REL Midwest Reference Desk

Relationship Between Block Scheduling and Student Engagement and Academic Performance

March 2013

Question

1. What is the relationship between block scheduling and student engagement and academic performance?

Background

REL Midwest received a request for information on the relationship between block scheduling and student engagement and academic performance.

Following an established REL Midwest research protocol, we conducted a search for research reports as well as descriptive and policy-oriented briefs and articles on the relationship between block scheduling and student engagement and academic performance. The sources included the Education Resources Information Center (ERIC), federally funded organizations, additional research institutions, several educational research databases, and a general Internet search using Google and Google Scholar.

We also searched for appropriate organizations that may act as resources on this issue. We have not done an evaluation of these organizations or the resources themselves but offer this list to you for your information only.

1. What is the relationship between block scheduling and student engagement and academic performance?

The relationship between block scheduling and student engagement


From the abstract: "Results are presented from a mixed-method investigation into the effects of Block Schedule on student self-efficacy, attitude, and instructional practices within the context of mathematics. Students exposed to block schedule showed no change in attitude toward mathematics, whereas those on a traditional schedule demonstrated a significant decrease. Students on block schedule also made significantly greater gains in
self-efficacy. If reformed teacher practice is a goal of transitioning to block schedule, results point to a critical need for professional development.”

Note: REL Midwest is unable to locate a link to the full-text version of this resource. Although REL Midwest tries to provide publicly available resources whenever possible, it was determined that this resource may be of interest. It may be found through university or public library systems.


*From the abstract:* “This study investigates differences in eighth-grade mathematics students’ engagement in standards-based curriculum and instruction practices between block- and traditional-schedule schools. Survey data were gathered from 156 middle level mathematics teachers to access the use of standards-based curriculum and instruction practices in their classrooms. Results indicate there are few differences in curriculum and instruction based on the type of school schedule.”


*From the abstract:* “This study examines the relationships between classroom environment and affective learning outcomes over time. Focus is placed on the investigation of the correlation between environmental variables and attitude toward science, and the change in attitude toward science and other classroom environment attitudes by students enrolled in block scheduled science courses. A group of rural high school students participated in this investigation that used an instrument developed by Simpson and Troost to measure attitudes toward science and other variables associated with school science by middle and high school students. Differences between grade levels and gender were found in this study.”

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**The relationship between block scheduling and academic performance**


*From the abstract:* “Block scheduling constitutes one of the major types of restructuring considered by school administrators seeking to improve student performance. The relationship between two school schedules—the seven-period A/B block and the seven-period traditional schedule—and achievement of students in grade 11 was examined. Comparisons showed no significant increase in students’ test scores over time associated with the alternating schedule. Although school leaders may find some improvement in
the initial year of implementation, improvements may be negated by decreased improvement rates in later years."

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From the chapter: "Reviews issues surrounding alternative scheduling models, examines the manner in which block scheduling has been implemented in schools, and describes the results of research related to current scheduling models. The benefits and problems of block scheduling in elementary, middle, and high schools are discussed. The chapter reports research that reveals a positive effect of block scheduling on student achievement, classroom management, and teacher instructional time. It is noted that a majority of teachers find block scheduling favorable after 2 years, and that principals favor it because it makes school less stressful for both students and teachers and because of the positive effect on school discipline. Attention is also given to the effects that block scheduling has on specific courses and the curriculum. The author concludes that that the key to successful implementation of block scheduling is sustained staff development, and that while block scheduling is not a panacea for problems in American schools, it may have a positive influence on a school's instructional climate."

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From the abstract: "This study compared higher- (HOTS) and lower-order thinking skills (LOTS) achievement of students enrolled in animal science on a Modified A/B Block schedule to that of students on a Nine-Week (4X4) Block schedule. Twenty-two teachers anticipated-12 Modified A/B schools with 189 students and 10 Nine-Week (4X4) schools with 136 students. Achievement was measured by an examination consisting of two scales based on Newcomb and Trefz ' (1987) "levels of learning" model. Thirty-three HOTS and 23 LOTS items were included. Teachers responded to a questionnaire describing themselves and their schools. Student achievement for LOTS was slightly more than half of the 'conventional' 70% passing standard and slightly less for HOTS. T-tests revealed student performance on a Modified A/B schedule was significantly superior. However, hierarchical regression analysis revealed that the moderator variables student length of FFA membership and teacher tenure significantly explained student
variability for HOTS achievement. After effects of the moderator variables were removed, then scheduling pattern did not explain additional variation.


From the ERIC abstract: “Focuses on changes in instructional approaches in the schools following the adoption of block scheduling that may influence student learning. Examines a number of student outcomes, including student grades, honor roll and failure rates, the numbers of students successfully completing Advanced Placement courses, and achievement test scores from the 1996–97 and 1998–99 school years. Notes student achievement measures improved and teachers reported student behavior problems lessened.”


From the abstract: “The purpose of this quantitative study was to examine whether a difference existed in the percentage performance of students earning a pass/advanced score on the Standards of Learning (SOL) Test in math and reading in Virginia's Region IV for schools using an A/B block schedule and those using a traditional schedule. The research also examined if the percentage performance by race—Black, Hispanic, and White—differed on the math and reading SOL Test for Region IV in Virginia. Forty-three schools were included in the study—23 block and 20 traditional schools. The percentage performance in math and reading of each school and the percentage performance by race for each school were studied. Analyses of variance and "t" tests were used to examine differences. The "t"-test results do not show significant differences in the percentage performance of students earning pass/advanced scores in reading and math in block and traditional schools. Significant differences were shown in the percentage of Black and Hispanic students earning pass/advanced scores on the math and reading SOL Test for Region IV in Virginia. A larger percentage of Black and Hispanic students earned pass/advanced scores in the A/B block-scheduled schools than in the traditional schools.”

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From the abstract: “Although block scheduling has become increasingly popular in the past decade, only a few researchers have investigated its effect on academic achievement. Therefore, this study was conducted to determine the effects of block scheduling on academic achievement between 115 high school students who received instruction via a 4x4 block schedule and 146 students who received instruction via a traditional schedule.
A series of independent t-tests, utilizing the Bonferroni adjustment, was conducted to compare grade point averages and scores on the Georgia High School Graduation Test (GHSGT) between the two groups. Findings revealed no statistically significant difference in grade point averages or in scores on the Writing portion of the GHSGT between the two groups. However, statistically significant differences were found for Language Arts (Cohen's d = 0.34, moderate), Mathematics (d = 0.52, large), Social Studies (d = 0.51, large), and Science (d = 0.46, large) scores. For each of the statistically significant differences, students who received instruction via a traditional schedule received the higher GHSGT scores."


From the abstract: "In this study we examined the effects of parallel block scheduling on the reading and math achievement of elementary school children in South Georgia. The sample for this study comprised students who were in the third, fourth, and fifth grades between the school years of 1993–1998. A total of 825 test scores were analyzed for block students, and 695 test scores were analyzed for non-block students. No statistically significant differences were revealed in reading and math achievement between (1) third-grade students who experienced parallel block scheduling and third-grade students who did not, (2) fourth-grade students who experienced parallel block scheduling and fourth-grade students who did not, and (3) fifth-grade students who did not. Implications of our findings and suggestions for further research are discussed."


From the abstract: "This study investigated trends in the mean ACT Assessment scores of 450 public high schools in Illinois and Iowa, according to how they scheduled classes. The schools continuously employed either a traditional eight-period daily schedule, 4 x 4 semester schedule, or an eight-block alternating day block schedule. Seven years of data were available for the blocked schools, representing 2 years preimplementation through 4 years postimplementation. The eight-period schools demonstrated a slight upward trend in mean ACT scores over time, regardless of content area. The eight-block schools demonstrated some variability in mean ACT scores, but increased little over time. After reaching a peak at or near the year of implementation, the 4 x 4 semester block schools demonstrated a generally declining trend in mean ACT scores across tests. With the exception of Reading, mean ACT scores rebounded somewhat at the fourth year postimplementation for the 4 x 4 semester block schools."

From the abstract: “Block schedules have been used in several different high schools in various areas of the United States. Reasons for their use vary from better preparing students for college work to fewer disruptions of the school day. Several studies have examined the impact of changing from a semester system to a block system on the academic performance in specific areas with varying results. This paper examines the impact of a change of schedule on overall academic performance as measured by a student’s Grade Point Average. This study indicates that, for the specific case studied, the change in systems did have a positive effect on performance.”

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From the abstract: “This study compared the academic achievement of high school students on the block schedule with the academic achievement of high school students on the traditional schedule. The goal was to determine what impact if any block scheduling would have upon academic achievement...The findings revealed that students on the traditional schedule scored significantly higher on the Algebra 1, Biology, English I and U.S. History tests than students on the block schedule.”


From the abstract: “To address the nation’s ongoing interest in student achievement, some researchers have focused on the effect of block scheduling—a model in which students take fewer classes for longer periods of time. Although block scheduling has demonstrated its viability in high schools, little research has explored its effect at the middle level. Because the middle level years are often marked by a decline in student achievement, particularly during the transitional year when students move from elementary school to sixth-grade, the current study was conducted. Results revealed significant increases in the mathematics achievement scores of sixth-grade students’ enrolled in five middle level schools that transitioned from traditional to block schedules. Characteristics of block scheduling that may have accounted for these outcomes and recommendations for future research are discussed.”


From the abstract: “One of the most important concerns expressed in A Nation at Risk (National Commission on Excellence in Education, 1984) was being related to how effectively classroom instruction time was being used in America’s schools. In response
to that report, many concerned educators and community patrons at national, state, and local levels argued that schools should increase the length of the school day and the school year and simultaneously restructure the traditional daily school schedule. The author explored student data from 5 high schools in a large metropolitan area for several years before and after the schools converted to either a Block 4 × 4 or Block 8 scheduling format designed to influence student achievement and success. The author gathered data on measures of student success based on student grade point averages in English and language arts. The author found little evidence to support the hypothesis that conversion to block scheduling formats would significantly affect student achievement in the specific English-content area. Additional support for increased enrollments in English and language arts resulting from scheduling structure changes, as well as for future research on this topic, also are discussed.”


From the abstract: “In conducting this study our purpose was to examine the effects of instructional scheduling (i.e., traditional versus block) on high school student academic achievement, student scholastic aptitude, and school climate variables at the secondary school level in the state of Texas. Through the use of multivariate analyses of variance procedures, 11 statistically significant differences were revealed between the traditional instructional schedule and a block instructional schedule. In 10 of 11 statistically significant differences, student performance was statistically better under the traditional instructional schedule than under a block instructional schedule. Only on the end-of-course exam in Algebra did Hispanic students under a block instructional schedule perform higher than Hispanic students under the traditional instructional schedule. Effect sizes were small (Cohen, 1988). Findings may be interpreted as a lack of evidence that students in schools with a block schedule outperform students in schools with a traditional schedule.”

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From the abstract: “Block-scheduling is a growing response to demands for systemic change in high schools. This longitudinal study examined a controversial block-scheduling program in a small, mid-western city. Findings were based on “hard” data only; for example, grade point averages and attendance, and not attitudes and perceptions. Data were collected on 500 students with from 0 to 3 years in the program. While not all the data relationships were significant, all that were significant involved a positive relationship with time in block scheduling. The findings were supportive of the block-scheduling program.”

*From the abstract:* "In this analysis of 58 empirical studies of high school block scheduling, the authors report findings in and across five groupings. Within groups, data were inconsistent regarding whether teachers' practices changed, but teachers believed that staff development was necessary to teach in a block schedule. Block scheduling appeared to increase student grade point averages and improve school climate, but the results regarding its effects on standardized test scores and attendance were inconsistent. Across studies, the findings indicated that (a) research studies omit key information; (b) teachers and students may view block scheduling positively (but their reasons are unknown); and (c) changes in teachers' practices are inconsistent. Many studies reported data that were collected over short periods of time. The authors of this analysis offer generalizations about block scheduling research, recommendations for further research, and a discussion of implementation issues.”

**Additional Organizations to Consult**

- The Center for Applied Research and Educational Improvement (CAREI)
  http://www.cehd.umn.edu/carei/

  *From the University of Minnesota website:* “CAREI seeks to improve the quality of education for all learners through neutral, rigorous research and evaluation of educational contexts and initiatives.”

**Keywords and Search Strings Used in the Search**

“Block scheduling” AND “academic achievement” OR “performance” OR “student engagement” OR attitude OR attendance OR participation

**Search of Databases and Websites**

**Institute of Education Sciences Sources:** National Center for Education Research (NCER), National Center for Education Evaluation and Regional Assistance (NCEE), Regional Educational Laboratory Program (REL), What Works Clearinghouse (WWC), Doing What Works (DWW), National Center for Education Statistics (NCES)

**Other Federally Funded Sites:** Center on Innovation and Improvement, National Center on Scaling Up Effective Schools, Center on Instruction, National Center for Analysis of Longitudinal Data in Education Research (CALDER)

**Additional Data Resources:** ERIC and EBSCO databases, JSTOR database, Google Scholar, Google

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Criteria for Inclusion

When Reference Desk researchers review resources, they consider—among other things—four factors:

- **Date of the Publication:** The most current information is included, except in the case of nationally known seminal resources.

- **Source and Funder of the Report/Study/Brief/Article:** Priority is given to IES, nationally funded, and certain other vetted sources known for strict attention to research protocols.

- **Methodology:** Randomized controlled trial studies, surveys, self-assessments, literature reviews, policy briefs. Priority for inclusion generally is given to randomized controlled trial study findings, but the reader should note at least the following factors when basing decisions on these resources: numbers of participants (just a few? thousands?); selection (Did the participants volunteer for the study, or were they chosen?); representation (Were findings generalized from a homogeneous or a diverse pool of participants? Was the study sample representative of the population as a whole?).

- **Existing Knowledge Base:** Although we strive to include vetted resources, there are times when the research base is slim or nonexistent. In these cases, we have included the best resources we could find, which may include newspaper articles, interviews with content specialists, organization websites, and so on.

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EXECUTIVE SUMMARY

In this report, Hanover Research examines available literature to highlight secondary school scheduling models that optimize learning and instruction, as well as meeting other student and district priorities. The report also discusses best practices for implementing a new scheduling model.

KEY FINDINGS

- **Existing research has not identified a correlation between secondary scheduling models and student achievement.** Although block schedules tend to reduce student attendance and behavioral problems slightly over traditional period schedules, teachers and administrators report some scheduling difficulties and time constraints regardless of the model used.

- **Block schedules appear to offer a slightly higher degree of flexibility than traditional schedules.** Other advantages include greater ease accommodating the needs of remedial and accelerated students from a scheduling perspective, the ability to offer more courses per year, and increased opportunities for teachers to use a variety of instructional techniques.

- **The increased scheduling flexibility of block schedules, however, must be balanced with well-planned curriculum.** Although block schedules increase the amount of time a student spends in a particular class per day or week, they often decrease the amount of time spent in a class over the whole year, essentially trading aggregate instructional time for scheduling flexibility. Administrators and teachers must, then, collaborate when implementing a new schedule to ensure that the curriculum adaptation accords with district goals and priorities.

- **Scheduling appears to have a negligible long term effect on achievement, and the best approach to evaluating scheduling models involves building consensus around district priorities.** Change management and new schedule implementation literature suggests that, for best results, districts define clear priorities and goals and then evaluate which model is most conducive to reaching them in the opinion of most stakeholders. Consensus can be built through honest and open discussion of the goals and models in consideration, clear communication throughout the implementation process, and the provision of appropriate and sustained development opportunities.

- **Instructors teaching in block schedules should use different teaching methods to make the best use of the additional time.** The literature recommends employing a diversity of teaching approaches—potentially including group work, in-class activities, and discussion, among others—and intentionally structuring the class into a progression of focused segments, such as time for instruction, application, and then review.