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ABSTRACT

In 1989, a study was conducted at Saddleback College (SC) to analyze the success rates of students who delayed enrollment into a mathematics class after completing the assessment process. The study population consisted of 1,027 students who participated in the mathematics assessment process between July and August 1988 and who enrolled in at least one mathematics class during the period from fall 1988 through fall 1989. Students were considered successful if they completed the class with a grade of C or better. Study findings were as follows: (1) 68.7% of the students enrolled in a mathematics class with no delay; (2) 62% enrolled in the class recommended, 36% enrolled in a higher-level course, and approximately 2% enrolled in a course lower than that recommended; (3) of the students enrolling in a math class one year after assessment, 41% enrolled in a more advanced class, and 14% enrolled in a lower course; (4) the success rate of students was fairly constant at approximately 42% over the four terms of the study; and (5) generally, overall success rates increased as the course level increased (from arithmetic through algebra). The data did not support the hypothesis that students who waited several terms to begin their mathematics study had a lower success rate in the recommended course than those who began their study immediately after assessment or only one semester later. Therefore, it was not recommended that SC students be required to retake the mathematics assessment test if they delayed enrollment in the mathematics curriculum. (JMC)

An Analysis of the Relationship between Student Success and Delayed Entry into the Mathematics Curriculum Following Completion of the Matriculation Process at Saddleback College

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Summary of Key Observations

Several community colleges required students who delayed entry into the mathematics curriculum following completion of the matriculation process to be reassessed before they were allowed to enroll. Based on data collected at Saddleback College over the terms from fall, 1988 through fall, 1989; it appeared that students who delayed entry into the mathematics curriculum were as successful as those who did not delay. Further, it appeared that many students, who felt that their mathematical skills had eroded, independently placed themselves in a lower level class than that originally recommended. Consequently, it did not appear necessary to require reassessment for those students who delayed entry into the mathematics curriculum.

Introduction

The diagnostic tests made available through the Mathematics Diagnostic Testing Program (MDTP) (a joint project of the University of California and California State University) were used for the mathematics assessment portion of the matriculation process at Saddleback College. Based on the score received, the student was advised into a particular mathematics course or course level. This recommendation was only advisory. The student was free to enroll in any mathematics course that was desired. Further, the student could simply decide to not enroll in a mathematics course.

Purpose

It was felt that a student who delayed enrollment into a mathematics class after completing the assessment process was likely to be less successful when she/he later enrolled in that course than a student who did not delay entry. Because of a time delay between assessment and enrollment, it was possible that the placement recommendation was no longer appropriate at the time that the student actually made the decision to enroll in the class. It was the purpose of this study to analyze, in the light of this conjecture, the success rates in the first mathematics course taken by students who had completed the mathematics assessment process.

Procedure

The 1027 students who participated in the mathematics assessment process between July 5, 1988 and August 30, 1988 and enrolled in at least one mathematics class during the period from fall, 1988 through fall, 1989 composed the population for this investigation. These four terms (fall, 1988; spring, 1989; summer,1989; fall, 1989) represented the period of interest for this study. Students were considered successful in a mathematics course if they completed it with a grade of C or better. Students who, for any reason, dropped, withdrew or received a grade other than A, B, or C were considered unsuccessful. Because it was not possible to know why a student dropped or withdrew, it was not possible to segregate those who had academic difficulty from those who did not. It should be noted that students who stopped attending after the last day permissible to withdraw from classes

could not be assigned a grade of W (i.e. Withdraw) by the instructor and consequently may have received a grade of F. Thus the failing grade, F, may have reflected a student's attendance record rather than the level of difficulty the student had meeting the requirements of the class.

Results

The majority (68.7%) of the students in the population enrolled in a mathematics class during the fall, 1988 term. Nearly a quarter (22.5%) waited one semester and enrolled in their first mathematics class during the spring, 1989 semester. Only nine (0.9%) students waited until the summer, 1989 term to begin their study of mathematics. Less than ten percent (7.9%) enrolled in their first mathematics course a full year after completion of the assessment process. The distribution of first time enrollments in a mathematics class was placed in figure 1.

Because the assessment recommendations were strictly advisory it was of interest to compare the rates at which the students followed the placement recommendations over the four terms of the study. The enrollment decisions made by students during the fall, 1988 and spring, 1989 terms were very similar. In the neighborhood of sixty-two percent of the students enrolled in the class recommended, thirty-six enrolled in a higher level course, and approximately two percent enrolled in a lower course than that recommended. A significantly higher percentage of those who began their mathematics study in the summer enrolled in the

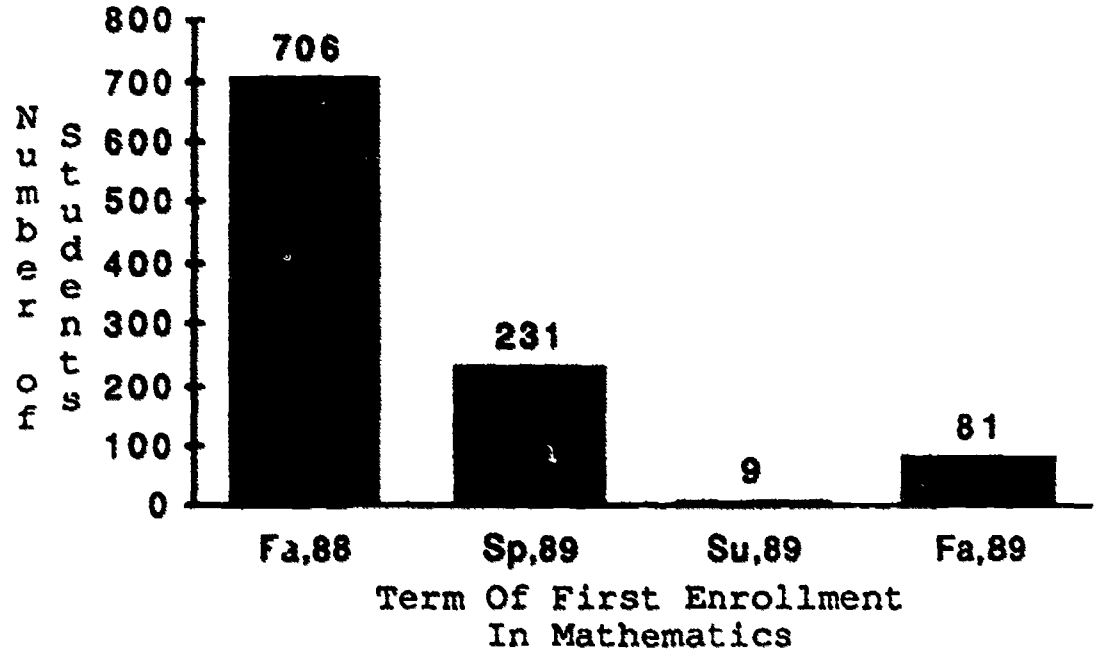

Figure 1

Distribution of First Mathematics Course Enrollment for Those Assessed Immediately Prior to the Fall, 1988 Semester

recommended course. However, this may have been a result of the very small (nine) number of students involved. While a slightly higher percent (forty-one percent) of those beginning their mathematics study a full year after completing the assessment process enrolled in a more advanced course than that recommended, a significantly higher proportion (fourteen percent) enrolled in a course at a lower level than recommended. One possible explanation for this nearly seven fold increase in the percent of students who enrolled in a lower level course than that recommended was that these students perceived a weakening of their mathematics skills over the period between the assessment process and their actual enrollment. They independently placed themselves in a course that, perhaps, was at a more appropriate level given their existing capabilities. The distribution of student

enrollments relative to the placement recommendation given was placed in Table 1.

Table 1

Student Enrollment Decision vs. Term of First Enrollment In a Mathematics Class

	Relative To the Recommendation, the Class Taken Was:		
Term	Lower	Equivalent	Higher
Fall, 88 (N=706)	2.5%	60.8%	36.7%
Spring, 89 (N=231)	1.7%	62.3%	35.9%
Summer, 89 (N=9)	0.0%	77.8%	22.2%
Fall, 89 (N=81)	13.6%	45.7%	40.7%

In the general, the success rate of students held fairly constant at approximately forty-two percent over the four terms of this study. Looking at the population as a whole, 42.2 percent successfully completed the course in which they enrolled on their first attempt. Looking at individual terms, the success rates ranged from a high of 44.4 percent for the summer, 1989 term to a low of 36.4 percent for the spring, 1989 semester. The mathematics course success rates were shown graphically in figure 2.

To gain another perspective on the rates of student success over the period of this investigation, specific emphasis was placed on those students who enrolled in the course or course level recommended for them as a result of the assessment process.

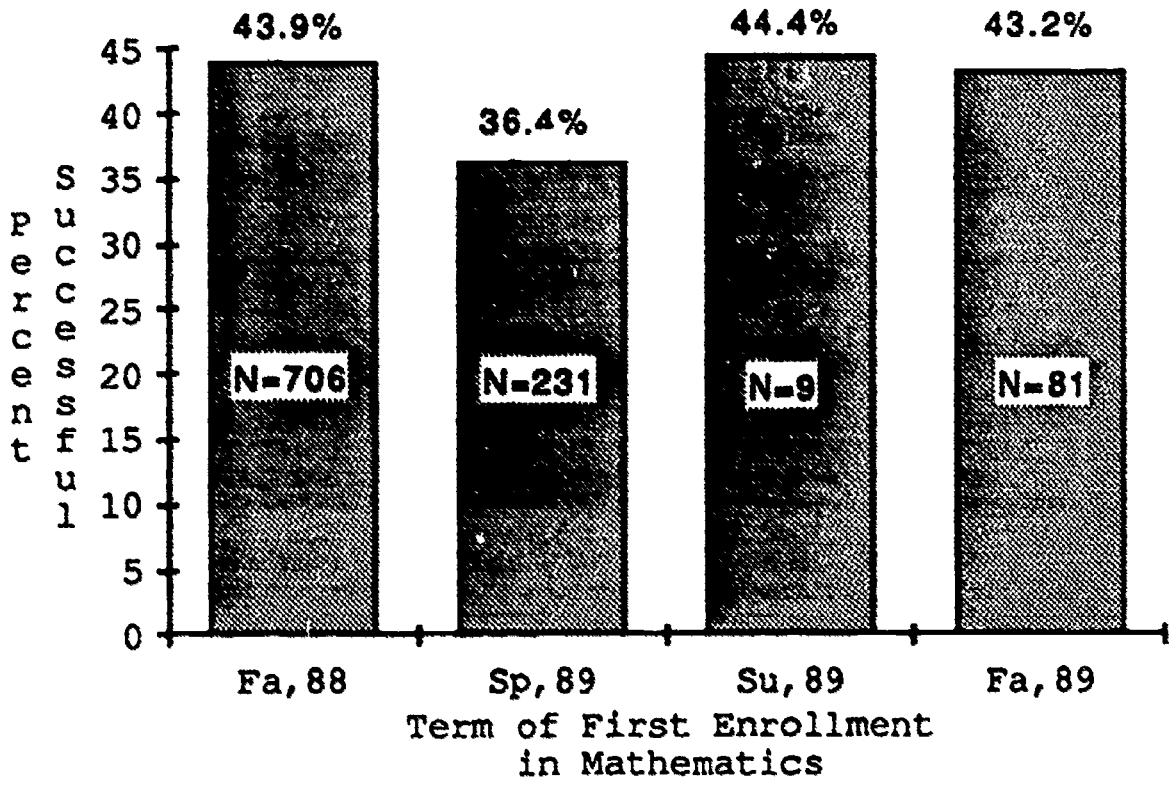

Figure 2

First Attempt Success Rates for Students
Who Enrolled in Mathematics

Sufficient enrollment to allow analysis over the four terms of this study existed for only the lower three levels of mathematics: arithmetic, beginning algebra, and intermediate algebra. While it was generally true that the overall success rates increased as the course level increased and that the group that enrolled in the fall, 1988 was more successful than the spring, 1989 group, little else could be gleaned from the data. A greater percentage of those who enrolled in beginning algebra in the fall, 1989 term after receiving that recommendation a year before were successful than were those who enrolled in the spring, 1989 term. Although only four students waited until the fall, 1989 semester to follow

the recommendation to enroll in intermediate algebra, they achieved a much higher success rate than did those students who enrolled in intermediate algebra immediately after the assessment process was completed. A summary of the success rates for those students who actually enrolled in the recommended course was place in Table 2.

Table 2

Success Rates for Those Students Who Enrolled in The Recommended Course

	Course		
Term	Arithmetic	Beg. Algebra	Int. Algebra
Fall, 1988	41.5% (N=135)	51.6% (N=188)	57.8% (N=83)
Spring, 1989	38.8% (N=49)	34.8% (N=69)	47.8% (N=23)
Summer, 1989	33.3% (N=3)	50.0% (N=2)	100.% (N=1)
Fall, 1989	33.3% (N=12)	38.1% (N=21)	75.0% (N=4)

Conclusion and Discussion

The data did not tend to support the conjecture that students who waited several terms to begin their mathematics study had a lower success rate in the recommended course than those who began their study immediately after assessment or only one semester later. One possible explanation of this observation was that at the time of assessment many students had reached a steady state condition with respect to their knowledge of mathematics. They had already lost what they were going to lose over the next few semesters.

That some students did independently reevaluate their mathematics competency several terms after the assessment process was complete was suggested by the relatively high percentage of students who began their study of mathematics in the fall, 1989 semester by enrolling in a course lower than that originally recommended. It was possible that a portion of those students whose level of mathematics competency was in transition at the time of the assessment activity realized that the placement recommendations were no longer appropriate several semesters later.

Based on these observations it was not considered necessary, under the assessment/placement model active at Saddleback College, to recommend that students be required to retake the mathematics assessment test if they delayed enrollment in the mathematics curriculum.