

Overview of Method

Research Opportunity at Suburban High School

This research project is part of an ongoing research effort that was begun during the 1996-97 school year by teachers at Suburban High School. Suburban is the only high school in a small school district located in a middle class suburb of a large U.S. city. During the 1996-97 school year, Suburban high school initiated a semestered block schedule for all ninth graders. In that same year, ninth graders were enrolled in IMP, as a phase-in of this new reform-based curriculum. Note that during this first year at

¹ “Suburban High School” is a pseudonym

Suburban High School, only ninth graders used IMP and the semestered block schedule. These students and their successors continued in this schedule/curriculum.

Testing the Traditional cohort. In order to assess their understanding of algebra, in the spring of 1997 all eleventh graders at Suburban High School completed an algebra test designed by the Core-Plus Mathematics Project. Core-Plus, like IMP, is a high-school curriculum designed to implement reform-based mathematics. Their algebra test was specifically designed to compare the effects of a *Standards*-based curriculum to those of more conventional curricula. The test is organized into three parts. Part 1 emphasizes the ability to understand and solve algebra problems presented in context, as is typically emphasized by Core-Plus, IMP, and other reform curricula. Part 2 emphasizes problems typical of traditional mathematics curricula: context-free symbolic manipulations that call for transformation of algebraic expressions and solutions of equations and systems. Items in Part 2 were adapted from released ACT examinations and from items that commonly appeared on college placement tests. Part 3 requires collaborative work on a single extensive open-ended applied problem and is completed by students working in pairs. Items from Part 1, Part 2, and Part 3 of the Core-Plus assessment define the Algebra Achievement test for this study.

The eleventh graders tested in the spring of 1997 had used a traditional schedule and traditional curriculum throughout Grades nine through eleven. They form a “Traditional” cohort to be contrasted with later cohorts of students at Suburban High School who were taught using a semestered block schedule and the IMP curriculum.

Testing the Pilot cohort. As the ninth graders who had piloted the semestered block schedule and the IMP curriculum during the 1996-97 school year advanced through high school, they continued using the new schedule and curriculum. In the spring of 1999, when they were eleventh graders, this “Pilot” cohort completed the same Algebra Achievement test that had earlier been completed by eleventh graders in the 1997 Traditional cohort. A pilot study used this test data to compare how well students in the two cohorts (Pilot versus Traditional) understood algebra.

Unlike later cohorts of students at Suburban High School who used IMP exclusively, the Pilot students reflected a mixture of curricula: Honors students, who had begun studying traditional algebra while in eighth grade, continued using the traditional curriculum, while all other regular education students used the IMP curriculum.

Testing the first reform cohort. In the spring of 2000, eleventh graders at Suburban High School again completed the Algebra Achievement test. Students in this “First Reform” cohort had used a semestered block schedule and the IMP curriculum throughout high school. Since teachers already had experience using the IMP curriculum and block schedule with the pilot cohort, it is likely that by the time students in the First Reform cohort were exposed to the new program their teachers had gotten past the “implementation dip” often experienced by major school reforms (Busick & Inos, 1992; Fullan & Miles, 1992). Also, lessons learned from the pilot study made it possible to ensure testing conditions for the experimental cohort were similar to those used for the Traditional cohort. For these reasons, it is reasonable to assume that a comparison of test scores of students in the First Reform cohort to those of students in the Traditional cohort will provide a fair indication of how a semestered block schedule, implemented jointly with the IMP curriculum, affected algebra achievement at Suburban High School.

Testing the second reform cohort. In the spring of 2001, eleventh graders at Suburban High School once again completed the Algebra Achievement test. Students in this “Second Reform” cohort again used a semestered block schedule and the IMP

curriculum throughout high school. This study combines scores from the First and Second Reform cohorts to estimate achievement of students who used a semestered block schedule and the IMP curriculum, and to compare their achievement to that of students in the Traditional cohort.

Data Analyzed

In order to answer the research questions, this study analyzed six types of data:

1. Scores from the Algebra Achievement test;
2. Mathematics achievement tests administered prior to high school, used as a covariate to compare relative prior ability of students using the Traditional and Reform programs.
3. Student transcripts;
4. Course syllabi, textbooks, and other documents used to teach mathematics at the school;
5. School system documents, including annual testing reports and annual school profiles;
6. Qualitative data from key informants at the Suburban High School.

Analysis of Algebra Achievement tests. This study compared tests taken by the

Traditional cohort of eleventh graders at Suburban High School who had completed a traditional mathematics curriculum within a traditional seven-period per day schedule, to those taken by two Reform cohorts of students who attended the same school three and four years later, completing a reform-based mathematics curriculum within a semestered block schedule.

Transcript analysis. This study analyzed student transcripts to see whether

mathematics course taking changed under the new schedule and curriculum. It compared Traditional to Reform students on three measures: total number of hours registered in mathematics courses, number of hours registered in advanced mathematics, and number of students enrolled in Advanced Placement courses.

Document analysis. This study reviewed annual “school profiles” published by the Suburban High School to determine the number of students each year taking Advanced Placement exams administered by the College Board, as well as to determine student grades on the Advanced Placement exams they took.

This study also analyzed course syllabi published by the school. Combined with the transcript analysis, these documents provided insight regarding students’ opportunity to learn the key topics evaluated in the Algebra Achievement test.

Key informants. If other educators are to learn from Suburban High School’s experience, it is important to understand not only the nature of the new schedule, curriculum, teaching methods, and syllabi, but also how course taking changed and why. Therefore, this study examined the administrative or counseling policies that influenced

course-taking decisions. Interviews with key informants, combined with the transcript analysis, provided data to answer these questions.