

Interaction of the Semestered Block Schedule and IMP Curriculum

One potential positive effect of a semestered block schedule is to give students and teachers extra time for learning. Less time is spent walking through hallways, and more time is potentially available for studying course content. Nonetheless, previous research has found that when traditional pedagogical techniques and a traditional curriculum are used in the longer time blocks of a block schedule, student achievement in mathematics can suffer (Raphael, Wahlstrom, & McLean, 1986; Marshall, Taylor, Bateson, & Brigden, 1995; Wild, 1998).

The current study has found that at Suburban High School, when a curriculum designed to be consistent with the *Curriculum and Evaluation Standards* (NCTM, 1989) was implemented together with a semestered block schedule, achievement in algebra did not suffer. Students who used the IMP curriculum under a semestered block schedule were more proficient than students who used a traditional curriculum and schedule when asked to formulate mathematical models, to interpretation graphs and tables, or to work in pairs to solve an extended complex algebra problem. Students who used a traditional curriculum and schedule appeared to be advantaged only when applying well-practiced procedures that were presented in standard form.

Results from the Algebra Achievement test indicate that unless “achievement” is defined very narrowly, the semestered block schedule and IMP curriculum together did not harm and in fact improved algebra achievement of students at Suburban High School. Results from AP exam grades corroborate this finding. Students who utilized both the IMP curriculum and semestered block schedule were more likely than others to enroll in AP mathematics, and achieved significantly higher scores when they completed the AP examinations.

The College Board (1998) found that students who complete a two-semester block-length Calculus BC course tend to score higher on the AP exam than do students who complete a traditional all-year course or students who take a one-semester course, so the current results may be partly explained by the two-semester format used under the block schedule. However, AP exam grades of students who took Calculus BC in the two-semester format and had used IMP as their core curriculum were significantly higher than AP exam grades of students who took Calculus BC in the two-semester format and had used a traditional curriculum. Thus, it appears that preparation using the IMP curriculum followed by studying Calculus BC in a two-semester block schedule format may have worked together to greatly improve student achievement.

The transcript analysis provides further evidence that together the semestered block schedule and IMP curriculum provided a considerable benefit to students at Suburban High School. While their algebra achievement by most measures improved, students in the Reform cohorts had considerably more time available to study mathematics topics other than algebra than did students using a traditional schedule and curriculum. In addition to studying the approximately two years worth of algebra and one year’s worth of geometry that was completed in the traditional core curriculum, students studied a considerable amount of probability and statistics. Students in Academic Assisted and College Preparatory level courses completed two IMP modules devoted primarily to statistics: *The Game of Pig* and *The Pit and the Pendulum*. Together these modules are equivalent to almost half of a course under a traditional

schedule. Students in Honors classes completed these same two modules, plus up to two additional modules that focused on probability and statistics (*Is There Really a Difference?* and *Pennant Fever*). Additional study in probability and statistics is integrated throughout the IMP curriculum. Also, as teachers have become more familiar with the IMP curriculum they have completed a larger number of modules with their students. In future years they expect to complete a larger number of the IMP probability and statistics modules.

Further, students in the Reform cohorts were more likely than students who used a traditional schedule and curriculum to enroll in advanced mathematics beyond the core requirements. These included courses in statistics or AP statistics, discrete mathematics, functional analysis, pre-calculus, Calculus AB and Calculus BC.

In summary, results of this study are consistent with the theory that mathematics achievement will improve at schools that implement a semestered block schedule while simultaneously replacing their core curriculum with the IMP sequence. At Suburban High school, by most measures students' achievement in algebra improved. This was true for both high- and low-ability students. Further, the very top students appeared to be better prepared to take advanced mathematics coursework. Also, while this study focused on algebra achievement and AP test exams, all students had considerably more exposure to probability and statistics than had been true under the traditional curriculum and schedule. Finally, many students had time to take more advanced mathematics coursework beyond the core curriculum than would have been possible under the traditional curriculum and schedule.