

TWO PATHS TO ADVANCED PLACEMENT CALCULUS: AN EXAMINATION OF SECONDARY STUDENTS' MATHEMATICAL UNDERSTANDING EMERGING FROM INTEGRATED AND SINGLE-SUBJECT CURRICULA

Dawn Teuscher

Dr. Robert E. Reys, Dissertation Advisor

ABSTRACT

This study examined high school students' mathematical understanding of calculus readiness concepts after studying four years of college preparatory (integrated or single-subject) mathematics. Data were collected from 505 students, 201 experienced an integrated curriculum (IC) and 304 experienced a single-subject curriculum (SSC). Additional data were collected on a subset of 199 of these students who enrolled in AP Calculus, 59 studied from the integrated curriculum (APIC) and 140 studied from the single-subject curriculum (APSSC).

Results revealed that SSC students performed statistically higher on the *Precalculus Concept Assessment (PCA)* than IC students; whereas, APSSC and APIC students performed comparably. AP Calculus students used similar solution strategies when solving the two open-ended tasks. However, APSSC students used strategies more effectively than APIC students. AP Calculus students from each curricula pathway demonstrated errors related to rates of change. Students successfully calculated the rate of change of linear functions; however, if the function was not linear, students struggled to calculate it, model it on a graph, or interpret it in a real world context.