

A Comparison of the Success of Vocational School Students in Basic Mathematics based upon Their Method of Placement in University

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Abstract

The purpose of this study is to compare vocational school students' success at basic mathematics subjects with regard to their entrance to the university. The data were obtained by administering a "Personnel Information Form" and "the Mathematics Test" prepared by the researcher to 617 vocational school students and 26 two-year degree programs at the Open University in Turkey. After analyzing the data, a considerable statistical difference in basic mathematical knowledge and skills among students was found based on students' entrance ranks to the programs. The results of the research indicated that there is a significant difference in success on mathematics courses taken at high schools and universities. On the other hand, there was no significant difference between men and women on mathematics tests.

Key Words:

Vocational school, project of entrance without having an exam, mathematics success.

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Rapid technological developments have increased the human resource quality standards required by the industry. In future societies, a change in company goals will occur where human beings with higher qualities will be targeted (Umay, 2004). A need will arise for human resources that possess good communication skills and capable of understanding the technology with appropriate troubleshooting skills. Also in demand are those individuals who are apt to team work and have the basic knowledge to understand the fundamentals of the technology itself such as sciences and mathematics. Mathematics is the key to the opportunity. It is no longer just the language of science; but, mathematics now contributes in direct and fundamental ways to business, finance, health, and defense. For students, it opens doors to new careers (National Research Council, 1998). Vocational schools are the only source for qualified human resources for the Turkish industry and a rapid increase in their importance can clearly be observed. The vocational school is a higher education institute that aims to provide human resources for specific professions by providing training within four semesters (2547 Numbered Higher Education Law, Article 3). In 2005, the percentage for vocational schools among all the state education institutions was 31.5% (20.4 % among all the education programs). This percentage is above 30% which is observed in most developed countries (YÖK Report, 2005).

Today, most professions and industrial careers require the basic ability to work with mathematics and have an understanding of mathematical theory. Employers expect their employees to solve problems which are not typical and encourage team work. Depending on the characteristic of the workplace, the employees must use proper analytical equipments to compile data and present a summary of the data using charts and graphs (Ersoy, 2002).

The only way to provide the growing Turkish industry a competitive edge among multi-national market is through qualified technicians who are educated in the vocational schools. The Turkish industry needs qualified human resources that have basic knowledge of science and mathematics that will help in the race to become a better society. By code law 4702 which has been valid since 10 July 2001, the project for “Entrance without an Exam” has been initiated first during the 2002–2003 education semester. The success of

the vocational students has dropped drastically with the use of the “Entrance without an Exam” project (YÖK Report, 2004; Dönmez & Polat, 2003a). The general thought among the vocational school students is that they are unsuccessful in science and mathematics courses (Dönmez & Polat, 2003b).

After the project was applied, very little research has been carried out on the success of the vocational school students. The aim of this research is to gather information that will describe the recent situation regarding the vocational school student’s knowledge of mathematics, which is also important for their daily work and life. It is hoped that the results of this research will shed some light on how to increase the quality of education in vocational schools.

Method

The aim of this study is to compare the success levels in basic mathematics subjects with respect to students’ way of entrance to universities. In addition, the factors that affect the vocational school students’ success were investigated. To achieve this objective, descriptive and relational models were used. Descriptive research are used to determine any situation in a given subject (Erdoğan, 1998); whereas relational models are used to find the presence of a change or degree of variation between two or more variables (Karasar, 1995).

A quota sampling technique was used to obtain the sample of the study. With this technique, the number of people who will be included in the research is determined as 10 to 20% of the whole population (Serper, 2000). Population of the research consists of students from four vocational schools of Anadolu University and students from two-year degree program of the Open University. Data were collected by a “Personnel Information Form” and “the Mathematics Test” which were administered to 643 students. Before the research was carried out, the validity and reliability of the Mathematics Test was investigated. The Kuder Richardson-20 for the test was found to be .71. The data were analyzed by SPSS 12.0. In these analyses, frequencies, percentages, averages, standard deviations, Chi-Square and independent-samples t-tests were used.

Results

By analyzing the data from the Personal Information Form, it was found that most students were at ages between 19 and 21 years, and the average income of their families was in between 501 to 1000 Turkish Lira per month. Also, it was found that 66 % of the mothers and 44 % of the fathers graduated from primary schools. The lower educational level of the families was an interesting finding. Most of the graduates of the vocational and technical secondary schools reported that if a chance had been given to them, they wouldn't have chosen the vocational and technical secondary schools. 34 % of the students who participated in the research entered the university by an exam, 66 % without an exam. After analyzing the data from the Mathematics Test, a considerable statistical difference in basic mathematical knowledge and skills was found based on the entrance criteria. The average score of the mathematics test among those who entered the university by an exam was found to be 5.5, whereas the average score for those who entered university without an exam was 2.9.

When each question was separately analyzed, except one question, in nine of the questions, the students who came entered as a result of the exam were more successful than the students who did not come through an exam. Also, the students who were successful in mathematics courses during their high school education continue their success in their college years. The results of the research indicate that there is no significant difference among student success in the mathematics test based on gender.

Discussion

This study shows that students who were accepted into the two-year degree programs without an exam had a lower success rates compared to the students who were accepted based on an exam score. According to the report published by the YÖK in 2004, that investigated the situation with vocational schools, the decrease of academic success for those students was due to the fact that they were less successful in mathematics. This study agrees with the results obtained from another study carried out on 872 vocational school students (Kızgın, 2005). Other studies in England, France, and

Germany have shown that vocational school students encounter problems with mathematics (Green, 1998). They fail in mathematics because of the insufficient education they receive during their vocational high school studies. Therefore, it is important to focus on these schools to understand the impact they have. It is not easy to determine critical factors such as the student, class, and teacher that will allow these schools to have an effective impact on the success of students (Bosker, Kremers & Lugthart, 1990). There is a very close relationship between the success of high school students in mathematics and with their school process, and school composition (e.g. mean school ability level, mean school socio-economic status, school ability heterogeneity) (Opdenakker & Van Damme, 2001). Together with research carried out on the efficiency of the vocational school education, the organizational development programs to improve the mathematics and science skills of the students, (which there are examples of; see. Bottoms & Presson, 2000; Wolf, 1992) throughout the world will contribute positively to the success of the vocational schools.

, in most of the studies carried out on mathematics education and success, gender has been considered as an important factor as well as attitudes toward the topic (see. Aksu, 1991; Tocci & Engelhard, 1991) and anxiety levels (see. Baloglu & Kocak, 2006; Hembree, 1990; Yuksel-Sahin, 2004). The widespread belief is that male students are more successful compared to female students. Through there seems to be no consistency in literature regarding this conclusion. Some studies support male success (i.e., Fennema & Carpenter, 1998), while others show that the success in mathematics for males and females is no different (i.e., National Science Foundation, 1996; inducer: Malphass, O'Neil & Hocevar, 1999). In the current study, the success in mathematics for males and females did not vary significantly.

In conclusion, mathematical skill and knowledge obtained during secondary and higher education has become a key ability in a world where access to information and informatics has become critical (The Skills 2000 Report, 2000; Green, 1998). In this context, it is very important to correctly develop a plan for mathematical education in vocational schools.

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