırdığı ifadelerinin, öğretmenler tarafından en çok kabul gören görüşlerin olduğu tespit edilmiştir. Öğretmenler tarafından en az kabul gören görüşler arasında ise soruların yazılı sınav sorularına benzer nitelikte olduğu, soruların çözümü için verilen sınav süresinin yeterli olduğu, soruların öğrencilerin bilgi düzeyini ölçmeye yönelik olduğu ve LGS sisteminin öğrenciler arası rekabeti arttırdığı ifadeleri tespit edilmiştir.

**Anahtar Kelimeler:** LGS sistemi, matematik öğretimi, sınavlar, öğretmen görüşleri

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## Introduction

Nowadays, developments in the world increase the importance of education. Societies that are aware of this importance have made education compulsory for individuals. Because educated people have an important effect on the development and direction of the society they are in. The education systems of the countries bring some implications and obligations in terms of their policies. While the developments in science and technology cause changes in the needs of individuals, the necessity of training qualified manpower that can catch up with the age and adapt to the speed of developing technology makes it obligatory for countries to make innovations in their education systems. For this purpose, with the rapid change in science and technology; education programs are prepared to raise qualified individuals who can use knowledge functionally in life, solve problems, think critically, and become entrepreneurs and contribute to society (MEB, 2018a). As the individual returns of different education types and levels increase, the demand for education increases and changes occur. Individuals demand higher education institutions to benefit more from the returns of education, and states develop policies that increase the demand for education to increase their level of development (Özkan et al., 2016). As a result of these changes and developments, measurement and evaluation, which is one of the dimensions of education, has become important in the education systems of countries.

The results obtained from national and international exams conducted to improve students' mental skills and determine the factors affecting this development constitute an important resource for educational reforms and investments (PISA, 2015). The Assessment Standards for School Mathematics published by NCTM in 1995 demonstrated the necessity of integrating teaching and assessment and pointed out that assessment plays a key role in the change in practice.

The information obtained as a result of measurement and evaluation in the education process is used to make decisions in many areas. One of these decisions has the purpose of selecting and placing in a higher education institution. For this reason, it is important that measurement and evaluation results are qualified and that learning and teaching processes are evaluated effectively.

Two types of assessment are carried out in our country, local and central (Çepni et al., 2003). In local assessment, students' knowledge and skill levels are measured by the teachers in the school. Comprehensive examinations conducted by MoNE (Ministry of National Education) and ÖSYM (Student Selection and Placement Center) and applied throughout the country are within the scope of the central evaluation. MoNE is involved in the preparation and application of exams both nationally and internationally. Some

[1] This study is derived from the master thesis of the first author under the supervision of the second author

of the national examinations made by the Ministry of National Education; Open Education High School (AÖL), Primary and Secondary Education Institutions Scholarship Exam, and Secondary Education Institutions Exams that will accept students by Central Exam. General evaluations made centrally are determinative especially when transitioning from primary education to secondary education. In our country, the number of institutions taking students through exams has increased continuously in the last two decades. In 2010, general high schools were transformed into Anatolian High Schools. In this case, a student selection exam, in which almost all students to continue secondary education participated, was applied.

In recent years, the education system, which selects a limited number of students, has been transformed into a system that admits students to all academic high schools and even some vocational high schools. In this process, competition between families and students has increased (Gür et al., 2013). Over time, the names, scopes, and numbers of the exams applied have changed according to the needs in education. Anatolian and Science High School Exams until the 1997-1998 Academic Year, High School Entrance Exams (LGS) between 1998-2003, Secondary Education Institutions Selection and Placement Exam (OKS) between 2004-2008, Placement Exam between 2009-2012 (SBS) between 2013-2017, the Transition Exam from Basic Education to Secondary Education (TEOG) were administered. In 2017-2018 academic year, the Secondary Education Institutions Exam that would get students by Central Exam was applied for the first time. The purpose of central exams conducted in line with certain standards is to measure and monitor the performance of countries, schools, and individual students (Eurydice, 2009). In this direction, it is ensured that the decisions taken regarding the future of the students are accurate and unbiased (Özkan et al., 2016). In the last 20 years, the system of transition from basic education to secondary education has been changed five times, and stability has not been achieved in a system that has been agreed upon. OKS transition system for four years, SBS for five years, and TEOG system for five years continued.

We constantly see change of the education system and accordingly measurement and evaluation system in Turkey. With the changing education system, what is expected from individuals is to make them use their skills in the most effective way and to maximize their potential. In order to realize themselves and lead a happy life, individuals increasingly want to receive higher education, and this desire is accepted as an indicator of the increasing demand for social education (Küçüker, 2017). Therefore, central exams in our country have always been important.

With the changing examination structure, there are also difficulties in placing students in a higher institution. According to the placement system applied in the past years, students' placement in high schools that are not close to their homes is considered negatively both psychologically and economically (Gür et al., 2013). It is seen that the address-based placement system, which was newly implemented after 2018 LGS, received many criticisms. The most basic criticism is that continuous and sudden changes in selection and placement cause uncertainties and there is no adaptation process to the new system. In our country, the cause of frequent changes in the examination system is the failure to find a specific system in Turkey (Duran & Sezgin, 2014).

It is known that the general approach of the international scale in restructuring education programs is to develop skills such as problem-based and inquiry-based learning, creativity, and critical thinking (ERG, 2018). It is expected that the assessment that will directly affect the students' future lives and to recognize and place them will correctly diagnose the students in terms of their cognitive, affective, and psychomotor readiness levels and place them in programs suitable for their current characteristics (Demirel, 2004).

It is important that the measurement tools used for the accuracy of the decisions to be taken based on the results obtained from the central exams are valid and reliable. Also, the number of qualified schools in Turkey is quite small than the number of the students. Although participation to the central exam is not mandatory, it can be said that the rate of participation in the exam is high. With increasing future anxiety, students enter an intensive preparation process, and students and parents are adversely affected by this situation (Dinç et al., 2014). While this situation triggers competition, it increases the need for an assessment and evaluation system to accurately measure the characteristics of students and determine their success ranks (Şad & Şahiner, 2016).

Although the regulations governing the national exam in Turkey are mostly considered to be made to reduce the negative impact of the exams on students and parents, teachers, one of the basic elements of education, directly affect other elements of education with their qualifications and practices (Adıgüzel, 2008). Therefore, considering teachers while making arrangements for national exams, decision-makers may make it possible to realize the efficiency aimed in the regulations. According to the studies, failure to reveal the impact of national exams on teachers in Turkey is seen as missing by researchers. In this context, it was necessary to obtain teachers' opinions to make the high school entrance system, which affects students' lives directly and indirectly in many parts of the society, and to contribute to the system. Because, taking teachers' opinions is considered important in terms of helping understand the problem, define the problems of the changing system, and identify new solutions to the problems of the system. The aim of this study is to reveal the positive or negative opinions of mathematics teachers about the transition system to secondary education and the mathematics questions of the High School Transition Exam (LGS), which was implemented for the first time in 2017-2018 academic year.

The problem statement of this study is "What are the opinions of middle school mathematics teachers about the High School Transition Exam (LGS), which was administered for the first time in 2018?". Depending on this problem, answers were sought for the following sub-problems:

1. What are the opinions of mathematics teachers about the LGS System?
2. Do the opinions of mathematics teachers regarding the LGS System differ significantly according to independent variables (gender, professional seniority, and school type)?

## Method

### Research Design

In this study, a relational screening model was used. The screening model aims to describe a situation that exists in the past or today (Karasar, 2012). Within the scope of the research, the awareness of middle school mathematics teachers towards the LGS exam system was determined in terms of various variables. The purposes and procedures of the current study were granted approval from the local ethical committee of the university (Sakarya University, 13.01.2021/E-61923333-050.99-3561)

### Study Population and Sample

The sample of the study consists of 471 middle school mathematics teachers (43.7% male, 56.3% female) working in different provinces (in Turkey) in the spring semester of 2018-2019 academic year. Findings regarding the demographic information of the teachers are given in Table 1 below.

**Table 1.** Distribution of teachers according to their demographic characteristics

| | | f | % |
|---|---|---|---|
| Gender | Male | 206 | 43.7 |
| | Female | 265 | 56.3 |
| Professional seniority | 1-5 years | 75 | 15.9 |
| | 6-10 years | 87 | 18.5 |
| | 11-15 years | 102 | 21.7 |
| | 16-20 years | 94 | 20.0 |
| | 21-25 years | 60 | 12.7 |
| | 26 years and above | 53 | 11.3 |
| School type | Private | 85 | 18.0 |
| | Public | 386 | 82.0 |

### Data collection tool

**Awareness Scale of Mathematics Teachers for LGS System:** The scale developed by Çetin (2018) was used to determine the awareness of middle school mathematics teachers towards LGS system. The scale consists of 23 items and three sub-dimensions (Awareness of Teacher Perceived Innovations-5 items, Awareness of Student Perceived Innovations-4 items, Awareness of the Quality of Questions-14 items). In order to express the level of agreement regarding the items in the scale, 5-point Likert type grading (Strongly Disagree = 1, Disagree = 2, Undecided = 3, Agree = 4 and Strongly Agree = 5) was used. Cronbach's alpha (α) coefficient calculated for the whole scale is .81, and the values calculated for its sub-dimensions are .83, .85 and .82, respectively.

### Data Collection and Analysis

The data of this study were collected by distributing scales to 471 mathematics teachers working in secondary schools in different provinces. The data obtained in the research were analyzed by using the SPSS 20.0 package program. The Kolmogorov-Smirnov test was used to test whether the data showed normal distribution, and parametric tests were used since the data were found to be normally distributed. Percentage, frequency, arithmetic mean, standard deviation, t-test, one-way analysis of variance (ANOVA) and Tukey-HSD tests were used in the analysis of the data depending on the sub-problems. In testing the significance of the differences, the significance level was accepted as .05.

Before the analysis of the data, the items were scored as "1 - Strongly disagree (1.00–1.80)", "2 - Disagree (1.81–2.60)", "3 - Undecided (2.61–3.40)", "4 - Agree (3.41–4.20)", "5 - I strongly agree (4.21–5.00)".

**Table 2.** Normality values of variables

| | Skewness | Kurtosis | Kolmogorov-Smirnov |
|---|---|---|---|
| | Statistic | Statistic | p |
| Gender | -.82 | -.56 | .22 |
| Age | .51 | -.75 | .27 |
| Professional seniority | -.67 | .30 | .40 |
| School type | .70 | -.45 | .20 |

**p<.01; *p<.05

## Results

In this section, analysis findings are included to find answers to the sub-problems of our study.

### First Sub-Problem

The first sub-problem sentence of the study is ***"What are the opinions of mathematics teachers about the LGS System?".***

The mean scores and standard deviation values obtained from the sub-dimensions are given in Table 3.

**Table 3.** The mean scores and standard deviation values regarding sub-dimensions

| **Sub-dimensions** | **f** | $\bar{X}$ | **Sd** |
|---|---|---|---|
| Awareness of Teacher Perceived Innovations | 471 | 3.58 | .44 |
| Awareness of Student Perceived Innovations | 471 | 3.50 | .67 |
| Awareness of the Quality of Questions | 471 | 4.42 | .70 |

Strongly disagree (1.00–1.80), Disagree (1.81–2.60), Undecided (2.61–3.40), Agree (3.41–4.20), Strongly agree (4.21–5.00)

When the mean scores obtained from the sub-dimensions are examined it was found that the sub-dimension "Awareness of the Quality of Questions" had the highest average ($\bar{X}$= 4.42), and the sub-dimension of "Awareness of Student Perceived Innovations" had the lowest average ($\bar{X}$= 3.50). The mean scores of the sub-dimension of "Awareness of Teacher Perceived Innovations" were also calculated as $\bar{X}$= 3.58. In addition, the distribution of the responses of mathematics teachers to the scale was examined (Table 4) and their awareness of the LGS system was tried to be revealed through these questions.

**Table 4.** Mathematics teachers' views on the awareness of the LGS system

| | Items | Strongly disagree | | | | | | | | strongly agree | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **f** | **%** | **f** | **%** | **f** | **%** | **f** | **%** | **f** | **%** | $\bar{X}$ |
| **1** | The new LGS system contributes to the professional performance of teachers. | 130 | 27.6 | 91 | 19.3 | 126 | 26.8 | 60 | 12.7 | 64 | 13.6 | 2.65 |
| **2** | The new LGS system has made the teacher in the school more effective. | 193 | 41.0 | 151 | 32.1 | 94 | 20.0 | 22 | 4.7 | 11 | 2.3 | **1.95** |
| **3** | The LGS system puts pressure and stress on teachers. | 178 | 37.8 | 124 | 26.3 | 100 | 21.2 | 45 | 9.6 | 24 | 5.1 | 2.18 |
| **4** | LGS system increases the need of teachers to renew and improve themselves. | 119 | 25.3 | 76 | 16.1 | 94 | 20.0 | 100 | 21.2 | 82 | 17.4 | 3.96 |
| **5** | LGS system gives results compatible with mathematics achievements at school. | 222 | 47.1 | 100 | 21.2 | 66 | 14.0 | 41 | 8.7 | 42 | 8.9 | 2.11 |
| **6** | LGS increases the students' need for out-of-school institutions. | 167 | 35.5 | 97 | 20.6 | 52 | 11.0 | 64 | 13.6 | 91 | 19.3 | 2.61 |
| **7** | LGS system increases the need of students for auxiliary resources. | 251 | 53.3 | 114 | 24.2 | 51 | 10.8 | 33 | 7.0 | 22 | 4.7 | 2.86 |
| **8** | LGS system increases competition among students. | 265 | 56.3 | 106 | 22.5 | 54 | 11.5 | 20 | 4.2 | 26 | 5.5 | **1.80** |
| **9** | The LGS system puts pressure and stress on students. | 245 | 52.0 | 89 | 18.9 | 64 | 13.6 | 40 | 8.5 | 33 | 7.0 | 2.00 |
| **10** | Questions are clear and straightforward. | 112 | 23.8 | 54 | 11.5 | 48 | 10.2 | 115 | 24.4 | 142 | 30.1 | 2.26 |
| **11** | Questions distinguish between successful and unsuccessful students. | 173 | 36.7 | 103 | 21.9 | 109 | 23.1 | 66 | 14.0 | 20 | 4.2 | 2.27 |
| **12** | Visualization of the questions made it easier for students to understand. | 107 | 22.7 | 71 | 15.1 | 82 | 17.4 | 75 | 15.9 | 136 | 28.9 | 3.13 |
| **13** | The questions are aimed at measuring the knowledge level of the students. | 277 | 58.8 | 105 | 22.3 | 57 | 12.1 | 22 | 4.7 | 10 | 2.1 | **1.69** |
| **14** | The questions determine students' learning deficiencies and misleading. | 159 | 33.8 | 80 | 17.0 | 172 | 36.5 | 36 | 7.6 | 24 | 5.1 | 2.33 |
| **15** | Exam questions are aimed at measuring students' processing skills. | 99 | 21.0 | 54 | 11.5 | 141 | 29.9 | 93 | 19.7 | 84 | 17.8 | 2.42 |
| **16** | Exam questions are aimed at measuring students' high-level thinking skills. | 181 | 38.4 | 96 | 20.4 | 103 | 21.9 | 46 | 9.8 | 45 | 9.6 | 2.32 |
| **17** | Exam questions are similar to the examples in the textbook. | 87 | 18.5 | 34 | 7.2 | 90 | 19.1 | 109 | 23.1 | 151 | 32.1 | 2.43 |
| **18** | The duration of the exam is sufficient for the solution of the questions. | 86 | 18.3 | 33 | 7.0 | 47 | 10.0 | 118 | 25.1 | 187 | 39.7 | **1.61** |
| **19** | Exam questions contribute to the use of mathematics in daily life. | 84 | 17.8 | 38 | 8.1 | 52 | 11.0 | 108 | 22.9 | 189 | 40.1 | 3.59 |
| **20** | The questions are similar to the written exam questions of the teachers. | 234 | 49.7 | 100 | 21.2 | 73 | 15.5 | 28 | 5.9 | 36 | 7.6 | **1.43** |
| **21** | Exam questions are suitable for the mathematics curriculum. | 153 | 32.5 | 102 | 21.7 | 138 | 29.3 | 52 | 11.0 | 26 | 5.5 | 2.35 |
| **22** | Exam questions can contribute to students' mathematical thinking. | 226 | 48.0 | 121 | 25.7 | 81 | 17.2 | 26 | 5.5 | 17 | 3.6 | 1.91 |
| **23** | Exam questions are aimed at measuring students' reading comprehension skills. | 119 | 25.3 | 72 | 15.3 | 86 | 18.3 | 98 | 20.8 | 96 | 20.4 | 2.83 |

**Mean: 2.52 Standard deviation (Sd): .60**

***Note.*** Strongly disagree (1.00–1.80), Disagree (1.81–2.60), Undecided (2.61–3.40), Agree (3.41–4.20), Strongly agree (4.21–5.00)

When Table 4 is analyzed, it is seen that the general opinion of mathematics teachers about their awareness towards LGS system is at the level of "Disagree" (Mean score of scale $\bar{X}$ = 2.52; standard deviation: .60); In other words, it was determined that their views on LGS system were negative.

It has been determined that the item that mathematics teachers responded most positively ($\bar{X}$ = 3.59) was "LGS system increases the need of teachers to renew and improve themselves" (Table 4). Afterwards, It was seen that the item with the second-highest mean ($\bar{X}$ = 3.59) was "Exam questions contribute to the use of mathematics in daily life"; seen the item with the third-highest mean ($\bar{X}$ = 3.13) "Visualization of the questions made it easier for students to understand", and seen the item with the fourth-highest mean ($\bar{X}$ = 2.86) was "LGS system increases the need of students for auxiliary resources".

**Table 5.** Female and male teachers' mean scores, standard deviation values, and t-test results

| Sub-dimensions | Gender | f | $\bar{X}$ | Sd | t | p |
|---|---|---|---|---|---|---|
| Awareness of Teacher Perceived Innovations | Male | 206 | 3.62 | .46 | 1.918 | .056 |
| | Female | 265 | 3.55 | .42 | | |
| Awareness of Student Perceived Innovations | Male | 206 | 3.45 | .68 | -1.434 | .152 |
| | Female | 265 | 3.54 | .67 | | |
| Awareness of the Quality of Questions | Male | 206 | 3.45 | .72 | .810 | .419 |
| | Female | 265 | 3.40 | .68 | | |

* p< .05, **p< .01

As seen in Table 4, the item that mathematics teachers responded most negatively ($\bar{X}$ =1.43) was "The questions are similar to the written exam questions of the teachers". Afterwards, It was seen that the item with the second-lowest mean ($\bar{X}$ = 1.61) was "The duration of the exam is sufficient for the solution of the questions"; seen the item with the third-lowest mean ($\bar{X}$ = 1.69) was "The questions are aimed at measuring the knowledge level of the students", and seen the item with the fourth-lowest mean ($\bar{X}$ = 1.80) was "LGS system increases competition among students".

**Second Sub-Problem**

The second sub-problem sentence of the study is ***"Do the opinions of mathematics teachers regarding the LGS System differ significantly according to independent variables (gender, professional seniority, and school type)?"***

The distribution of mean values, standard deviations, and t-test results according to teachers' gender are given in Table 5. When Table 5 is examined, the t-test was applied to determine whether the awareness of female and male teachers about LGS System differed or not, and it was found that there was no significant difference (p> .05). This finding shows that the awareness of male and female teachers towards LGS System is similar.

The distribution of mean values and one-way ANOVA results according to teachers' professional seniority are given in Table 6a and Table 6b. As seen in Table 6b, it was examined with one-way analysis of variance whether teachers' mean scores obtained from the sub-dimensions are differed according to teachers' professional seniority. It was found that there is a statistically significant difference only in the sub-dimension of "Awareness of Student Perceived Innovations" (p< .01). According to this result, it was found that the mean scores ($\bar{X}$ = 3.75) of teachers whose professional seniority is in the range of "1-5 years" are higher than teachers with professional seniority "11-15 years" and "26 years and above" (respectively $\bar{X}$ = 3.42, $\bar{X}$ = 3.33). The distribution of mean values, standard deviations, and t-test results according to school type are given in Table 7.

When Table 7 is examined, the t-Test was applied to determine whether the awareness of mathematics teachers working in public and private secondary schools towards LGS system differed, and it was found that there was no significant difference (p> .05). This finding shows that the awareness of mathematics teachers working in public and private secondary schools towards the LGS System is similar.

**Table 6a.** Mean scores according to teachers' professional seniority

| Sub-dimensions | Professional seniority | f | $\bar{X}$ |
|---|---|---|---|
| Awareness of Teacher Perceived Innovations | 1-5 years | 75 | 3.60 |
| | 6-10 years | 87 | 3.61 |
| | 11-15 years | 102 | 3.56 |
| | 16-20 years | 94 | 3.61 |
| | 21-25 years | 60 | 3.46 |
| | 26 years and above | 53 | 3.62 |
| | **Total** | 471 | 3.58 |
| Awareness of Student Perceived Innovations | 1-5 years | 75 | 3.75 |
| | 6-10 years | 87 | 3.47 |
| | 11-15 years | 102 | 3.42 |
| | 16-20 years | 94 | 3.48 |
| | 21-25 years | 60 | 3.55 |
| | 26 years and above | 53 | 3.33 |
| | **Total** | 471 | 3.50 |
| Awareness of the Quality of Questions | 1-5 years | 75 | 3.51 |
| | 6-10 years | 87 | 3.22 |
| | 11-15 years | 102 | 3.35 |
| | 16-20 years | 94 | 3.51 |
| | 21-25 years | 60 | 3.45 |
| | 26 years and above | 53 | 3.58 |
| | **Total** | 471 | 3.42 |

**Table 6b.** One-Way ANOVA results according to teachers' professional seniority

| Sub-dimensions | | Sum of Squares | Sd | Mean Square | F | p | Tukey-HSD |
|---|---|---|---|---|---|---|---|
| Awareness of Teacher Perceived Innovations | Between Groups | 5 | .233 | 5 | 1.202 | .307 | |
| | Within Groups | 465 | .194 | 465 | | | |
| | Total | 470 | | 470 | | | |
| Awareness of Student Perceived Innovations | Between Groups | 5 | 1.402 | 5 | 3.157 | .008* | I-III I-VI |
| | Within Groups | 465 | .444 | 465 | | | |
| | Total | 470 | | 470 | | | |
| Awareness of the Quality of Questions | Between Groups | 5 | 1.347 | 5 | 2.814 | .016 | |
| | Within Groups | 465 | .478 | 465 | | | |
| | Total | 470 | | 470 | | | |

* p< .05, **p< .01; I : 1-5 years, II:6-10 years, III: 11-15 years, IV: 16-20 years, V: 21-25 years, VI: 26 years and above

**Discussion and Conclusion**

Secondary school mathematics teachers' opinions about LGS, which was applied for the first time in 2018, were tried to be determined according to the demographic characteristics of the teachers.

According to the results obtained from the study, it was found that the teachers had remarkable views about the positive and negative aspects of LGS. When the opinions of mathematics teachers are examined, the most positive opinions were that they felt the need to renew and improve themselves for the LGS system, the exam questions contributed to the use of mathematics in daily life, and the visualization of the questions made it easier for students to understand the questions. In the studies of Çelik et al. (2018), it was stated that teachers needed to renew and improve themselves, and at the same time, pressure and stress were placed on them due to the results of LGS. Similar results were found in the studies of Çetin and Ünsal (2019), and it was stated that national exams allowed teachers to update their personal and professional development and increase their readiness by providing a self-assessment opportunity. The most negative opinions of mathematics teachers were that the LGS questions were not similar to the exam questions prepared in schools, the exam duration was given for the solution of the questions was not sufficient, and the questions were not aimed at measuring the knowledge level of the students.

How national tests affect teachers' classroom teaching performance has been the subject of many studies. Especially in our country, it is stated that one of the most important factors affecting the teaching activities of teachers is national exams (Bakırcı & Kırıcı, 2018). In other words, it is one of the most common trends identified that teachers design learning-teaching environments according to the national examination systems that students will enter and determine the purpose and content in the focus of these exams (Bardak & Karamustafaoğlu, 2016; Çelik & Ünsal, 2018). This situation moves the teaching away from the context of the basic acquisitions in the curriculum and directs it to technical issues such as improving speed and test solving skills or focusing only on exam subjects (Bardak & Karamustafaoğlu, 2016). Therefore, it is important to get rid of the understanding of the technician teacher who designs learning-teaching environments for national exams, considering the environment and student diversity, as well as to adopt the understanding of expert teachers that focus on student understanding by considering the aims of the curriculum.

One of the main goals of mathematics education is to develop problem-solving skills in children (Baki, 2008). It is considered important, to achieve these goals, the problems used in the classroom (Gök & Erdoğan, 2017). By middle school mathematics teachers analyzing the problems in their classrooms, Özmen et al. (2012) found that teachers mostly used textbooks in their problem preferences, and in this direction, they included verbal problems that can be solved in a few steps intensively. Similarly, some studies in the literature reveal that students have difficulties in non-routine problem solving (Çelik & Güler, 2013).

**Table 7.** The mean scores, standard deviation values and t-test results of teachers working in public and private schools

| Sub-dimensions | School type | f | $\bar{X}$ | Sd | t | p |
|---|---|---|---|---|---|---|
| Awareness of Teacher Perceived Innovations | Public school | 386 | 3,61 | .42 | 1.905 | .057 |
| | Private school | 85 | 3,53 | .48 | | |
| Awareness of Student Perceived Innovations | Public school | 386 | 3,52 | .71 | .659 | .510 |
| | Private school | 85 | 3,47 | .61 | | |
| Awareness of the Quality of Questions | Public school | 386 | 3,40 | .69 | -.577 | .564 |
| | Private school | 85 | 3,44 | .71 | | |

* p< .05, **p< .01

In our study, it was found that LGS questions did not show similar qualities to the written exam questions of teachers; Özkan et al. (2016), in their studies, draw attention to the results that teachers' written questions and TEOG exam questions have similar characteristics and that the scores from the TEOG exam and the scores from the mathematics written exams are consistent with each other. In addition, in our study, considering that the exam questions are not of a quality that can contribute to the mathematical thinking of the students and that the exam questions are not similar to the examples in the textbook, it is thought that the teachers' failure to include questions that will challenge the students in the classroom environment and make them think is effective in LGS failure.

It can be said that teachers have a strong tendency to focus on an exam in their teaching activities. In this respect, the fact that exam questions contribute to the use of mathematics in daily life and those teachers have opinions about measuring students' higher order thinking skills may be an indication that teachers need questions such as high-level reasoning and logical inference while raising students.

In our study, in line with the opinions of the teachers, it was determined that the exam time given for the solution of the questions was not sufficient. A similar result was seen in the study of Güler et al. (2019) in which teachers stated that the time given for LGS questions was less than the time given in the TEOG exam. Considering that LGS is a large-scale success test, it is a fact that the test duration is too long or shorter than necessary will affect the reliability and validity of the test. In addition, considering that there is a positive relationship between the time allocated for problem-solving in standard tests and student scores (Baştürk, 2009; Frisby & Traffanstedt, 2003; Feinberg, 2004), the meticulous determination of the duration of the exam will enable students to reveal their actual performance.

In our study, when the opinions of the teachers were examined according to their demographic characteristics, it was found that the awareness of male and female teachers towards LGS System was similar in terms of gender. Batur et al. (2016), in their study on the examination of the TEOG exam according to the opinions of teachers and students, found that female teachers were more indecisive about TEOG than male teachers, in other words, male teachers found the TEOG exam relatively more positive than female teachers, determined that they have. In the study of İnceoğlu (2015), it was found that the opinions of mathematics teachers about the TEOG exam differ according to gender. Also, in the same study, they agreed more with the view that the wrong answers did not affect the correct answers increased the chance of success, compared to the female teachers. In addition, our findings show that teachers' awareness of LGS System is similar according to the variables of public and private secondary schools in which they work. It was found that teachers whose professional seniority was in the range of "1-5 years" have a higher level of awareness perceived by students about the LGS system than teachers with professional seniority of "11-15 years" and "26 years and over". As a reason for this, it can be shown that the professional enthusiasm of teachers in the first years of their profession and the mathematics teaching lessons applied in the undergraduate programs of universities are effective.

## Suggestions

Since the questions asked in LGS system, which has been applied to high schools since 2017-2018 academic year, are prepared with a focus on measuring the metacognitive skills of the students, in this context, daily life questions, especially those belonging to the upper-level cognitive process steps, should be included in the written exams at schools. To achieve this, teacher candidates and teachers can be trained in measurement and evaluation, and question writing.

## Conflict of Interest Statement

The authors declare that there is no conflict of interest with any institution or person within the scope of the study.

## Author Contribution Rates

All authors equally took part in all processes of the article. All authors have read and approved the final version of the study.

## Ethical Declaration

The purposes and procedures of the current study were granted approval from the ethical committee of the Sakarya University (Ethics Committee's Decision Date: 13/01/2021; Ethics Committee Approval' Issue Number: E-61923333-050.99-3561).

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## Appendices

**Appendix-1:** Turkish Form of *Awareness Scale of Mathematics Teachers for LGS System Scale*

| | **LGS Sistemine Yönelik Matematik Öğretmenlerinin Farkındalıkları Ölçeği** | **Kesinlikle Katılmıyorum** | **Katılmıyorum** | **Kararsızım** | **Katılıyorum** | **Kesinlikle Katılıyorum** |
|---|---|---|---|---|---|---|
| **1** | Yeni LGS sistemi öğretmenlerin mesleki performansına katkı sağlamaktadır. | | | | | |
| **2** | Yeni LGS sistemi okuldaki öğretmeni daha etkin duruma getirmiştir. | | | | | |
| **3** | LGS sistemi öğretmenler üzerinde baskı ve stres oluşturmaktadır. | | | | | |
| **4** | LGS sistemi öğretmenlerin kendilerini yenileme ve geliştirme ihtiyacını arttırmaktadır. | | | | | |
| **5** | LGS sistemi okuldaki matematik başarılarıyla uyumlu sonuçlar verir. | | | | | |
| **6** | LGS öğrencilerin okul dışı kurumlara olan ihtiyacını arttırmaktadır. | | | | | |
| **7** | LGS sistemi öğrencilerin yardımcı kaynaklara ihtiyacını arttırmaktadır. | | | | | |
| **8** | LGS sistemi öğrenciler arası rekabeti arttırmaktadır. | | | | | |
| **9** | LGS sistemi öğrenciler üzerinde baskı ve stres oluşturmaktadır. | | | | | |
| **10** | Sorular açık ve anlaşılırdır. | | | | | |
| **11** | Sorular başarılı ve başarısız öğrenciyi ayırt etmektedir. | | | | | |
| **12** | Soruların görselleştirilmesi öğrencilerin anlamasını kolaylaştırmıştır. | | | | | |
| **13** | Sorular öğrencilerin bilgi düzeyini ölçmeye yöneliktir. | | | | | |
| **14** | Sorular öğrencilerin öğrenme eksikliklerini ve yanlış öğrenmelerini belirleyicidir. | | | | | |
| **15** | Sınav soruları öğrencilerin işlem becerilerini ölçmeye yöneliktir. | | | | | |
| **16** | Sınav soruları öğrencilerin üst düzey düşünme becerilerini ölçmeye yöneliktir. | | | | | |
| **17** | Sınav soruları ders kitabındaki örneklerle benzer niteliktedir. | | | | | |
| **18** | Soruların çözümü için verilen sınav süresi yeterlidir. | | | | | |
| **19** | Sınav soruları günlük hayatta matematiğin kullanımına katkı sağlar niteliktedir. | | | | | |
| **20** | Sorular öğretmenlerin yazılı sınav sorularına benzer niteliktedir. | | | | | |
| **21** | Sınav soruları matematik öğretim programını uygundur. | | | | | |
| **22** | Sınav soruları öğrencilerin matematiksel düşünmelerine katkıda bulunabilecek niteliktedir. | | | | | |
| **23** | Sınav soruları öğrencilerin okuduğunu anlama becerilerini ölçmeye yöneliktir. | | | | | |