

Teknik Bilimler Meslek Yüksekokulu Öğrencilerinin Temel Matematik Başarılarının Değerlendirilmesi

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ÖZ

Meslek Yüksekokullarında öğrenim gören öğrencilere, teorik ve pratik olmak üzere iki yöntem kullanılarak dersler verilmektedir. Temel Matematik de teorik kapsama giren oldukça önemli derslerden birisidir. Meslek Yüksekokulları temelde nitelikli ara eleman ihtiyacını karşılamak amacıyla kurulduğu düşünüldüğünde, matematiğin önemi yadsınmaz.

Yapılan bu çalışmada, öğrencilerin matematik dersine olan bakış açıları ve bu dersteki başarıyı etkileyen faktörler incelenmeye çalışılmıştır. Özellikle sınavlı ve sınavsız geçişle gelen öğrencilerin başarı durumları ele alınarak değerlendirmeler yapılmıştır. Bu çalışmada, Selçuk Üniversitesi TBMYO Bilgisayar Programcılığı Bölümünde eğitim gören öğrencilere çeşitli sorular yöneltilerek değerlendirmeler yapılmıştır.

Yapılan bu çalışmanın sonucunda, öğrencilerin matematiğe olan bakış açıları ve değerlendirmeleri ortaya konulmuştur. Verilerin toplanması sürecinde, öğrencilerin matematik dersine olan bakış açılarını belirlemek için hazırlanmış bir anket çalışmasından ve öğrenci işlerinden alınan istatistikî verilerinden faydalanılmıştır. Verilerin değerlendirilmesinde Likert Ölçeği değerlendirme aralığı kullanılarak sonuçlara gidilmiştir.

Anahtar kelimeler: Matematik Eğitimi, Teknik Bilimler Meslek Yüksekokulu, Sınavlı-Sınavsız Geçiş.

Assessment of Basic Mathematics Achievements of Students at the Vocational School of Technical Sciences

ABSTRACT

Students attending Vocational Schools of Higher Education are given courses using two methods, namely theoretical and practical. Basic Mathematics is one of the highly important courses that fall within the group of theoretical courses. Importance of mathematics cannot be denied given that Vocational Schools of Higher Education were established to meet the need for qualified intermediate staff members.

This study aimed to investigate students' views concerning mathematics course and factors affecting success in this course. Assessments were made, especially taking into account the achievements of students who were admitted through examination and those who were admitted through open admission. In this study, evaluations were made on the basis of various questions asked of students attending Selçuk University Vocational School of Technical Sciences (VSTS) Department of Computer Programming. As a result of this study, students' points of views concerning mathematics and their assessments in this regard were revealed. In the process of data collection, a questionnaire which was prepared in an effort to determine students' views regarding the mathematics course and statistical data obtained from the Office of Students Affairs were made use of. Likert Scale assessment range was used in the evaluation of the data to arrive at conclusions.

Keywords: Mathematics Education, Vocational School of Technical Sciences, Admission through Examination-Open Admission.

1. Introduction

Today, when science and technology are developing rapidly, people are making efforts to keep pace with this change. Skills of creativity, reasoning and problem solving rise to prominence in this process of adaptation. In today's world, countries do not derive their powers from their populations or underground or ground sources only but from the qualified, well-equipped and well-educated manpower. Rapid advances in technology have eliminated the borders between countries. In particular, a global concept of world citizenship in an economic sense has become an item of agenda. The concept of internationalization not only in economy but also in education has entered into the agenda of all nations and rapid integration into the world in all fields has gained importance (Alkan et al., 2014). In this scope, vocational schools of higher education which were established to raise intermediate staff members who possess adequate information and skills in fields needed especially by sectors such as industry, commerce

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and service constitute the most important component of vocational and technical educational system (Alkan et al., 2014).

When all students of higher education attending associate degree, bachelor's degree, master's degree and proficiency in art programs are taken into consideration, the percentage of students attending vocational schools of higher education is seen to be 32.1 % (Alkan et al., 2014). In other words, about one third of university students are at vocational schools. This indicates that vocational schools have a significant place in the higher education system. However, the need for intermediate staff having the desired qualifications is increasing day by day (Başaran et al., 2010). Mathematics education has an important share in gaining these skills (Turanlı, Türker and Keçeli, 2008).

Basic mathematics skills of students who were admitted, through the university entrance examination or without it, to vocational schools, which are the equivalent of the intermediate staff education system in our country, were compared and contrasted. Basic mathematics skills have an important place in the theoretical courses of the education programs of existing vocational schools. Where students have the most difficulty during the teaching of courses involves operations that require basic mathematical skills. Students who are successful in these operations do better in theoretical courses. Therefore, the aim of this study was to see what kind of an effect this situation had on students who were admitted to vocational schools through the university examination and those who were admitted through the open admission system.

This study investigated the relationship between the problems of quality and nature of education, which arose as a result of the introduction of the open admission system in our country, and the basic mathematical skills. Education of intermediate staff, which is a prominent problem in today's world, is changing and developing rapidly. In today's world, where rapid advances are being experienced in science and technology, people are struggling to keep pace with these changes. Creativity, reasoning and problem solving skills rise to prominence in this process of adaptation. Mathematics education has an important place in the stage of acquisition of these skills (Turanlı, Türker and Keçeli, 2008).

Table 1 below presents findings about the mathematics course and skills obtained from studies conducted in previous years

Table 1. Findings in Various Studies Conducted on Mathematics Course and Skills

(Kaya et al., 2013)	They investigated and analyzed the factors affecting achievements of students attending vocational schools of higher education in the mathematics course. This study was conducted on 356 students who were selected randomly among 5500 students from 5 vocational schools.
(Aksu, 2015)	This study dealt with the variables that might influence vocational school students' attitudes towards Mathematics II course and investigated the levels of students' attitudes to this course.
(Leylek and Gürten, 2015)	They conducted a study to reveal whether or not there was a significant difference in the basic mathematical skills of students who were admitted to vocational schools through the university entrance examination or via the open admission system and whether or not demographic variables had an effect on them.
(Polat and Dönmez, 2003)	They stated that students were especially unsuccessful in Turkish Language, foreign language, mathematics and physics courses.
(Sezgin, 2000), (İleri ve Çelebi 2015)	They defined technical education as a process of education that requires advanced level science and mathematics knowledge as well as practical technical skills, and improves knowledge, skills and working habits needed for a task in a professional post between a skilled worker and an engineer.
(Saraltn and Erol, 2015)	They regarded knowledge of mathematics as one of the sine qua non knowledge and skills for students attending the program of accounting and taxation. In addition, they emphasized that their shortcomings with regard to basic mathematics should be eliminated.
(ERG and KOÇ, 2012: 24).	They found that students at vocational schools of higher education were bad at basic science, mathematics and theoretical courses of their relevant programs and that about 95 % of the graduates were inefficient concerning the rules of basic mathematics.

(Bayer et al. 2015)	They stated that students coming from vocational high schools had the necessary background information in mathematics and sciences and that students coming from common high schools had a low level of achievement, which prevented them from attaining a satisfactory level of education at vocational schools, which offer 2-year education programs. They pointed out that mathematics and science subjects need to be increased in vocational high schools and maritime programs at vocational schools of higher education.
(Can et al., 2015)	They emphasized that students were not sufficiently educated in secondary education, notably in mathematics, and that instructors at vocational schools should continue to perform the task of removing shortcomings in knowledge in this regard until authorities make the necessary regulations to correct the situation.
(Özkan et al., 2015)	They agreed that the courses the students did badly at were Mathematics, Turkish Language, Atatürk's Principles and Reforms, Foreign Language etc..
(Büyükakıllı, 2015)	They called attention to the fact that a good background knowledge in physics, chemistry and mathematics was necessary for courses offered in programs of vocational schools of technical sciences.
(Özsoy and Yılmaz, 2015)	74.14 % of the 252 academic staff members working at vocational schools at Trakya University stated that the open admission system reduced the quality of education. 84.5 % of the academics who participated in the study argued that the levels of students admitted through the open admission system in basic studies (Turkish, Mathematics, Sciences) were inadequate.

It is stated in the studies conducted that knowledge of mathematics is not given adequately in secondary education and therefore this problem persists in vocational schools of higher education and students do badly in this course. It is emphasized in those studies that basic courses such as physics, chemistry and notably mathematics are necessary to raise well-qualified students. Moreover, it is pointed out that students admitted through the open admission system are inefficient in these courses.

2.Method

Data obtained from 55 students collected through the random sampling method among the students attending Selçuk University Higher School of Technical Sciences Department of Computer Technologies were used as the research material. The Likert Scale evaluation range was used in the evaluation of the data (Table 2).

Table 2. The Likert Scale Evaluation Range (Nuhoglu and Yalçın, 2004)

Rating Values	Meaning	Range
5	Strongly Agree	4.21-5.00
4	Agree	3.41-4.20
3	Neutral	2.61-3.40
2	Disagree	1.81-2.60
1	Strongly Disagree	1.00-1.80

3.Findings

In the study, genders of the students who participated in the study are given in Table 3, their distribution by the type of school they graduated from is given in Table 4, their distribution by the method by which they were admitted to university (through examination or through open admission) is given in Table 5, and the range of the scores they received from the mathematics course is given in Table 6. In addition, their ranges of scores obtained from the mathematics course were evaluated separately based on the type of high school they graduated from (Table 7) and the method of admission to university (through an examination or through open admission) (Table 8).

This was intended to determine students' points of view of the mathematics course, their satisfaction with the course and their views regarding this course. To this end, seven critical questions were asked in Table 9. Frequency, percentage and mean values belonging to this table were given.

Table 3. Distribution by Gender of the Students Participating in the Study

	Range	
	f	%
Male	44	80
Female	11	20
Total	55	100

Table 4. Distribution of Students by the Type of High Schools They Graduated from

	Range	
	f	%
Vocational High Schools	31	56,36
Technical High Schools	18	32,72
Anatolian High Schools	2	3,63
Other High Schools	4	7,27

It is seen from Table 3 that 80 % of the students are male while 20 % are female. This percentage is important in that it gives an idea about the gender distributions of students admitted to vocational schools of technical sciences. Table 4 shows students' distribution by the type of high schools they graduated from. Of the 55 students who were selected for evaluation, 31 graduated from vocational high schools, 18 from technical high schools, 2 from Anatolian high schools and 4 from other high schools. As can be seen in Table 4, a large percentage of the students coming to this department are from vocational high schools, followed by students coming from technical high schools. It is seen that the number of students coming from other schools is quite low compared with those coming from vocational high schools and technical high schools.

Table 5. Distribution of Students According to the Method of Admission to University (Examination/ No Examination)

	Range	
	f	%
Admission through Examination	28	50,9
Open Admission	27	49,1
Total	55	100

Table 6. Students' Score Ranges in the Mathematics Course

	Range	
	f	%
0-20	0	0
21-40	2	3,63
41-60	16	29,09
61-80	27	49,09
81-100	10	18,18

For a long time, vocational schools admitted students entirely through the open admission system. However, this situation changed and now students are admitted to these schools through both the university entrance examination and through the open admission system. It is seen from Table 5 that

about 50 % of the students who participated in the survey in the computer programming department of the Vocational School of Technical Sciences were admitted through the examination whereas about 50 % were admitted through the open admission system. It is a strong possibility that if the vocational schools are supported and their significance is better understood in the near future, then this percentage will change.

Students' ranges of scores from the mathematics course are seen in Table 6. It is seen from this table that about 49 % of the students are within the 61-80 score range and a large part of the remaining students are above and below this range. Although it is seen from Table 6 that students' achievements in the mathematics course are quite high, one needs to question to what extent these achievements reflect the truth. In compulsory courses such as Mathematics, Turkish Language, and Foreign Language, which are taught to students from different departments, instructors also choose to give examinations jointly. As a result of this, when achievement is low in these courses in some departments, then this causes the scores of students in other departments to rise. Therefore, this situation should not be ignored.

Table 7. Score Distribution Ranges of Students in the Mathematics Course According to the Type of High School They Graduated from

		Score Distribution Ranges of Students in the Mathematics Course				
		0-20	21-40	41-60	61-80	81-100
Type of High School	Vocational High Schools	0	2	10	15	4
	Technical High Schools	0	0	3	10	5
	Anatolian High Schools	0	0	1	1	0
	Other High Schools	0	0	2	1	1

Table 8. Score Distribution Ranges of Students in the Mathematics Course According to the Method of Admission to University

		Score Distribution Ranges of Students in the Mathematics Course				
		0-20	21-40	41-60	61-80	81-100
Entrance to university	Admission through Examination	0	1	6	15	6
	Open Admission	0	1	10	12	4

In Table 7, students' score ranges from the mathematics course were investigated on the basis of the type of high school they graduated from whereas in Table 8, their score ranges from the mathematics course were investigated based on the method of admission to university. It is seen from Table 7 that students who did well in the mathematics course were those who came from vocational high schools, followed by students from technical high schools. It is seen from Table 8 that students who were admitted through the examination were more successful than those who were admitted through the open admission system. The rise in the percentage of students admitted through the university entrance examination points to the fact that educational quality of vocational schools will increase.

Table 9. Questions Aimed at Finding Students' Points of Views of the Mathematics Course

	Strongly Agree		Agree		Neutral		Disagree		Strongly Disagree	
	f	%	f	%	f	%	f	%	f	%
Mathematics is one of my favorite courses	7	12	9	16	15	27	14	25	10	18
My knowledge of Mathematics will support me in daily life	3	5	4	7	5	9	31	57	11	20
Mathematics is closely related to other courses in the department where I study	6	11	5	9	10	18	22	41	10	18
I received enough Mathematics classes in secondary education	10	18	15	27	16	29	7	12	6	11
Mathematics class hours offered at the university are sufficient	14	25	17	30	12	21	10	18	2	3
The curriculum is adequate and covers necessary information	10	18	18	33	10	18	12	22	3	5
The instructors teaching this course are efficient	7	13	8	15	19	35	16	30	3	5

In Table 9, various questions intended to determine students' points of view of the mathematics course were asked. 27 % of the students responded "I am undecided" to the statement/question "Mathematics is one of my favorite courses". 25 % of the students stated that they liked this course while 18 % expressed a strong interest in this course. These results indicate that mathematics course is in general liked by students. A large majority of the students, 57 %, believe that this course is also important for daily life. Students in the computer department believe that mathematics course is closely related to their department. A large percentage of these students stated that they did not receive adequate mathematics education in secondary education. Likewise, the class hours allocated of the mathematics course in their university education are regarded by students as inadequate. Students consider the curriculum followed in the mathematics course insufficient and demand a system where mathematical topics appropriate for the needs of their departments are prioritized. When the students were asked to evaluate the instructors teaching this course, 35 % were undecided, 30 % regarded them as efficient while 28 % regarded them as inefficient.

4. Conclusion

The important problem for students studying at Vocational Schools of higher education is that adequate mathematics knowledge and skills are not given to them in secondary education. Therefore, in order to eliminate this problem, academic staff members teaching the mathematics classes should help those students catch up on missing knowledge and then proceed to provide them with mathematics knowledge. However, class hours allocated for mathematics are not enough, so class hours and number of semesters allocated for the mathematics course should be increased.

It is good news that in general students believe that mathematics course is important and necessary for them. Students consider the mathematics course to be necessary for both school and everyday life. In order for mathematics courses to be more useful for students, course curricula should be prepared extremely painstakingly. These courses should be taught in accordance with the needs of the departments

and in a format specific to each department. Mathematics course should be deemed to be a basic vocational course and its content should be designed accordingly.

It is seen that students who were admitted through the examination were more successful than those who were admitted through the open admission system. New ways should be sought to increase the number of students who are admitted to the department through the examination, which is vital to raise the educational quality of vocational schools.

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