

Research Questions

This study compares the mathematics achievement of students using the reform-based *Interactive Mathematics Program* (IMP) curriculum within a semestered block schedule to the mathematics achievement of students learning a traditional curriculum within a traditional schedule. To narrow the scope of the problem, the primary research questions focus on students' knowledge of algebra. As noted by Huntley, et al. (2000), algebra has been at the heart of high school mathematics for many years, and high student achievement in algebra is generally seen as the hallmark of preparedness for advanced mathematical and scientific studies.

Student achievement data was collected at the end of Grade 11. It was assumed at the time of data collection that most students would have completed their algebra work by the end of eleventh grade.

The high school where this study was conducted used between class ability grouping. Under the block schedule/IMP curriculum the nature of this ability grouping changed: under the new program, lower-level and higher-level classes used the same text, whereas previously they had used different texts. Also, the new curriculum affected the decision rules for assigning students to academic "levels" for mathematics instruction. Thus, this study's analyses examine both the main effects of schedule/curriculum on student achievement, and the interaction between schedule/curriculum and prior student ability.

Primary Research Questions

- i. How do students enrolled in a reform-based curriculum and a semestered block schedule compare to students enrolled in a traditional curriculum and

traditional schedule in their ability to solve algebraic symbol manipulation problems? Do the results of this comparison differ depending on students' prior ability?

- ii. How do students enrolled in a reform-based curriculum and a semestered block schedule compare to students enrolled in a traditional curriculum and traditional schedule in their ability to interpret and solve challenging algebra problems presented in context? Do the results of this comparison differ depending on students' prior ability?
- iii. How do students enrolled in a reform-based curriculum and a semestered block schedule compare to students enrolled in a traditional curriculum and traditional schedule in their ability to collaboratively solve and communicate their solution to a complex open-ended algebra problem? Do the results of this comparison depend on students' prior ability?

Secondary Research Questions

A semestered block schedule affords students the opportunity to take more mathematics classes during high school than they would under a traditional schedule. The curriculum being investigated by this study attempts to take advantage of this situation by covering fewer content objectives in each mathematics course, while expecting students to complete more mathematics courses during high school. However, the fact that students have the opportunity to complete additional mathematics courses does not necessarily mean that they will avail themselves of this opportunity. Actual student course-taking patterns are important to study both in their own right and because

they will inform results discovered by the algebra achievement testing. The next two research questions address the issue of student course-taking.

- iv. How did students enrolled in a reform-based curriculum and a semestered block schedule differ from students enrolled in a traditional curriculum and traditional schedule in the number of registered mathematics class hours by the end of Grade 12?
- v. How did students enrolled in a reform-based curriculum and a semestered block schedule differ from students enrolled in a traditional curriculum and traditional schedule in participation in advanced courses, as measured by the number of registered hours in advanced mathematics classes by the end of Grade 12, by the number of students enrolling in Advanced Placement courses, and by scores on Advanced Placement tests?

Previous authors have pointed out that, while a semestered block schedule might provide an opportunity for students to spend more time studying mathematics, administrative policies can either enhance or impede this opportunity (Harter, 1994; Kramer, 1996). Such policies are essentially part of the “treatment,” just as much as the mathematics curriculum and the format of the schedule itself. In addition to administrative policies, other aspects of the school and community could influence the way a semestered block schedule and the IMP curriculum affect student mathematics achievement and student enrollment in mathematics courses. If other schools are to learn from the experience at Suburban High School¹, special aspects of the school and community need to be described. The sixth research question addresses these issues.

- vi. According to administrators and faculty who assumed critical responsibilities for implementing the shift to a semestered block schedule and reform-based

mathematics curriculum, what school administrative policies and what unique aspects of the school and community affected mathematics course enrollment and mathematics achievement under the new schedule and curriculum?