

Investigation of Science Achievement on Transition to High School System (THS) in terms of Some Variables

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Abstract

THS is applied to Science High Schools, Social Sciences High Schools, Anatolian Technical Programs of Vocational and Technical Anatolian High Schools and Project schools for student selection. With THS, approximately 10 percent of more than one million students are placed in a secondary education institution based on their preferences. The purpose of this study was to examine the relationship between the success of the THS Science test of the students who have just graduated from middle school and who took the THS exam and their middle school science course scores, gender, and socio-economic level. In this ex post facto research, a total of 101 students were involved in the sample. Majority of the students were male (n=54, 53.5%). Pearson correlation analysis revealed that THS science score of participants were significantly and positively correlated with their 6th, 7th, and 8th grade science scores. The results of independent samples t-test demonstrated that there was no significant difference in THS science scores for male and female participants. Finally, the results of one-way ANOVA indicated that there were significant differences in THS science scores by participants' socio-economic levels. Accordingly, students with high socio-economic level had higher scores from THS science test than students with moderate and low socio-economic levels. Based on this particular finding, policy makers are recommended to reconsider their efforts to provide equality of opportunity in education.

Keywords: *Science education, Transition to high school, Middle school students, Socio-economic level.*

Introduction

Due to the increase in population, central exams are applied in Turkey because the number of qualified schools cannot fully meet the increasing number of students. Although there was a significant increase in the number of schools, it was inevitable to hold a central examination in these transitions on the grounds that the supply was not able to meet the demand (Kızıkan & Nacaroglu, 2019). In Turkey, such exams were held for the first time in 1955 for the transition to Maarif Colleges. Maarif colleges were opened by the Ministry of National Education to provide education in a foreign language. Students were admitted to these high schools after examination for a total of 7 years including one year of preparatory class. In 1975, these schools were changed to Anatolian High Schools and continued to accept students through central

examination (Çetintaş & Genç, 2001). Anatolian high schools were followed by Science High Schools (1964), Anatolian Imam Hatip High Schools (1985), Social Sciences High Schools (2003), and Sports High Schools (2009) in accepting students through centralized examination. There have been changes over time in terms of content and method in the central exams applied during the transition to secondary education. It is tried to reach an optimum exam system for students by determining the advantages and disadvantages in each exam model and making improvements. Until the high school transition system (HSTS), which was put into practice in the 2017-2018 academic year, exams including high school entrance exam, Secondary Education Institutions Selection and Placement Exam, Placement Exam, and Transition from Basic Education to Secondary Education Exam were applied.

Today, THS is applied to Science High Schools, Social Sciences High Schools, Anatolian Technical Programs of Vocational and Technical Anatolian High Schools and Project schools for student selection. With THS, approximately 10 percent of more than one million students are placed in a secondary education institution based on their preferences. The rest of the students are able to select the high school closest to their homes. The main purpose of this application is to reduce the anxiety and stress of the students toward the exam to some extent and to enable them to pass to the secondary education level without an exam. Students who choose local placement can make five choices, provided that they choose the first 3 from their own registration area. While evaluating student preferences, situations such as registered addresses, selection priorities and school achievement scores are taken into consideration. With this system, a process-oriented rather than result-oriented education was planned throughout the middle school education, more time was given to sports, artistic and social activities by reducing the student's test anxiety, and the student's orientation to additional activities such as out-of-school courses and classrooms was reduced (MONE, 2021). THS involves questions from six courses including Science (20 items) Math (20 items), Turkish (20 items), Foreign Language (10 items), Religious Culture and Moral Knowledge (10 items), and Turkish Republic Revolution History and Kemalism (10 items) (MONE, 2022). Science, which is among these courses, has been the focus of the current study.

The main purpose in science education is to encourage the learner to discover how science develops by investigating the nature of knowledge, adapting knowledge to life, and scientific processes (Kaya, 2003). Exploring nature and understanding the relationship between human and the environment are part of science education. It also aims to integrate science

education with technology and engineering fields (MONE, 2018). In an age where technology is advancing rapidly, it is seen that countries, especially developed ones, carry out educational reforms. Advances in science education account for the majority of these reforms (Çakıcı & Girgin, 2012). In order to keep up with the developing world in science education in Turkey, efforts are made to improve science education. Examining the curricula and innovations of developed countries and making some changes in the science curriculum can be considered as an example of these efforts (Balbağ et al., 2016). Today, science lessons are provided in 3rd, 4th, 5th, 6th, 7th, and 8th grades, and it is taught as three hours per week in 3rd and 4th grades while 4 hours per week in 5th, 6th, 7th, and 8th grades (TTKB, 2018).

The literature review revealed that most of the studies focused on previous exam style. These studies involved the effect of private teaching institutions or course centers on academic success in central exams (Başol & Zabun, 2014), the predictive power of participation in course activities and performance grades on Secondary Education Institutions Selection and Placement Exam success (Karakoç & Köse, 2018), the effect of independent variables such as private school, gender, family income, and education level on the Secondary Education Institutions Selection and Placement Exam (Okutan & Daşdemir, 2018). On the other hand, since there are some changes in method and question style in THS, which has been implemented since the 2017-2018 academic year, it is thought that the analysis of the variables affecting success in this exam system will contribute to the literature. In this context, the purpose of this study was to examine the relationship between the success of the THS Science test of the students who have just graduated from middle school and who took the THS exam and their middle school science course scores, gender, and socio-economic level. Within this scope, the following research questions were tried to be answered.

- Is there a significant correlation between students' THS Science scores and their science course scores?
- Do students' THS Science scores significantly differ by their gender?
- Do students' THS Science scores significantly differ by their socio-economic level?

Method

Research Design

This study was designed as ex post facto research. It is a design particularly suitable in educational contexts where the independent variables cannot be manipulated. It seeks relations between the events that that have already happened (Cohen et al., 2005).

Research Sample

The participants of this study involved 101 students who just graduated from middle school and took the THS exam. All of the students graduated from a public middle school located in the Central Black Sea Region. The majority of participants were male (n=54, 53.5%). 45 (44.6%) participants had low, 32 (31.7%) had moderate, and 25 (23.8%) had high socio-economic level.

Research Instrument and Procedure

This study did not employ a data collection tool. All of the information including the demographics, course scores, and THS science scores were obtained through school records.

Data Analysis

In the analyses, independent samples t-test, one-way ANOVA, and Pearson correlation were used to answer the research questions. The alpha value was set as .05 in this study.

Results

The correlations between students' THS Science scores and their science course scores were examined using Pearson correlation analysis. The descriptive statistics and findings were provided in Table 1.

Table 1

Descriptive Statistics and Correlations for Study Variables

Variable	<i>n</i>	<i>M</i>	<i>SD</i>	1	2	3	4
1. 6 th grade science score	101	70.223	18.041	-			
2. 7 th grade science score	101	69.322	19.032	.862*	-		
3. 8 th grade science score	101	98.510	3.045	.553*	.624*	-	
4. THS science score	101	5.648	6.101	.753*	.729*	.452*	-

* $p < .05$.

The results of Pearson correlation analysis revealed that THS science score of participants were significantly and positively correlated with their 6th, 7th, and 8th grade science scores. Independent samples t-test was conducted to see whether participants' THS Science scores significantly differed by their gender. The findings were provided in Table 2.

Table 2*Results of THS Science Score Differences by Gender*

Variable	Male		Female		<i>t</i> (99)	<i>p</i>
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>		
THS Science Score	4.657	5.921	6.787	6.169	1.768	.080

The results of independent samples t-test demonstrated that there was no significant difference in THS science scores for male ($M=4.657$, $SD=5.921$) and female participants ($M=6.787$, $SD=6.169$); $t(99) = 1.768$, $p > .05$. One-Way ANOVA was carried out to determine whether THS science scores significantly differed by participants' socio-economic level. The findings were summarized in Table 3.

Table 3*Means, Standard Deviations, and One-Way Analyses of Variance in THS Science Scores by Socio-Economic Level*

Variable	Low		Moderate		High		<i>F</i> (2-98)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
THS Science Score	3.338	4.743	4.504	5.480	8.990	6.572	8.391*

* $p < .05$.

The results of one-way ANOVA indicated that there were significant differences in THS science scores by participants' socio-economic level ($F(2-98) = 8.391$, $p \leq 0.05$). The post-hoc comparisons using LSD test indicated that the mean score of students with high socio-economic level ($M=8.990$, $SD=6.572$) was significantly higher than the mean scores of students with moderate ($M=4.504$, $SD=5.480$) and low ($M=3.338$, $SD=4.743$) socio-economic levels. However, there was no significant difference in the mean score of students with moderate ($M=4.504$, $SD=5.480$) and low ($M=3.338$, $SD=4.743$) socio-economic levels.

Discussion, Conclusion, and Recommendations

Discussion

The first research question of the study focused on the correlations between participants' THS science scores and their science course scores. The findings showed that participants' THS science scores correlated with their 6th, 7th, and 8th grade science course scores positively and

significantly. Although there was no other study focusing on science scores to our knowledge, similar correlations were found in other courses such as Turkish Republic Revolution History and Kemalism (Öntaş et al., 2020).

The second research question sought whether students' THS Science scores significantly differed by their gender. The findings revealed that the mean scores of male and female students were not significantly different. The literature review yielded no other study that focused on the THS science score differences by gender. The third research question focused on the socio-economic levels of students. The analysis revealed that the mean scores of students with high socio-economic level were significantly higher than the mean scores of students with moderate and low socio-economic levels. These findings are consistent with the literature (Aslanargun et al., 2016; Cingöz & Gür, 2020).

Conclusion

Students' THS science scores correlated with their science course scores. Therefore, it can be expressed that high achievers in science courses are more likely to obtain higher scores in THS. In this study, gender had no effect on students' THS science scores. Finally, the socio-economic level was determined to be an important factor for THS science scores of participants. Students with high socio-economic status had a much higher mean score than students with moderated and especially low socio-economic levels.

Recommendations

This study involved the data of 101 students. This poses a problem regarding the generalizability of the results. Future research is recommended to involve a more comprehensive sample. The results revealed that socio-economic level was extremely important for students' THS science scores. Students with low socio-economic level had the lowest mean scores of THS science. Thus, policy makers should reconsider their efforts to provide equality of opportunity in education. Moreover, researchers are recommended to design some experimental studies to increase achievement of students with low socio-economic status.

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