A STUDY ON THE PREDICTION OF

GEOMETRY ACHIEVEMENT

AN ABSTRACT OF

A THESIS

PRESENTED TO THE GRADUATE FACULTY

OF

WESTERN CONNECTICUT STATE COLLEGE

IN PARTIAL FULFILLMENT

OF THE REQUIREMENTS FOR THE DEGREE

MASTER OF SCIENCE

by

Audrey St. Pierre Jannetty

October 1979

The prediction of achievement in mathematics has always been a major concern of mathematics teachers and guidance counselors. The placement of students in the appropriate level of the course of study should help to improve a student's motivation and hopefully lead to a successful encounter with mathematics.

Early studies indicate that a general test of mental abilities does not give enough information to predict a student's achievement in any particular mathematics course. As more research was completed, it was discovered that several factors appeared to be good forecasters of mathematics success and, in particular, of geometry success. Students' second semester algebra grades and scores on tests designed to measure aptitude for a specific course were two of the most significant predictor variables.

Disagreement concerning which sex had more predictable achievement test scores was apparent in previous investigations. Differences in actual achievement by males and females was often researched, but differences in the prognosis of their success was mentioned in only a few studies.

This study investigated the predictability of geometry achievement from a prognosis test. The population sample included 122 students (52 males, 70 females) from

Newtown High School for whom the scores on the prognosis test and the achievement test were available for the 1978-1979 school year. All students had passed their first year of algebra and their first semester of geometry.

The research design used a nonexperimental, correlational approach. The two hypotheses tested were the following. First, there is a positive correlation between the scores on a geometry prognosis test and achievement in geometry. Second, there exists no difference in the predictability of geometry achievement for males and females. The predictor variable for both hypotheses was the students' scores on Part II of the Orleans-Hanna Geometry Prognosis Test. The second variable was geometry success as measured by Part I of the geometry section of the Cooperative Mathematics Test.

In March 1978, the prognosis test was administered to all algebra students by their teachers. During the 1978-1979 school year, some of these students were enrolled in a traditional geometry course. The geometry teachers designed their own materials, but they all followed the same content guidelines. Then, in June 1979, the geometry teachers gave the students the standardized achievement test as one section of the entire final examination.

The correlation coefficient between the prognosis and achievement test scores for the entire sample was computed. The policy of the administration at Newtown High

School requires that those students who fail the first semester of geometry in January 1979 not be allowed to continue into the second semester. Therefore, these students did not take the achievement test. Their scores on the prognosis test were compared to the scores on the prognosis test of those students who passed the first semester of geometry. Also, the correlation coefficients for males and females were calculated separately to determine whether males' or females' achievement test scores were more predictable from the prognosis test score.

A statistical analysis of the data for this research revealed that there is a positive correlation between the prognosis test scores and the achievement test scores for the given population sample. The first hypothesis was accepted. The correlation coefficient showed the existence of a marked relationship between the variables; however, this proved to be lower than originally anticipated. Several factors could account for this. First, the achievement test was administered in June during the final examination week. The students experience a great amount of pressure at this time of year. Second, a more comprehensive achievement test could yield a better measurement of ability. Third, the three geometry teachers that were part of the study had varying degrees of teaching experience. Fourth, the measurement of success was given during the same time period as the "teacher-made" final examination.

A review of the data also indicated that the correlation coefficient for females was higher than that for males. Therefore, the second hypothesis was rejected. Females' achievement test scores for this population sample appeared to be more predictable from a specially designed prognosis test than males' achievement test scores. Two conditions could have influenced this outcome. First, the size of the population sample for females was larger than for males. Second, all of the geometry teachers involved in this study were female.

Some of the data could not be included in the statistical analysis. The prognosis scores for those students failing the first semester of geometry in January 1979 were considered separately. Although the prognosis scores for those failing the second semester of geometry in June 1979 were part of the data, they were also looked at separately. It was discovered that a large majority of the geometry failures from both groups had prognosis test scores in the lowest quarter of the distribution. This indicates that the prognosis test may be a useful method of locating those students who will either fail geometry or at least have trouble with it.