

# THE EFFECTS OF GENERAL MATHEMATICS IN HIGH SCHOOL ON COLLEGE CALCULUS AT ANADOLU UNIVERSITY IN TURKEY

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**ABSTRACT** The purpose of this research is to investigate the effects of various different level high school mathematics courses, on the students' further educational performance, namely, their achievements on freshman college calculus course.

The chosen research pattern is 46 freshman students in Eskişehir Vocational School at the Anadolu University in 1998-99 academic year.

The results indicate that the students' performances in calculus courses are closely related with their high school mathematics course levels, that is, their high school mathematics backgrounds.

The curriculum of mathematics followed in vocational high schools and social-branch of high schools are quite different from science-branch of high schools. The curriculum of mathematics in most vocational high school and social-branch of high schools is relatively superficial.

Taking the research results into consideration, I believe that the freshman college students graduated from these schools must take pre-calculus in first semester. Besides, freshman college students graduated from science-branch of high schools and the repeating students must be in another class.

## 1) INTRODUCTION

The aim of this study is to investigate the effects of general high school mathematics on success of vocational college students in Eskişehir in the academic year of 1998-99.

The curricula of mathematics followed in vocational high schools and in social-branch of high schools are quite different from science-branch of high schools. To investigate how this difference relates to the success in the university forms the basic of this study.

There is a special property of the first-year general mathematics in the university. This lecture connects directly and heavily with abilities and skills of students acquired from general mathematics in high schools.

Besides, mathematics in vocational high schools and in social branch of high schools is relatively superficial. Relatively easy lecture of mathematics in these branches is a serious problem for first-year university students. Because mathematical concepts comes into relatively serious in complex forms.

Modern scientific thinking was formed with mathematical concepts and for centuries, mathematics helped to solve the secrets of nature. From this point of view, we must teach general mathematics to our students (Bressoud, 1992).

The students in high school mathematics, develop the applications of manipulative and technical exercises. Conceptual teaching of general mathematics could be realized by a glance to concepts, knowledge of method and research findings (Ferrini-Mundy, Lauten, 1994).

The problem of setting manipulations into theoretical mathematics rose in early 1980's. Starting from this reason, it is defended that general mathematics is needed to set into curriculum of college calculus. The curriculum of general mathematics in undergraduate level must be organized in teaching methods as to activate the students (Oliva, 1989).

Real goal for college calculus is to teach mathematical knowledge at the same level by less credit. Thus, the students can spend more time for lectures of profession.

Besides, the basic thinking of curriculum of general mathematics at these schools is that arithmetical calculations and algebra is not needed by the students.

Generally, educators assert that the source of unproductiveness in mathematics and inadequates in understanding of students is curriculum. In order to start a better curriculum of

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mathematics, we must develop the curriculum of general mathematics, deciding on what we will teach to our students (Goldsmith, Mark 1999).

Curriculum must be based on the productive studies of the students which help to their detailed and deeper understandings. Besides, to concrete mathematical approximations, curriculum must contain the activities based on the teacher effectiveness and students' applications (Kaput, 1997).

The students who are in social branch of high schools or in vocational schools, learn mathematics anyway. The important thing is that we must pay attention to these consequences. The reality believed, is that the mathematics taught in high schools is inadequate to be successful in general mathematics in the first year of university. The knowledge of arithmetic and algebra that students starting calculus have has fallen (Askey, 1997). The number of these students can reach to the critical percentages of the students in the branch of science in high schools. In this situation, both the students in the branch of science and the students repeating general mathematics, could be the dominant group. General mathematics, in this way for one group of students could be unuseful and for the other group of students could not be appropriate. Thus, at the same class, for two different students-groups, they could not be taught in the same rate. In this situation, these two different groups who receive general mathematics in the first year of university must be separated from one another. Manipulating general mathematics in different way for the students who graduated from branch of sciences and experienced, time could be saved. For other group, it is appropriate that reducing the difference of two groups, it could be one year more, this is not loss of time. Thus, the students will complete the knowledge which is not new. Finally, these two different student groups come to the same level. Thus, the negative effects in the system of secondary education could be converted to positive effects.

## 2) THE METHOD

This study was realized with the students in Eskişehir Vocational College in the academic year of 1998-99. According to high schools graduated, their grades of success were investigated. The results of this investigation were given in Table 1, Table 2.

## 3) FINDINGS

As expected, according to high schools graduated, the meaningful difference among their successes in general mathematics can be seen in Table 1 and Table 2. This situation affected students negatively. Not following the lecture, the students who believe that the lecture is not useful for themselves prepare their failure. While for one group of students, the lecture would be meaningless, for other group, it would be hard to achieve.

**TABLE 1**

		Sum of Squares	df	Mean Square	F	Sig.
VAR00001	Between Groups	16177,7	2	8088,8	29,8	,000
	Within Groups	11653,3	43	271,0		
	Total	27831,0	45			

**TABLE 2**

(I) VAR00002	(J) VAR00002	Mean Difference (I-J)	Std. Error	Sig.	%95 Confidence Interval	
					Lower Bound	Upper Bound
1	2	38,44*	6,287	,000	22,88	53,99
	3	39,97*	5,656	,000	25,94	53,99
2	1	-38,44*	6,287	,000	-53,99	-22,88
	3	1,53	6,135	,992	-13,61	16,67
3	1	-39,97*	5,656	,000	-53,99	-25,94
	2	-1,53	6,135	,992	-16,67	13,61

#### 4) CONSEQUENCES AND SUGGESTIONS

Many parents and teachers believe that the students must study mathematics, since mathematics prepare the students to apply the mathematical abilities to real world, to think logically, to be successful in their professions. Thinking the reality which is used in different structures by more disciplines, we understand the importance of the lecture. Together with the effects of the curriculum followed, to have a useful general mathematics and to get the modern thinking on this matter, firstly, the classes must be homogeneous. With the suggestion that the mathematics in colleges must be directed to the applications, increasing the technological potential, the systems of number, functions and related relations, derivation and the operations of derivation, integration and the techniques of integration will be nucleus of the curriculum of general mathematics. Teachers should develop the strategies to get the students to understand the concepts, prepare homeworks related with the concepts taught, thus obtain a permanent knowledge.

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