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Examining Gifted Primary School Students' Logical Reasoning Ability

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Abstract

Gifted students have advanced creative, analytical, critical, and logical reasoning skills. Logical reasoning is different from other thinking skills. The logical reasoning skill, which is also a high-level thinking skill and required for other high-level thinking skills, has also been the subject of many studies. However, it has been observed that there are not enough studies on the logical reasoning skills of gifted students. In this study, the logical reasoning levels of gifted primary school students will be analyzed. The research was designed according to the descriptive survey model, one of the quantitative research methods. The sample of the study consists of 38 primary school students in a center where gifted students are educated. The Longeot's Test of Cognitive Development was used as a data collection tool. Frequency and percentage distributions and non-parametric analysis methods were used in the analysis of the data. None of the gifted primary school students got full marks on the test. While none of the gifted primary school students could get full points from the questions belonging to the formal operational period, only 3 students got full points from the questions belonging to the concrete processing period. While the cognitive development level of 26 gifted primary school students is in the formal operational stage, the cognitive development of 12 students is in the concrete operational stage. According to the gender variable of gifted primary school students, there is no statistically significant difference between the mean scores of the concrete and formal operational periods. There is a statistically significant difference in favor of male students in the mean scores of combinatorial analysis problems.

Keywords: Cognitive development, Gifted student, Gifted elementary school student, Logical reasoning.

Üstün Zekâlı İlkokul Öğrencilerinin Mantıksal Muhakeme Becerilerinin İncelenmesi

Öz

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Üstün zekâlı öğrenciler gelişmiş yaratıcı, analitik, eleştirel ve mantıksal düşünme becerilerine sahiptirler. Mantıksal düşünme, diğer düşünme becerilerinden farklıdır. Kendisi de bir üst düzey düşünme becerisi olan ve diğer üst düzey düşünme becerileri için de gereken mantıksal düşünme becerisi birçok araştırmanın da konusu olmuştur. Ancak özel yetenekli öğrencilerin mantıksal düşünme becerileri ile ilgili yeterince çalışma yapılmadığı görülmüştür. Bu çalışmada özel yetenekli ilkokul öğrencilerinin mantıksal düşünme düzeyleri analiz edilecektir. Araştırma, nicel araştırma yöntemlerinden betimsel tarama modeline göre tasarlanmıştır. Araştırmanın örneklemini üstün yetenekli öğrencilerin eğitim gördüğü bir merkezde bulunan 38 ilkokul öğrencisi oluşturmaktadır. Veri toplama aracı olarak “"Longeot Bilişsel Gelişim Testi" kullanılmıştır. Verilerin analizinde frekans ve yüzde dağılımları ile parametrik olmayan analiz yöntemleri kullanılmıştır. Üstün yetenekli ilkokul öğrencilerinden hiçbirinin testten tam puan almamıştır. Üstün yetenekli ilkokul öğrencilerinin hiçbiri soyut işlemler dönemine ait sorulardan tam puan alamazken sadece 3 öğrenci somut işlemeler dönemine ait sorulardan tam puan almıştır. Üstün yetenekli ilkokul öğrencilerinin 26'sının bilişsel gelişim düzeyi soyut işlemler aşamasında iken 12 öğrencinin bilişsel gelişimi somut işlem aşamasındadır. Üstün yetenekli ilkokul öğrencilerinin cinsiyet değişkenine göre somut ve soyut işlemler dönemlerine ait puan ortalamaları arasında istatistiksel olarak anlamlı bir fark yoktur. Kombinasyonel analiz problemleri ortalama puanlarında erkek öğrenciler lehine istatistiksel olarak anlamlı bir fark vardır.

Anahtar Kelimler: Bilişsel gelişim, Üstün zeka, Üstün zekalı ilkokul öğrencisi, Mantıksal düşünme.

1. INTRODUCTION

The concept of giftedness is a social concept and differs between cultures (Borland, 2009). Each country has its own concept of giftedness and defines it according to its cultural values (Maya, et al. 2020). Gifted students perform exceptionally well in at least one academic field valuable to their culture (Pfeiffer, 2013). Giftedness does not only mean a high score in an intelligence test (Morelock, 1996). For this reason, giftedness tests should be evaluated together with socioeconomic and cultural differences (Renzulli, 2004).

Gifted students differ from students with normal development in terms of their psychosocial and cognitive development and learning needs (Reis & Renzulli, 2010). It is thought that the development of gifted children is complex due to their innate differences compared to their peers (Smith, 2017). Gifted students have advanced creative, analytical, critical, and Logical reasoning skills. Gifted students have research, discussion, and problem-solving skills. Gifted students analyze information critically and independently and integrate it logically and critically. Gifted students need special education to develop these skills (Reis & Renzulli, 2010).

Logical reasoning is different from other thinking skills. Correct thinking rules and forms are important in logical reasoning. In critical thinking, inaccurate thinking styles are also given importance (Özlem, 2012). Knowledge and experience are given importance in logical reasoning. In

creative thinking, on the other hand, importance is given to perception, attitude, intuition, and assumption (Rawlinson, 1995). Logical reasoning studies an object both by itself and by considering its relation to other objects. Analytical thinking, on the other hand, examines an object by dividing it into categories (Yaman & Karamustafaoğlu, 2006). Logical reasoning should also be at the forefront in the successful execution of higher-order thinking processes (Başerer, 2017). Individuals with strong Logical reasoning skills are more successful in overcoming the difficulties they encounter (Karakuyu & Tortop, 2009).

For gifted students to develop their Logical reasoning skills, they first need to learn correct thinking methods and techniques. Logic can be used to teach correct thinking methods and techniques (Özlem, 2012). According to the Turkish Language Association (2022), logic; is "the art and science of right thinking; It is the way and method of right thinking." Logic is a discipline that reveals the rules and laws of Logical reasoning (Emiroğlu, 2012). The science of logic deals with types of thinking such as Logical reasoning, reasoning, and argumentation (Özlem, 2012).

Logic teaching in Turkey aims to raise individuals who can transfer the right ways of thinking to daily life, think consistently, notice contradictions, think independently, and produce solutions to the problems they encounter (MoNE, 2009). In our country, the logic course is applied only in secondary education and as an elective course. In this case, gifted primary school students receive training in the skills required for critical reasoning too late. It should not be late in teaching logic, which is important for the development of Logical reasoning skills that enable gifted students to make better decisions.

Individuals with advanced Logical reasoning skills can form hypotheses and test their accuracy. In addition, these individuals can offer different solutions to the new problems they encounter (Kıncal & Yazgan, 2010). Individuals with advanced Logical reasoning skills use their abilities such as categorizing concepts, making generalizations, stating their hypotheses with mathematical formulas, and using numbers effectively while solving problems (Bektasli, 2006).

When all the above information is considered together, it provides Logical reasoning skills, making comparisons and inferences by distinguishing the relationships between different situations; Recognizing abstract structures, and enabling conceptual analysis; It can be defined as a high-level way of thinking that enables solving complex problems.

To be able to produce scientific solutions to problems by using Logical reasoning, numbers effectively; is the ability to test a hypothesis with mathematical formulas, to classify and generalize by

seeing the relationships between concepts (Bümen, 2010). There are different opinions about the age at which the Logical reasoning skill starts to develop. According to Spelke and Kinzler (2009), concept formation and classification skills are the basis of Logical reasoning. As these skills begin to develop from infancy, Logical reasoning also begins to develop from infancy (Spelke & Kinzler, 2009). Piaget, on the other hand, states that reasoning in the preoperational period (4-7 years) is at an intuitive level. In this age range, children learn about their environment with simple generalizations and symbols. According to Piaget, Logical reasoning skills begin to develop in the concrete operational period (7-11 years old), and it is a skill that is also seen in the formal operational period (Senemoğlu, 2004). However, education and culture could influence Piaget's stages of development. In this case, children in the preoperational period can also be trained and gain Logical reasoning skills in the concrete operational period (Santrock, 2012).

The logical reasoning skill, which is also a high-level thinking skill and required for other high-level thinking skills, has also been the subject of many studies. Lis and Magro (1993), Yenilmez, Sungur, and Tekkaya (2005), Zarotiadou, and Tsaparlis (2000) examined the logical reasoning skills of secondary school students. Demirtaş (2011), Kılıç and Sağlam (2009), Rohaeti, Hindun and Fitriani (2019), Sukarna, Sumarmo, and Kurniawan (2020) investigated the logical reasoning skills of high school students. Turgut, Yenilmez, and Balbağ (2017), Hacıömeroğlu, and Hacıömeroğlu (2018) examined prospective teachers' logical reasoning skills from various perspectives. Tuna, Biber, and İncikapı (2013) stated that prospective teachers' logical reasoning skills differ significantly according to the type of high school they graduated from and the grade level they were in. Kıncal and Yazgan (2010) stated that the logical reasoning levels of middle school students showed a significant difference according to the type of school where they were educated.

When the literature is examined, although there are researches about logical reasoning of prospective teachers or students with normal development, there is not enough research about the logical reasoning levels of gifted students. It is considered important to examine whether gifted students have the necessary skills to maximize their potential to solve complex daily life problems. For this reason, the problem of the research is what the Logical reasoning levels of gifted primary school students are.

Purpose of Research

In the 2023 Education Vision, it is planned to reorganize all exams in the education system in terms of the purpose, content, structure depending on the question types and the benefits it will provide; It is aimed to reorganize the exams in a way to emphasize the testing of reasoning, critical

thinking, estimation, interpretation and similar mental skills. In addition, it is seen that central exam questions related to secondary education institutions are intended to measure Logical reasoning and reasoning skills.

All these developments reveal the necessity of identifying and supporting the development of students' Logical reasoning and reasoning skills from an early age. It is expected that the logical reasoning skills of gifted students who show more cognitive development than their peers will also be developed. In this context, the logical reasoning levels of gifted primary school students will be analyzed in this study. Examining the logical reasoning skills of gifted primary school students can contribute to educators and researchers about the necessity of giving logic education to gifted students at an early age.

In this context, the research was conducted to examine the logical reasoning skills of gifted primary school students. To achieve this aim, answers to the following questions were sought:

- ✓ What are the cognitive development levels of gifted primary school students?
- ✓ Do the cognitive development levels of gifted primary school students differ according to their genders?
- ✓ Do gifted primary school students' scores on the whole Longeot cognitive development test and its sub-dimensions differ according to their gender?

The answers to be obtained will make significant contributions to the education of gifted primary school students. Because more information will be obtained about gifted students. This information will also be useful for teachers to design activities in their lessons that are more appropriate for students' abilities.

2. METHOD

In this section, the research model, the study group of the research, the methods and techniques used in data collection, preparation and analysis are explained.

Research Design

This research was designed according to the descriptive survey model, which is one of the quantitative research methods. Survey research is a quantitative research method that helps to determine the perceptions, attitudes or achievements of a group of people with certain characteristics towards events, phenomena and situations (Fraenkel, Wallen, & Hyun, 2015). For this reason, the

descriptive survey method was used in the study, since it was aimed to determine the Logical reasoning levels of gifted primary school students (Creswell, 2013).

Research Sample

The universe of the research consists of gifted primary school students. The sample of the study consists of 38 primary school students in a center where gifted students are educated. 19 of these students are girls and 19 of them are boys. Easily accessible sampling method, which is one of the purposeful sampling methods, was used to determine the sample. In purposive sampling, the participants are not randomly selected, but are chosen according to the purposes of the research (Plano-Clark & Creswell, 2015). Easily accessible sampling method allows the researcher to select situations close to being reached. Thus, practicality is provided to the research and loss of time, money and workforce is prevented for the researcher (Mcmillan & Schumacher, 2010; Yıldırım & Şimşek, 2016).

Research Instrument

"The Longeot's Test of Cognitive Development [LTCD]" was used as a data collection tool in the research. The LTCD arose out of the need to quickly and consistently measure the cognitive development levels of a large number of students. The test, which was developed in order to determine the levels of Logical reasoning in French, was translated into English by Sheehan (1970). Ward et al. (1981) conducted an adaptation study of this test. It was adapted into Turkish by Hacıömeroğlu and Hacıömeroğlu (2018). The test consists of four parts and 28 questions. Part one of the test consists of five items involving the concept of class inclusion. Part two of the test consists of six items designed to measure propositional logic. The third section contains nine proportional reasoning problems. Part four consists of eight combinatorial analysis problems which require the subject to list all possible combinations of a set of items. A student with a score of 30 and above on the LTCD is in the formal operational stage, while the student with a score below 30 is in the concrete operational stage (Ward et al., 1981). The Turkish version of the LTCD was applied to gifted students in the fall semester of the 2020-2021 academic years.

Data Analysis

Since the number of participants was low, non-parametric analysis methods were used in the analysis of the data (Yıldırım & Şimşek, 2013). In addition, frequency and percentage distributions were also used in descriptive analyses. Ethical rules were followed during data analysis. No information was given about the identities of the participants.

3. FINDINGS

Findings related to the LTCD scores of gifted primary school students are explained according to the problem sentences of the research.

Descriptive Findings

The cognitive development levels of gifted primary school students were determined by descriptive analysis of the LTCD scores. In addition, the frequency and percentage distributions of the scores were also calculated.

First, the total scores of gifted primary school students from LTCD were calculated. The frequency and percentage distributions of these scores, taking into account the various score ranges, are given in Table 1.

Table 1. Total Scores from LTCD

Total Scores	f	%
15-19	3	7.9
20-24	5	13.2
25-29	4	10.5
30-35	17	44.7
36-39	9	23.7

Among the questions in the LTCD, 1 point was given to the questions in the concrete operational period, and 2 points were given to the questions in the formal operational period. In this context, the highest score that can be obtained from LTCD is 44. When Table 1 is examined, it is seen that none of the gifted primary school students got full points from the LTCD. The lowest score received from the LTCD is 15, and the highest score is 39.

A student who scores at least 30 in LTCD is in the formal operational stage. Cognitive development levels of gifted primary school students were determined by considering their total scores from LTCD. Information on the cognitive development levels of the students is given in Table 2.

Table 2. Percentage of the Gifted Primary Students in Each Cognitive Stage Measured by LTCD

Cognitive Stages	f	%
Concrete Operational	12	31.6
Formal Operational	26	68.4

According to Table 2, 26 of the gifted primary school students have cognitive development in the formal operational stage. The cognitive development of the other 12 students is in the concrete operational stage.

In LTCD, there are 12 questions belonging to the concrete operational period. Each of these questions is worth one point. The highest score that can be obtained from this section is 12. The scores of gifted primary school students from the questions of the concrete operational period are given in Table 3.

Table 3. Concrete Operational Scores

Scores	f	%
5	1	2.6
6	1	2.6
7	3	7.9
8	3	7.9
9	5	13.2
10	9	23.7
11	13	34.2
12	3	7.9

When Table 3 is examined, it is seen that only 3 of the gifted primary school students got full points from the questions belonging to the concrete operational period. Three quarters of the highest score that can be obtained from this section is 9 points. 79% of the students were able to get 9 or more points from the questions belonging to the concrete operational period. This ratio shows that gifted primary school students can successfully solve the questions of the concrete operational period.

In LTCD, there are 16 questions belonging to the formal operational period. Each of these questions is worth two point. The highest score that can be obtained from this section is 32. The scores of gifted primary school students from the questions of the formal operational period are given in Table 4.

Table 4. Formal Operational Scores

Scores	f	%
8	3	7.9
10	2	5.3
12	4	10.5
14	3	7.9
16	3	7.9
18	5	13.2
20	5	13.2
22	4	10.5
24	4	10.5
26	5	13.2
28	3	7.9

When Table 4 is examined, it is seen that none of the gifted primary school students can get full points from the questions belonging to the formal operational period. Three quarters of the highest

score that can be obtained from this section is 24 points. Only 31.6% of the students were able to get 24 or more points from the questions belonging to the formal operational period. This ratio shows that most of the gifted primary school students could not successfully solve the questions of the formal operational period.

Findings Related to LTCD scores of Gifted Primary School Students by Gender

It was investigated whether gifted primary school students' scores from concrete and formal operations sections differed significantly according to their genders. This analysis was done with the Whitney-U test and the results are given in Table 5.

Table 5. Mann Whitney U Test Results for Cognitive Stages

Cognitive Stages	Gender	N	Mean Rank	Sum of Ranks	U	Z	p
Concrete Operational	Female	19	20.47	389	189.29	-.282	.730
	Male	19	18.53	352			
Formal Operational	Female	19	23.16	440	136.55	-1.686	.072
	Male	19	16.10	306			

When Table 5 is examined, there is no statistically significant difference between the average of concrete operational and formal operational scores according to the gender variable of the primary gifted students. It was investigated whether the LTCD total and sub-dimensions scores of gifted primary school students differed significantly according to their genders. This analysis was done with the Whitney-U test and the results are given in Table 6.

Table 6. Mann Whitney-U Test Results for LTCD

	Gender	N	Mean Rank	Sum of Ranks	U	Z	p
Sub-dimensions							
Concept of Class Inclusion	Female	19	21.45	408	161.51	-.848	.315
	Male	19	17.64	335			
Propositional Logic	Female	19	21.61	411	166.46	-.909	.322
	Male	19	17.49	332			
Proportional Reasoning Problems	Female	19	20.76	394	183.59	-.424	.624
	Male	19	18.27	347			
Combinatorial Analysis Problems	Female	19	23.85	453	121.76	-2.065	.029
	Male	19	15.47	294			
Total	Female	19	23.32	443	132.22	-1.764	.061
	Male	19	15.94	303			

When Table 6 is examined, there is no statistically significant difference between the average scores of gifted primary school students on the concept of class inclusion, propositional logic, and proportional reasoning problems, according to the gender variable. There is a statistically significant difference in favor of male students in combinatorial analysis problems. In addition, there is no

statistically significant difference between the LTCD total score averages of gifted primary school students according to the gender variable.

4. DISCUSSION and CONCLUSION

The results obtained from the research show that the logical reasoning skills of the gifted primary school students are developed. Most of the gifted primary school students take part in the formal operational stage. Majority of the gifted students got a total score of 30 or more from LTCD. The gifted primary school students students were able to solve concrete operational questions successfully, but they could not show the same success in formal operational questions.

Piaget stated that in the cognitive development theory, the concrete operational stage developed around 7-12 years of age and the formal operational stage developed after the age of 12 and that logical reasoning skills appeared in both stages (Yaman & Karamustafaoğlu, 2006). Gifted students have a more advanced cognitive development compared to their peers. For this reason, it is quite normal for gifted students to be in the formal stage, which is a more advanced development period than their peers (Sak, 2011).

The results obtained as a result of the research also coincide with the results of studies measuring the cognitive development levels of students at different grade levels using LTCD. Sumarmo (1987) stated that 72% of the gifted students studying in 5th and 6th grades, and all of the gifted students studying in 7th and 8th grades were in the formal operational stage. Rohaeti et al. (2019) stated that 76% of the 7th grade students are in the formal operational stage. Sukarna, Sumarmo et al. (2020) stated that 87% of 11th grade students were in the formal operational stage. Rohaeti, Putra, and Primandhika (2019) stated that 70% of 11th grade students are in the formal operational stage.

There is no significant difference in terms of gender between the scores of the general, concrete and formal operational stages of the gifted primary school students from the LTCD. Unlike this result, Lis and Magro (1993) stated that the number of male students attending the formal operational stage was significantly higher than female students. Additionally, Zarotiadou and Tsaparlis (2000) and Sungur and Tekkaya (2003) stated that there is a difference between male and female students according to the concrete operational stage.

There is no significant difference in concept of class inclusion, propositional logic and proportional reasoning problems sub-dimensions of LTCD according to gender variable. According to the combinatorial analysis problems, male students are more successful than female students. Battista (1990) stated that logical reasoning skills do not differ between male and female students. Kılıç and

Sağlam (2009) and Yenilmez et al. (2005) stated that gender is an important factor in explaining students' logical reasoning skills.

This study is limited to the answers given to the LTCD of 38 gifted primary school students in a center where gifted students are educated in Sivas city center in the 2020-2021 academic year.

5. RECOMMENDATIONS

Various suggestions were made based on the findings and results of the research. The development of students' logical reasoning skills has an important place in teaching activities. It may be beneficial for teachers to structure their lessons by taking into account the cognitive stages of students. It is recommended that teachers structure their lessons by identifying the cognitive periods of both gifted students and other students.

In this study, the logical reasoning skills of gifted primary school students were examined. It is recommended that those who will research in the future should also examine the logical thinking skills of students with special abilities or normal development at different grade levels.

Logic teaching aims to develop students' reasoning power. The necessary skills to increase the intellectual potential of gifted students can be realized by teaching logic. In addition, teaching logic enables gifted students to make better decisions. For this reason, logic lessons should be included in the education of gifted students at an early age.

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Genişletilmiş Özet

Sosyal bir kavram olan üstün zekâlılık kavramı kültürler arasında farklılık göstermektedir. Her ülkenin kendi üstün zekâlılık kavramı vardır ve onu kültürel değerlerine göre tanımlar. Üstün zekâlı öğrenciler kültürleri için değerli en az bir akademik alanda olağanüstü başarı sergilerler. Üstün zekâlı öğrenciler, psikososyal ve bilişsel gelişimleri ile öğrenme ihtiyaçları bakımından normal gelişim gösteren öğrencilere göre farklılık gösterirler. Üstün zekâlı öğrenciler gelişmiş yaratıcı, analitik, eleştirel ve mantıksal düşünme becerilerine sahiptirler. Üstün zekâlı öğrenciler araştırma, tartışma ve problem çözme becerilerine sahiptirler. Üstün zekâlı öğrenciler bilgiyi eleştirel ve bağımsız olarak analiz edip mantıksal ve eleştirel olarak bütünleştirirler. Mantıksal düşünme, diğer düşünme becerilerinden farklıdır. Üst düzey düşünme süreçlerinin başarılı bir şekilde yerine getirilmesinde mantıksal düşünme de ön planda olmalıdır. Mantıksal düşünme becerisi güçlü olan bireyler, karşılaştıkları güçlüklerin üstesinden gelmede daha başarılıdırlar. Kendisi de bir üst düzey düşünme becerisi olan ve diğer üst düzey düşünme becerileri için de gereken mantıksal düşünme becerisi birçok araştırmanın da konusu olmuştur. Ancak özel yetenekli öğrencilerin mantıksal düşünme becerileri ile ilgili yeterince çalışma yapılmadığı görülmüştür. Bilişsel anlamda akranlarından daha fazla gelişim gösteren özel yetenekli öğrencilerin mantıksal düşünme becerilerinin de gelişmiş olması beklenmektedir. Bu bağlamda bu çalışmada özel yetenekli ilkokul öğrencilerinin mantıksal düşünme düzeyleri analiz edilecektir. Özel yetenekli öğrencilerin mantıksal düşünme becerilerini incelemek mantık eğitiminin özel yetenekli öğrencilere erken yaşlarda verilmeye başlanması gerekliliği konusunda eğitimcilere ve araştırmacılara katkı sağlayabilir. Bu bağlamda araştırma, özel yetenekli ilkokul öğrencilerinin mantıksal düşünme becerilerini incelemek amacıyla yapılmıştır. Elde edilecek veriler özel yetenekli ilkokul öğrencilerinin eğitimine önemli katkılar sunacaktır. Çünkü özel yetenekli öğrenciler hakkında daha fazla bilgi edinilecektir. Bu bilgiler, öğretmenlerin derslerinde öğrencilerin yeteneklerine daha uygun etkinlikler tasarlamaları için de faydalı olacaktır. Bu araştırma, nicel araştırma yöntemlerinden betimsel tarama modeline göre tasarlanmıştır. Araştırmanın evrenini üstün yetenekli ilkokul öğrencileri oluşturmaktadır. Araştırmanın örneklemini üstün yetenekli öğrencilerin eğitim gördüğü bir merkezde bulunan 38 ilköğretim öğrencisi oluşturmaktadır. Bu öğrencilerin 19'u kız, 19'u erkektir. Veri toplama aracı olarak “"Longeot Bilişsel Gelişim Testi" kullanılmıştır. Verilerin analizinde frekans ve yüzde dağılımları ile parametrik olmayan analiz yöntemleri kullanılmıştır. Üstün yetenekli ilkokul öğrencilerinden hiçbirinin testten tam puan almamıştır. Testten alınan en düşük puan 15, en yüksek puan 39'dur. Üstün yetenekli ilkokul öğrencilerinin 26'sının bilişsel gelişim düzeyi soyut işlemler aşamasında iken 12 öğrencinin bilişsel gelişimi somut işlem aşamasındadır. Üstün yetenekli ilkokul öğrencilerinden sadece 3'ü somut işlemler dönemine ait sorulardan tam puan almıştır. Üstün yetenekli ilkokul öğrencilerinin hiçbiri soyut işlemler dönemine ait sorulardan tam puan alamamıştır. Üstün yetenekli ilkokul öğrencilerinin cinsiyet değişkenine göre somut ve soyut işlemler dönemlerine ait puan ortalamaları arasında istatistiksel olarak anlamlı bir fark yoktur. Kombinasyonel analiz problemleri ortalama puanlarında erkek öğrenciler lehine istatistiksel olarak anlamlı bir fark vardır. Öğretmenlerin hem üstün yetenekli öğrencilerin hem de diğer öğrencilerin bilişsel dönemlerini belirleyerek derslerini yapılandırmaları önerilir.