

THESIS TITLE : THE CAUSAL RELATIONSHIP MODEL OF VARIABLES AFFECTING
STUDENT LEARNING ACHIEVEMENT IN THE CALCULUS I AT
SURANAREE UNIVERSITY OF TECHNOLOGY

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ABSTRACT

The purpose of this study was to study the causal relationship of variables affecting students learning achievement in the Calculus I at Suranaree University of Technology. The studies of causal relationship in male and female students were conducted separately. The population were the first year students of the 1998 academic year of Suranaree University of Technology. The sample consisted of 314 students. 205 males and 109 females. These students were randomly selected using stratified random sampling technique. The independent variables were students' fundamental knowledge, aptitude for mathematics learning, students' motivation, attitude towards studying in Calculus I, time for external study, time for activity in university, studying habits and adjustment while the dependent variable was learning achievement in the Calculus I at Suranaree University of Technology. The instruments were standardized test, aptitude test in mathematics, motivation test in mathematic, attitude test towards learning calculus I, studying habits test and adjustment test. The data were analyzed using the method of path analysis in the multiple regression.

The results of the study were as follows :

1. For male student, the causal relationship model for learning achievement of the first year students in Calculus I at Suranaree University of Technology can be expressed as follows:

The variables which influenced the most direct effect to achievement in Calculus I were students' motivation (.485), time for external study (.220), time for activity in the university (-.194), aptitude in mathematics (.190), students' adjustment (-.118), attitude towards learning in Calculus I (.096) and studying habits (.047) and the variable which indicated indirect effect to Calculus I learning achievement was the students' fundamental knowledge.

The variance for seven variables that accounted for Calculus I learning achievement for male was 67.90 % ($R = .824$) and standard error was .551.

2. For female students, the causal relationship model for learning achievement of the first year students in Calculus I at Suranaree University of Technology can be expressed as follows:

The variables which influenced the most direct effect to achievement in Calculus I were students' motivation (.285), time for external study (.261), students' fundamental knowledge (.230), students' adjustment (-.179), time for activity in the university (-.167) and studying habits (.163) and the variable which indicated indirect effect to Calculus I learning achievement were aptitude in mathematics learning and attitude towards learning in Calculus I.

The variance for six variables that accounted for Calculus I learning achievement was 51.80 % ($R = .720$) and standard error was .677.