

**Blocking the School Schedule:
Potential for Instructional Change**

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Paper presented at the Annual Meeting of the
University Council for Educational Administration

November 2001
Cincinnati, Ohio

The Argument for Unfreezing Classroom Instruction

There are few if any high schools that have not at least considered adopting some form of block schedule. A block schedule provides longer but fewer periods each school day and, throughout a school year, can provide more time slots for courses than the traditional six or seven-period daily schedule. Some schools have adopted a block schedule primarily to provide students more opportunities for enrolling in courses to meet local and state requirements. Most schools, however, responded to persistent pressure to improve, adopting a block schedule for the purpose of increasing the quality of the high school experience for all students.

High school educators believed changing to a block schedule would help their schools raise student achievement. The premise was that student achievement would improve if teachers engaged students in more active and indepth classroom instructional activities. Advocates believed that with a longer class period, teachers would be supported, even motivated, to change their classroom teaching practice. Marshak (1997) saw the block period as a “structural lever, because its length simultaneously invites and impels teachers to change their teaching” (p.1).

Researchers and advocates have placed a heavy load of expectations on the block schedule – it would “serve as both a lever and a stage in the development of a new vision of high school” and “eventually engage many or most teachers in re-evaluating their mental models of learning, curriculum, coverage, and assessment” (Marshak, p. 1-2).

Numerous researchers painted a picture of high school students as passive learners (Goodlad, 1984; Sizer, 1984, Boyer, 1983). In Sizer’s (1984) description, students docilely complied with boring coverage of subject matter, teachers did not know their students well enough to personalize instruction, and getting a diploma did not necessarily require students to use their minds well. Goodlad (1984) observed classrooms dominated by “three categories of

student activity marked by passivity – written work, listening, and preparing for assignments” and found “contrastingly low incidence of activities invoking active modes of learning” (p. 105).

Visions of teaching and learning as active engagement of teachers and students are not new. Prawat (1995) says, “It is not surprising that [John] Dewey’s name is once again being evoked in connection with the current reform era. For 60 years, Dewey has been viewed as the godfather of activity-based instruction” (p. 13).

Dewey (1938) chose the “scientific method as the pattern and ideal of intelligent exploration and exploitation of the potentialities inherent in experience” (p. 86). He thought ideas should be treated as hypotheses that must be “continuously tested and revised.” Ideas and hypotheses were tested by studying the “consequences which they produce when they are acted upon.” Finally, the experimental method required “keeping track . . . a matter of reflective review and summarizing” (p. 87).

Prawat (1995), applying Dewey’s philosophy and learning theories, concluded: “The teachers’ task . . . is to create discourse communities that allow students to hammer out and apply big ideas, like author’s point of view in literature, or part-whole relations in mathematics, to real-world phenomena that they can then view with fresh eyes. Ideally, in this scenario, the classroom becomes a center of lively discourse, where people engage in animated conversations about important intellectual matters” (p. 20).

In going back, we need not stop at Dewey. Without accepting the Greek view of the world, we can look to Plato’s dialogues for techniques of learning and teaching. Indeed, Socratic seminars are among the learning strategies teachers are commended to use in extended period classes (Sizer, 1984; Canady & Rettig, 1995). These reform ideas about effective teaching and

learning are very old ideas indeed. The problem is that they are not very evident in high schools today.

Newmann (1991) proposes to characterize what should be required of students as "authentic achievement." Authentic work, it is hoped will counteract "persistent disengagement" exhibited by most students and respond to the "explosion of knowledge" (p. 459). By authentic achievement, he means "authentic expressions" of knowledge such as writers, historians, and scientists use. Classroom tools to obtain authentic achievement would include "substantive conversation" between student and teacher and between student and student, collaboration in small groups, and more sustained, long-term, and indepth investigation (Newmann, 1991). Authentic pedagogy would "require students to think, to develop indepth understanding, and to apply academic learning to important, realistic problems" (Newmann & Wehlege, 1995).

Authentic achievement requires a changed role for students in their schooling. These changes include a shift from behavioral to constructivist principles of learning, implying active learning, meaningful tasks, and the ability to use knowledge. Knowledge is not in the "possession of the teacher, waiting to be transmitted" but is "mutually constructed by the teacher and the student" (Murphy, 1993, p. 13). The teacher's role in the classroom is also changed. Teaching is more like coaching or guiding, conducting dialogue, and using other methods to increase students' opportunity to "observe, engage in, and invent or discover expert strategies in context" (p. 14).

The traditional schedule was seen as a major roadblock to implementing more effective teaching practices (National Commission on Time and Learning). Bexell (1998) asked whether block scheduling might be the "heat that can 'unfreeze' classroom practice" (p. 6), referring to Schein's (1992, p. 298) discussion of organizational change. Early advocates of block

scheduling identified the block schedule as the catalyst, or vehicle, for bringing about desired changes in secondary education (Carroll, 1990; Canady and Rettig, 1995). Keller (1997) looked at block scheduling alongside the characteristics of science education reform and constructivist learning theory and concluded, “It appears that all three sets of characteristics combined should be compatible in fostering student achievement” (p. 35).

Other school reformers and researchers warn that the long block and other adjustments to the use of time will not change the longstanding habits and methods of teaching. A revised schedule alone will not improve the quality of teacher and student interaction. Structure alone will not alter conceptions of what constitutes knowledge, content of courses, or changes in classroom teaching that must occur for any new schedule to affect student learning (Conley, 1994; Cushman, 1995; Newmann, 1991).

Literature Review

Considerable research and evaluation work has been done to document the implementation processes and outcomes when schools adopt some form of block schedule. Canady and Rettig have summarized much of this literature through 1998 on their website at <http://curry.edschool.virginia.edu/curry/centers/ciss/learned.html>. Since 1998, scores more dissertations and journal articles have been published. This literature review will briefly refer to research about school climate and student achievement but will focus on what is known about classroom instruction under block scheduling.

What is Known about School Climate and Block Scheduling

Ferguson (1999), after an extensive review of the literature, concluded that most studies of school climate and block scheduling used stakeholder questionnaires and surveys. Vawter

(1998) and Richardson (2000) found that the majority of studies they reviewed showed high satisfaction with whatever model of block scheduling a school had adopted. Reasons given for teacher and student satisfaction with their block schedules included: a calmer school climate, a less rushed and stressed atmosphere, and deeper relationships between teachers and students. Numerous studies found attendance to school improved and that student behavior incidents (referrals and suspensions) declined (Ferguson, 1999; Vawter, 1998).

What is Known about Student Achievement and Block Scheduling

Research examining student achievement in block-scheduled schools compared to traditional schools showed mixed and inconclusive results (Vawter, 1998; Richardson, 2000; Ferguson, 1999). Reviewers found studies that showed academic gains in block-scheduled classes and schools, studies that showed no differences, and studies that showed academic losses with block scheduling. Studies reported findings such as: (1) grades students earned in their courses usually improved but sometimes did not, (2) failure rates improved or did not, (3) honor roll attainment increased, (4) sometimes there were increases in graduation rates, and (5) there were increases or decreases in AP test scores.

What is Known about Classroom Instruction with Block Scheduling

Perceptions of teachers and students

Most research about block scheduling and classroom instruction, as with research on school climate, used student, teacher, and parent questionnaires and surveys. In many studies, teachers reported that they changed how they taught when their school adopted a block schedule. They decreased their use of lecture (Banbury, 1998; Eineder, 1996; King, 1996; Rufino, 1999). Teachers perceived they had increased the use of cooperative and small group learning (Banbury,

1998; Hays, 1998; Hartzell, 1999; Rufino, 1999; Staunton, 1997), increased student-centered learning (Banbury, 1998; Hartzell, 1999), increased hands on projects/labs (Banbury, 1998; Hartzell, 1999), increased use of technology (Banbury, 1998), had a greater variety of instructional activities (Eineder, 1996; Hays, 1998; Hartzell, 1999; Khazzaka, 1997-98; Rofes, 2001; Staunton, 1997; Veal & Flinders, 1999), more in-depth simulations that last longer (Hays, 1998), more role plays (Hays, 1998), more practice of concepts in-depth (Hays, 1998), and provided more opportunities for critical thinking (Hartzell, 1999). Teachers said they got to know their students better and that teacher-student relationships improved (Hartzell, 1999; Khazzaka, 1997-98; Veal & Flinders, 1999).

When students reported what they liked about block scheduling, they mentioned lessons that are more hands-on and project-oriented (Rofes, 2001). Some groups of students reported that teachers were using a greater variety of learning activities (Khazzaka, 1997-98; Wilson & Stokes, 2000), but other students were divided and thought teachers needed to use more variety (Rofes, 2001). Some groups of students thought they got more individual attention (Khazzaka, 1997-98, Wilson & Stokes, 2000), while other groups were divided (Mutter, Chase, & Nichols, 1997). There were students who thought teachers could improve the use of block scheduling by spending less time lecturing (Mutter, Chase, & Nichols, 1997; Rofes, 2001). In several studies, students reported that lecture was the dominant type of teaching format (Queen, Algozzine, & Eaddy, 1997). Students and parents were divided on whether students were more active participants in learning (Mutter, Chase, & Nichols, 1997). Students said that class periods seemed to last too long (Wilson & Stokes, 2000).

In a study of 45 Biology I teachers and their students in 12 high schools (Keller, 1997), students with a block schedule reported more frequent engagement in problem-solving, more

frequent writing of conclusions to an experiment, and a greater variety of instructional activities for each class. They said that it was easier to learn and remember things. Teachers with a block schedule reported that laboratory activities were more easily completed on a block schedule. There were no differences reported in the use of cooperative groups in block and traditional classes.

Bryant (1995) did a comparative study of teaching strategies used in block and traditionally scheduled high schools in the State of Wyoming. Samples of teachers and students were given an identical list of 10 classroom teaching strategies and asked their frequency of use in their classes. Both blocked and unblocked students rated “lecture and class discussions” as the most frequently experienced teaching strategies. “Class discussions” were considered to be whole class discussions led by the teacher. Blocked students rated “working in small groups” as the next most frequent, but unblocked students reported experiencing “working in small groups” significantly less frequently.

Observation findings

Six studies were found that included classroom observation as one of the research methods. Each study had different procedures, instruments, and purposes.

Study 1: The final report by Copernican Associates (1999) on the effects of Copernican scheduling on student performance at Palisades Park High School, comparing student performance in 1998-99 and 1999-2000 with the 1997-98 baseline year.

Method: Copernican Associates researchers observed all teachers for a full class period five times, once to gather baseline data under the traditional schedule and once each semester for years one and two under the block schedule. Levels of engagement were recorded, and observers recorded the number of minutes allocated to seven types of classroom activity.

Findings: The levels of engagement were much better in the first year under the block schedule, while in the second year the ratings were the same as under the traditional schedule. The most notable changes in the uses of time in the spring of year one were the decline of “seat work” of about 10% (high school) to 20% (junior high school) and an increase of “group work” of about 10% (high school) to 15.6% (junior high school). The second year found similar though smaller changes. At the junior high, there was a 10.5% decline in the use of “lectures” in the first year and a 9% decline from 13% to 4% in the second year. The major use of time at both junior and senior high was “teacher/student interactive discussion” – 37.5% for both at the baseline year, and in years one and two, the amount varied up and down from 32.2% to 50.9%.

Study 2: Paper by Bush and Johnstone (2000) examining implementation of an alternate block (A/B) schedule in three high schools in Irving, Texas.

Method: Bush and Johnstone did an observation evaluation of high school A/B block classes in one district’s three high schools. Data were from a random sample of Algebra I, Biology I, English II, and US History classes. Four teachers in each school from each of the four courses were observed during one period. Observers recorded the materials and equipment used by the teacher, materials and equipment used by the students, student engagement (recording whether they were on or off task and other indicators such as whether they complied, showed interest, or explored ideas collaboratively), any individualization or differentiation, classroom management characteristics, thinking indicators (e.g. students related examples from their own experience, teachers asked open-ended questions with multiple answers), percent of time spent on whole class or small group or individual activity, what activities teachers spent their time on, and what activities students spent time on.

Findings: Bush and Johnstone (2000) concluded that teachers “had not changed their instruction to match the longer periods of time” (p. 20). They found (1) a predominance of teacher-centered instruction across all four courses, (2) the most-used materials and equipment were characteristic of teacher-centered instruction (i.e., overhead, chalkboard, textbooks, worksheets, etc.), (3) classroom climate was positive and student engagement was high, (4) there was little or no student individualization or differentiation, (5) teachers’ uses of thinking indicators were mixed and further revealed the predominance of teacher-centered instruction, (6) teachers spent most of their time presenting content/guiding discussion and monitoring student seatwork, and (7) most students’ time was used for listening and responding and doing short-answer exercises or homework.

Study 3. Paper by Wayne (1998) investigating the impact of changing to a block schedule on secondary students with learning disabilities in six high schools in south and central Michigan.

Methods: Researchers conducted classroom observation of selected students with learning disabilities and a non-disabled peer (two student groups). There were observations of 31 students in three blocked schools and 44 students in traditionally scheduled schools (two schedule types).

Findings: There were no significant differences in percent of time on or off task by student group or schedule type, though students attending traditional schools engaged more often in activities requiring multiple modes of engagement (engaged in verbal and motor activities). Teachers in blocked schools had a higher level of walking or pacing during the class period, while teachers in traditional school had higher levels of sitting during the class periods. Teachers in block-scheduled schools had a higher level of giving students academic feedback, attending to

small groups, actively structuring or directing during the class period, and giving students positive feedback during the class period.

Students in blocked schools spent significantly higher amounts of their class time reading or researching, while students in traditional schools spent significantly higher amounts of their time watching or listening during the class period. Students in traditional schools spent significantly higher amounts of their time both using computers or other technology and in having no assigned activity during the class period. Finally, there were no significant differences in level of individual attention received by students.

Wayne (1998) concluded, “Teachers in block-scheduled classrooms appear to be more actively involved in classroom activities offering more input and reinforcement to the students, while the students in these classrooms are engaged in activities that are more active than passive in nature” (p. 135).

Study 4. Paper by Hart (2000) comparing the use of instructional time in block scheduled and traditionally scheduled high school classrooms.

Methods: Fifty-two classes were observed in four high schools (2 block and 2 traditional) across five core subjects. Instructional strategies were categorized into four types and off task behavior was recorded.

Findings: There were no statistically significant differences in the rates of passive instruction (e.g. lecture), individually active work (e.g. worksheet, silent reading, artwork), group instruction (e.g. seminar, cooperative groups), and management activities (e.g. providing directions, handling discipline) between the block and traditionally scheduled classes. In addition, there were no differences in rates of off-task behavior in either setting. The most common type of instruction in both settings was individually active instruction (47.29% of the

observation intervals in the block settings and 55.94% in the traditional settings). The next most common type of instruction was passive instruction (26.02% in the block settings and 23.42% in the traditional settings). The least common type of instruction was management (7.92% in the block settings and 7.69% in the traditional settings).

Study 5. A doctoral dissertation by Bexell (1998) studying the effects of class period length on the number, variety, and interaction level of instructional strategies.

Method: Eight teachers in a block-scheduled school were each observed four times and eight teachers in a traditionally-scheduled school were each observed six times. There were two teachers from each of the four core subject areas in each school. All were interviewed. The teachers also kept logs of the strategies they used, their duration, and their interaction level. The instructional strategies were assigned interaction levels representing the expected level of student/student or student/teacher interaction. For example, library research in small groups was assigned an interaction level of 3; guided written practice was assigned interaction level 1.

Findings: The observed data showed that “lecture” was the strategy that consumed the most time for both block and traditional classes, over 27-28%. “Practice” was the second most time consuming strategy, about 14-15%. “AV presentations” were the third highest time consuming and discussion the fourth. With all subject areas considered together, the interaction level of block classes was 16% higher than that of traditional classes. Specifically, interaction levels in English and science classes were higher with a block schedule, though social studies and mathematics classes were not different by schedule.

Study 6. A doctoral dissertation by Shockey (1997) studying the effects of varying retention intervals within a block schedule, observing math teachers instructional strategies employed during review.

Method: Four algebra teachers at two block-scheduled schools were observed on alternate days for approximately four weeks. At School A, 17 observations of approximately 90 minutes each were done for a total of 1,496 minutes. At School B, 18 observations were done for a total of 1,544 minutes. Instructional strategies observed were separated into three major categories of activities: explanation, application, and synthesis. Instructional strategies were timed to determine the amount of class time used for a particular activity.

Findings: When pooling all observations, two-thirds of the observed time was used for explanation; one-third of the time was used for application activities; and less than 1% of the time was used for synthesis activities. Shockey (1997) concluded that the instructional strategies observed during the teacher review of Algebra 2 skills/concepts were those associated with a traditional school schedule and not consistent with strategies named in the literature on block scheduling.

Findings across the six studies

Observation instrumentation and methodology were different for each of the six studies. However, there were some broad findings that can be stated across these studies. Teacher-centered instruction predominated in these studies whether characterized as “lecture” or “teacher-student discussion.” Students spent considerably more time working individually than working in groups though there may have been increases in group work with block schedules. Teachers working under block schedules may be selecting activities that require more student-

student and student-teacher interaction, but teachers may not be requiring students to think more deeply.

Methodology for This Study

For seven years, researchers at the Center for Applied Research and Educational Improvement (CAREI), College of Education and Human Development, University of Minnesota, have been conducting evaluations of block scheduling for school districts across Minnesota and Wisconsin. Thirty-six high schools and 14 middle/junior high schools have requested some or all of the following evaluation methods: teacher, student, or parent surveys; classroom observation; or focus groups of teachers, students, or parents.

CAREI has collected classroom observation data in 31 high schools and 10 middle/junior high schools. Data were collected before the school switched to a block schedule and the first year after switching in 12 high schools and 2 junior high schools. In 7 of these high schools, data was collected in the second and/or third year after switching to a block schedule. This study will examine classroom observation data from those 12 high schools with before block and after block data. All subject areas were observed in some schools, but in other schools only five core subjects were observed: English, foreign languages, math, science, social studies. For this study only these five core subjects will be analyzed. See Table 1 for the total number of classes by subject areas.

Observers spent one day in each school each year, observing all teachers in the chosen subject areas. Observers watched 3-5 classes simultaneously during a period, stepping into classrooms several times, approximately 10-15 minutes apart. Shorter periods had 3-4

observation points and longer periods had 5-6 observation points. Percentages of classroom strategies given in this paper are the percentages of the times observed.

Table 1.
Number of classes observed by subject area in 12 schools

	Year before block	First year on block	Second year on block	Third year on block
Subject area	12 schools	12 schools	7 schools	3 schools
English	331	225	132	34
Foreign Language	165	136	77	18
Math	258	185	106	35
Science	255	177	79	33
Social Studies	284	197	106	31
Total classes	1293	920	500	151

Observation forms changed over the seven years, beginning with 9 categories of teaching strategies the first year, increasing to 11, then to 12, then to 25 during the sixth year (see Appendix 1). Data were merged, collapsing categories into seven that most closely matched across the seven years: (1) Teacher presentation and teacher led discussion, (2) Teacher led whole class discussion with more equal student participation, (3) Student dominated whole class activity (e.g. seminar, presentations, or simulations/games), (4) Other whole class activity (e.g. video, reading aloud), (5) Individual work, (6) Group work, and (7) No activity.

The engagement level scale set up in the first year remained the same throughout the seven years: 4=almost all engaged, 3=many engaged (more than half), 2=some engaged (fewer than half), and 1=few if any engaged. “Engaged” was consistently defined as “students doing what the teacher expects.” An interest scale was added during the sixth year of the study to

capture “how interested the students were in the work they were doing.” The interest scale was: 5=Total involvement/total engagement, 4=interested/focused/attentive/intent, 3=somewhat interested/ compliant/somewhat bored, 2=disinterested/bored/off task, and 1=acting out/misbehaving.

CAREI has analyzed student surveys from 34 high schools and 14 middle/junior high schools. The student high school survey database includes 11 high schools that completed surveys one year before switching to a block schedule and one year after, nine of these completed surveys during the second year, and five of these completed surveys the third year. Of the middle/junior high schools, 2 junior high schools completed student surveys before and the first year after switching to a block schedule. For this study, only the 11 high schools with before and after results will be examined. The number of students from the 11 high schools completing the surveys were: one year before block scheduling = 10502, first year on block = 10060, second year on block = 9163, and third year on block = 3808.

Results

Student Perceptions of Classroom Teaching Strategies: the Student Survey Results

High school students perceived that they were “listening to the teacher lecture” and “filling out worksheets” far more than any of the other activities listed on the student survey whether on traditional or block schedules (see Table 2). Students reported they experienced all of the listed teaching strategies significantly more the first year on the block schedule than they did the year before switching. This included lectures and worksheets though the effect sizes are small (.08 and .06 respectively). Students perceived the greatest increases in frequency in how much they experienced “working in small groups” (effect size = .31) and “a variety of activities

in most class periods” (effect size= .33). After the first year on a block schedule, there was little change in students’ perceptions of the frequency they were experiencing the activities on the list.

Table 2.
Students’ perceptions of how frequently they experience specific teaching strategies

	Before block Mean	Std. dev.	First year Mean	Std. dev.	Effect size	Second year Mean	Third year Mean
Listen to the teacher lecture.	3.84	1.07	3.93***	1.06	.08	3.90	3.93
Fill out worksheets.	3.69	1.10	3.75***	1.08	.06	3.78	3.82
Think hard about ideas	3.17	1.05	3.41***	1.00	.23	3.35	3.43
Do activities (such as labs or projects) to apply what I learn	3.12	1.01	3.27***	1.02	.15	3.29	3.33
Work in small groups.	2.91	1.02	3.22***	1.01	.31	3.26	3.29
Have indepth discussion	2.80	1.04	3.05***	1.04	.24	3.02	3.10
Do a variety of activities in most class periods	2.65	1.03	3.00***	1.06	.33	3.00	3.07

Notes: Scale is 1=never or seldom to 5=almost all the time.

*** = Statistically significant at the .001 level of significance (Independent samples t-test)

Effect size = (post-project instructional mean – pre-project instructional mean)/S.D._{ave}. Researchers differ as to what constitutes a significant effect size. Jacob Cohen (1988) suggests that an effect size of .20 can be considered small; an effect size of .50 medium, and an effect size of .80 large. Rosenthal and Rosnow (1984), however, categorize an effect size between .1 and .3 as small; between .3 and .5 medium; and over .5 large.

Classroom Teaching Strategies Observed: Classroom Observation Results

The two most frequently observed teaching strategies were “teacher presentation/teacher led discussion” and “individual work” whether the schedule was traditional or block (see Table 3). During the first year on a block schedule, the type of teacher led discussion observed included more student participation than seen on the traditional schedule the year before (11.6% compared to 3.1%). There was a little more “group work” (3.2% more) and a little less “individual work” (2% more). There was a little more “student dominated whole class activity”

(1.3% more) though it was a low percent (6%) of the times observed. There was little change in teaching activities during the second year on the block from the first year on the block.

Table 3.
Teaching strategies observed in 12 schools with before block and first year on block data and the engagement levels observed during these strategies

Teaching strategies	Before	1st year	2nd year	Engaged before	Engaged 1st year	Effect size	Engaged 2nd year
	Percent	Percent	Percent	Mean	Mean		Mean
Teacher presentation and teacher led discussion	32.1	21.8	22.0	3.38	3.61***	.33	3.56
Teacher led whole class discussion/ more equal student participation	3.1	11.6	11.2	3.66	3.78***	.21	3.67**
Student dominated whole class activity	4.7	6.0	6.2	3.75	3.84***	.19	3.84
Other whole class activity	14.3	13.0	10.0	3.52	3.67***	.22	3.62
Individual work	32.3	30.3	33.4	3.22	3.41***	.21	3.34*
Group work	10.0	13.2	12.2	3.39	3.48**	.11	3.42
No activity	3.5	4.0	4.7	1.00	1.00		1.00

Note: Other whole class activity included activities such as watching videos or reading aloud. Student dominated whole class activity included activities such as seminars, individual or group presentations, and simulations.

Percent=percent of times observed. *** P< .001, ** P< .01

Engagement scale is: 4=almost all engaged, 3=many engaged (more than half), 2=some engaged (less than half), 1=few if any engaged.

Effect size = (post-project instructional mean – pre-project instructional mean)/S.D._{ave}. Researchers differ as to what constitutes a significant effect size. Jacob Cohen (1988) suggests that an effect size of .20 can be considered small; an effect size of .50 medium, and an effect size of .80 large. Rosenthal and Rosnow (1984), however, categorize an effect size between .1 and .3 as small; between .3 and .5 medium; and over .5 large.

Table 3 includes the level of student engagement observed while each of the teaching strategies were occurring. Student engagement was highest during those whole class activities with the most student participation: “student dominated whole class activity” and “teacher led whole class discussion with more equal student participation.” Student engagement was not as

high during “group work” as with whole class activities. A table later in the paper (Table 9), showing that the level of student engagement was higher when students were doing cooperative group work than when doing other group work, may help explain that the group work students were asked to do was not always highly engaging. The lowest engagement level was during “individual work.” All engagement levels for all teaching strategies were significantly higher the first year under a block schedule than under a traditional schedule. The second year under a block schedule found the engagement levels for two of the activities return to levels seen under a traditional schedule; others were a bit lower but still higher than under a traditional schedule.

When examining teaching strategies by five subject areas (see Table 4), math and English teachers used the most “individual work” time though both declined under block schedules by

Table 4
Teaching strategies in 12 schools with before and first year data by five subject areas

Teaching strategies	English		Foreign language		Math		Science		Social studies	
	Before	1st	Before	1st	Before	1st	Before	1st	Before	1st
Teacher presentation and teacher led discussion	24.8	16.4	32.3	19.9	35.9	22.3	34.7	24.8	34.4	26.3
Teacher led whole class discussion with more equal student participation	1.5	9.8	6.7	16.4	3.0	13.3	2.0	11.0	4.1	9.4
Student dominated whole class activity	5.8	7.6	10.4	7.2	.6	1.1	4.2	2.5	4.2	11.1
Other whole class activity	16.8	16.3	13.1	15.6	3.0	4.5	15.1	12.6	21.9	16.0
Individual work	39.1	33.5	21.8	22.6	48.7	43.0	25.0	23.4	22.3	26.2
Group work	7.5	10.8	12.9	15.9	6.1	11.2	16.4	21.9	9.0	8.1
No activity	4.6	5.6	2.9	2.5	2.8	4.6	2.7	3.9	4.0	3.0

Note: numbers are the percent of times observed.

about 5% of the time. Whether under traditional or block schedules, English teachers used the least teacher led whole class activity, about 26% of the times observed, while the four other subject areas used teacher led whole class activity around 35% of the time. All subject areas except social studies increased the use of “group work” under block schedules, but only 3% to 5.5% of the times observed. Social studies teachers used the most “student dominated whole class activity,” perhaps including simulations and student presentations, though it reaches only about 11% under block scheduling. The highest levels of “group work” were found in foreign language and science classes, reflecting language practice groups and lab groups in science.

When looking at engagement levels by subject area (see Table 5), the highest engagement levels across the three years were found in foreign language classes. Math classes were consistently among the lowest of engagement levels while the other four subject areas increased significantly from under the traditional schedule to the first year on the block schedule.

Table. 5
Student engagement in 12 schools with before and first year data by five subject areas

Subject areas	Before block Engagement		1st year block Engagement		Effect size	2nd year 7 schools Mean
	Mean	Std. Dev.	Mean	Std. Dev.		
English	3.31	.96	3.46***	.89	.16	3.40
Foreign language	3.42	.87	3.64***	.75	.27	3.63
Math	3.25	.97	3.33	.91	.09	3.33
Science	3.36	.89	3.46**	.83	.12	3.29***
Social studies	3.27	.93	3.54***	.79	.31	3.40***
Overall mean	3.31	.93	3.48***	.85	.19	3.40***

For the seven schools continuing classroom observation into the second year on the block, engagement levels significantly lowered for science and social studies classes.

In the last two years of this study, an interest scale was added to the observation instrument. The scale for engagement was a four-point scale and the scale for interest was a five-point scale. There appeared to be a relationship between engagement and interest, that is, subjects with the highest engagement levels also had the highest levels of interest (see Table 6). The engagement scale measured whether students were doing what teachers were expecting and the interest scale measured how interested the students were in what they are doing. It appeared that students' compliance was at a higher level than their interest.

Table 6
Interest and engagement levels for 6 high schools by subject area and overall

Subject	# classes	Engagement Mean	Interest mean
English	456	3.76	3.81
Foreign language	288	3.76	3.88
Math	378	3.61	3.50
Science	348	3.63	3.56
Social studies	366	3.66	3.66
Overall mean	1836	3.69	3.68

Note: Scale for engagement is from 1=few if any engaged to 4=almost all engaged.
Scale for interest is 1=acting out/misbehaving to 5=total involvement/total engagement.

The list of teaching strategies for the observation instrument expanded to 25 in the past two years (years 6 and 7 of this study). Major categories used in previous years were sub-

divided in order to capture greater differentiation among teaching strategies. Tables 7 through 10 examine engagement and interest levels among categories of “individual work,” “group work,” and “teacher led” activities.

When examining the categories of individual work (see Table 7), engagement and interest were lowest when students were working on “worksheets/study guides/text questions,” which was the most frequently experienced “individual work.” Levels of interest were highest when students were working with “computers” or “hands-on products,” which were the least frequently experienced “individual work” categories.

Table 7
Engagement and interest levels by individual work categories

Individual Work Teaching Strategies	Percent of times	Engagement		Interest	
		Mean	Std. Dev.	Mean	Std. Dev.
Worksheet/study guide/text questions	11.7	3.46	.75	3.36	.75
Writing/drafting/editing/revising/researching	6.4	3.71	.52	3.75	.78
Hands on product	2.2	3.81	.40	4.21	.68
Quiz/test	8.5	3.88	.41	3.95	.48
Unique use of technology/computers	.6	3.85	.38	4.33	.71

Note: Percent of times is the percent of times the activity was observed considering all activities, not just individual work categories. “Unique use of technology/computers is for those times students were learning to use computer hard of software. Computers may be in use for other teaching strategies.

Table 8 examines seven categories of “teacher led” activity. Both engagement and interest levels were higher when students were more actively involved. Highest engagement levels were found when students were at least equally involved in a discussion or dominating the

discussion time. The highest engagement level was when there was “teacher-student problem solving/ students pushed to think.” The highest level of interest was observed when there was “whole group discussion with students doing most of the talking,” the least frequently experienced teacher led activity, followed by when “students were pushed to think.” The lowest interest levels were observed then students were “listening to lecture” and when there was “mostly teacher talk/students responding.” These two activities made up 16.3% of the times observed, a higher percent than any other teacher led activity.

Table 8
Engagement and interest levels by teacher led activity categories

Teaching strategies	Percent of times	Engagement		Interest	
		Mean	Std. Dev.	Mean	Std. Dev.
Lecture/students listen	4.3	3.58	.67	3.40	.68
Lecture/students take notes	2.8	3.86	.35	3.65	.72
Teacher giving directions/ demonstration	5.5	3.78	.53	3.73	.80
Mostly teacher talk/students reciting	12.0	3.72	.51	3.44	.74
More equal teacher-student discussion/question and answer	4.6	3.89	.31	3.99	.68
Teacher-student problem solving/ students pushed to think	5.2	3.95	.22	4.25	.57
Whole/large group discussion/students do most of the talking	1.2	3.84	.37	4.44	.70

Note: Percent of times is the percent of times the activity was observed considering all activities, not just teacher led activity categories. Four-point scale for engagement; five-point scale for interest.

Levels of engagement and levels of interest differed by the type of group activity (see Table 9), being substantially higher when students were working in “cooperative groups doing reflection or a joint project or giving feedback” rather than “helping each other complete individual work.” Cooperative groups were observed a little more often than other small groups.

Table 9
Engagement and interest levels for group activity

Teaching strategies	Percent of times	Engagement		Interest	
		Mean	Std. Dev.	Mean	Std. Dev.
Cooperative group/joint product/reflection/lab/give feedback	7.2	3.80	.50	3.98	.82
Students helping each other complete individual work	5.8	3.48	.63	3.40	.76

Note: Percent of times is the percent of times the activity was observed considering all activities, not just group work categories. Four-point scale for engagement; five-point scale for interest.

When examining a selected variety of activities across major categories (see Table 10), the highest engagement and interest levels were found when students were pushed to think or were doing most of the talking. On other activities, student engagement levels were otherwise consistent across activities except for when doing worksheets or study guides. On other activities, levels of student interest were much more varied from low levels for “mostly teacher talk/students reciting” and “worksheets/study guides” to much higher levels for “cooperative groups” and “hands on products.” The two most frequently observed activities, “worksheets” and “mostly teacher talk/students reciting.” were also those with the lowest levels of student engagement and interest.

Table 10
Engagement and interest levels for a selected variety of teaching strategies

Teaching strategies	Percent of times	Engagement		Interest	
		Mean	Std. Dev.	Mean	Std. dev.
Mostly teacher talk/students reciting	12.0	3.72	.51	3.43	.76
Teacher-student problem solving/ students pushed to think	5.2	3.95	.22	4.28	.56
Whole/large group discussion/students do most of the talking	1.2	3.84	.37	4.36	.67
Video	5.2	3.79	.50	3.78	.75
Worksheet/study guide/text questions	11.7	3.46	.75	3.38	.75
Hands on product	2.2	3.81	.40	4.08	.65
Cooperative group/joint product/ reflection/lab/give feedback	7.2	3.80	.50	3.96	.82

Note: Percent of times is the percent of times the activity was observed considering all activities, not just those listed in this table. Four-point scale for engagement; five-point scale for interest.

Conclusions

Choice of teaching strategies

Findings from observation of classroom teaching strategies supported students' perceptions of what activities they were experiencing most often. Students reported they experienced "lecture" and "filling out worksheets" most often; observers saw "teacher presentation/teacher led discussion" and "individual work" most often. This was consistent with other observational studies that found "teacher-student discussion" or "lecture" as the most frequently observed activities. Students tended to categorize as "lecture" the two activities in our study that were teacher led when the teacher did a majority of the talking.

“Individual work” and “seatwork” also dominated class time in other observational studies – only one study saw less “seat work” under block scheduling. This was consistent with the approximately 30% of time spent on “individual work” found in this study.

Students reported “working in small groups” significantly more often under block scheduling, while observers saw “small group activity” only 3% more of the time when considering all 12 schools together. When examining the 12 schools separately, seven schools showed an increase in “small group activity” of 4% or more; 4 of these from 6% to 9% more “small group activity” under a block schedule. Four schools stayed the same; two of these were among those having the highest percent of “small group activity,” having around 15-16% of the time spent in “small groups.” These findings appear consistent with other observational studies that saw more “group work” in block schools.

Students reported “thinking hard about ideas” and “having indepth discussion” significantly more often under block schedules. These perceptions may be consistent with observers in this study who saw more “equal student participation in whole class discussion” and a bit more “student dominated whole class activity.” This may also be supported by Bexell (1998) who found teachers on block schedules using teaching strategies requiring more interaction than teachers on a traditional schedule.

There appeared to be slight changes in teachers’ choices of teaching strategies, but it was clear that “lecture/teacher led discussion” and “individual work” still composed a substantial portion of a student’s class day in core subject areas. It was interesting that students reported increases in use of teaching strategies that engaged them more actively even though observers recorded only small increases in these strategies.

Student engagement and interest levels

Subject areas were somewhat predictive of choices of teaching strategies. Students in math classes experienced mostly “lecture/teacher-led discussion” and “individual work.” This may help explain math classes having the lowest levels of student engagement and interest.

Foreign language and science classes used “group activity” more often than other subjects. Foreign language also had the most “student dominated whole class activity.” This may help explain foreign language students having the highest levels of engagement and interest.

Classes in all subject areas but English had about 35% “lecture/teacher led discussion” and all subjects had 23% or more individual work while English had over 33%. In English classes, percentages of time were spread more evenly across teaching strategies, except for heavier use of individual work. This may explain finding higher levels of engagement and interest in English classes than in other subjects except for foreign language.

It was no surprise that students were more engaged in work requiring them to be actively discussing or making presentations rather than when listening to the teacher. Students were more engaged in group work that required a joint product or reflection. Group work to complete individual assignments was only somewhat more engaging than working alone.

Levels of interest fluctuated considerably more than did levels of engagement. Studies, including this one, have found students consistently doing what teachers expected. Hands on activities, including those involving computers, registered the highest interest levels.

The activities students experienced most often were those in which students were the least engaged and interested – “lecture” (including teacher talk/students reciting) and “filling out worksheets.”

Final words

It would seem that the small amount of change in the way teachers teach after switching to a block schedule would be disappointing to block scheduling advocates. Though students much preferred block schedules to traditional schedules, it may be for reasons other than what they were experiencing in the classroom. Indeed, research shows that there are other outcomes to commend block scheduling, such as improvement in school climate and lowering of stress levels of teachers and students.

If we look back to the theory of action – that increases in student achievement depend on changes in classroom work – it would seem quite premature to expect that student achievement would change very much if at all. If student achievement has changed, particularly when evidenced by students earning higher course grades, it may very well be for reasons attributable to the schedule alone. Having only four classes a day to prepare for may be enough to help students better handle their workload and meet teachers' expectations.

Important questions hover over these findings. What is an effective amount of teacher lecture? Or group work? Or individual work?

An important limitation of this and most other observational studies may be the way classroom activities were observed and categorized. One thing that is missing from the observation instrument used in this study is any judgment about the quality of a lecture, quality and depth of a discussion, or the complexity of group or individual work. These data may not be capturing the changes teachers are making in response to higher standards set by state departments of education or subject area national organizations.

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Appendix 1

Classroom Observation Teaching Strategies

List as used in Years 6 and 7 of the study

1. No Activity

2. Administrative (attendance, pass back papers, etc)

Teacher presentation

3. Lecture content-information/students listen
4. Lecture content-information/students take notes
5. Teacher giving directions / demonstration

Teacher led whole class discussion

6. Mostly teacher talk/students reciting-responding-questioning
7. More equal teacher-student/more discussion/question-answer
8. Teacher-student problem solving/inquiry/students pushed to think

Student dominated whole class activity

9. Whole/large group discussion/students do most of the talking
10. Individual student presentations
11. Group student presentations
12. Debate/Simulation/Mock trial/Role playing/Games
13. Students practice music / sports / language / Other

Other whole class activity

14. Video
15. Reading aloud in class (teacher / students / take roles)
16. Other: e. g. Guest speaker / cleaning up / other

Individual work

17. Worksheet/study guide/text questions/reading
18. Writing/drafting/editing/revising/researching/organizing
19. Hands on product (e.g. art, lab)
20. Quiz/test
21. Unique use of computer/other technology

Group Work/pair

22. Cooperative group/joint product/reflection/lab/giving feedback
23. Students helping each other complete individual work
24. Pairs/groups practicing music / sports/ speaking / other
25. Using technology/computer/other

Categories for merging

No activity

Teacher presentation and teacher led discussion

- 3.
- 4.
- 5.
- 6.

Teacher led whole class discussion/more equal student participation

- 7.
- 8.

Student dominated whole class activity

(same as across)

Other whole class activity

(same as across)

Individual work

(same as across)

Group work

(same as across)

Note: "Administrative" was not a category in previous years and was such a small percentage of the times observed that it was excluded from analysis across years.