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An Analysis of Research on Block Scheduling

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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.

KEYWORDS: block scheduling, high school reform, high school scheduling patterns.

As the accountability bar rises, schools continue to explore avenues for increasing student achievement, and school leaders have examined new teaching methods, emerging technologies, and alternate scheduling patterns to improve the teaching and learning processes. The National Education Commission on Time and Learning (1994) described the traditional 6-hour schedule as the “unacknowledged design flaw in American education” (p. 2). Block scheduling emerged as a way to modify the traditional 6-hour day for high school students.

Although there are variations, block schedules include the 4×4 , in which the school day is divided into four roughly equivalent blocks of time, usually 80 to 90 minutes each. Following a university model, students in a 4×4 schedule begin new courses twice a year. Another variation is the *trimester* schedule, in which the year is divided into three terms instead of two as in the 4×4 block schedule. In the *alternating block*, also called the *A/B block*, students meet every other day throughout the school year and typically enroll in six to eight classes, each lasting between 70 and 90 minutes.

The Copernican Plan has two main configurations, each combining block periods of differing lengths during the day. In the first configuration, students enroll in one 4-hour macro-class each day (typically a core course such as algebra or English) and then in two or three shorter classes lasting between 70 and 90 minutes each. Approximately every 30 days, students receive a new schedule. In the second configuration of the *Copernican Plan*, students enroll in two classes lasting approximately

2 hours each and receive new schedules every 60 days. Regardless of the configurations made to accommodate the context of the school, block scheduling has been characterized as a reform strategy.

At the high school level, perhaps no attempt at reform has generated more debate than block scheduling. The literature and proponents supporting block scheduling boast increased student achievement (Fletcher, 1997; Khazzaka, 1998), decreased discipline referrals (Duel, 1999; Stader, 2001), increased student attendance rates (Queen, Algozzine, & Eaddy, 1997; Snyder, 1997), and an improved school climate (Buckman, King, & Ryan, 1995).

Equally pervasive, however, has been research saying that the impact of block scheduling was negative relative to increases in student achievement. According to Knight, De Leon, and Smith (1999), AP (advanced placement) examination scores dropped after a block schedule was implemented; and Cobb, Abate, and Baker (1999) reported that standardized test scores of students on a block schedule dropped significantly. However, Lare, Jablonski, and Salvaterra (2002) reported that academic achievement remained constant after implementation of a block schedule. Fletcher (1997) and Pisapia and Westfall (1997b) concluded that block scheduling had no effect on attendance, and Hamdy and Urich (1998) reported that classroom management was more stressful in a block schedule. It appears that even though the research results on the effects are mixed, block scheduling is being implemented in high schools across the United States.

Events Leading to Block Scheduling

The high school remains at the forefront as reformers, policymakers, and politicians engage business and the public in discourse. “High school graduates, employers, and [college] instructors support a broad reform agenda, including strongly supporting measures that would raise the expectations for high school students, test them more rigorously, and require them to take more challenging courses” (Peter D. Hart Research Associates, 2005, pp. 2–3). Earlier, Powell, Farrar, and Cohen (1985) reported that the history of high school reform had evolved through an “almost incessant criticism of secondary education and the succession of movements to reform the schools” (p. 234); and more recently, Cuban (2004) argued that high school reform “continues to generate and receive scorching censure” (p. 17).

The criticisms and reform efforts in high schools have a rich history intermittently spanning three centuries. The history can be chronicled from a report made in 1893 by the Committee on Secondary School Studies, known as the Committee of Ten. Subsequent reports published in the 20th century—by the Carnegie Foundation in 1906, the National Commission on Excellence in Education in 1983, the National Commission on Time and Learning in 1994, and other groups—were motivated by the nexus between declining student achievement and the deleterious effects on the economy (Boyer, 1983; Lagemann, 1983; Peter D. Hart Research Associates, 2005; Powell, Farrar, & Cohen 1985; Wraga, 1998, 1999). The reform agenda for high schools in the 21st century has followed a call for accountability, higher standards, and restructuring efforts to ensure that students graduate with the requisite skills to be successful in college and the workplace. The criticisms of the high school continue, a major example being the 2005 report *Rising to the Challenge: Are High School Graduates Prepared for College and Work?* which was released during an

educational summit sponsored by the National Governors Association and Achieve, Inc. (Peter D. Hart Associates, 2005).

Powell et al. (1985) aptly observed that “life has not stood still in high schools” (p. 234). One constant in the reform agendas has been the ways in which learning and time are arranged. In 1893, the Committee of Ten recommended what subjects should be taught, the sequence of subjects, and the length of instruction. In 1906, the Board of Trustees of the Carnegie Foundation defined a course as meeting for a certain period daily and weekly throughout the entire year. Although the Carnegie Unit has been characterized as “mechanical” and a “bookkeeping device,” serving as “the basis on which the school day, and indeed the entire curriculum, is organized,” this unit is still the way that schools organize the curriculum within the instructional program (Boyer, 1983, p. 60).

With the furor caused by the Sputnik launch in 1957 and the concern that high school students were not prepared with enough “hard subjects,” school reform was at the forefront to ensure the international competitiveness of U.S. high school students (Conant, 1959). As a way to restructure the day, time was organized differently in many high schools in the late 1950s and early 1960s, most notably through the work of Trump (1959), who introduced flexible modular scheduling. Flexible modular scheduling was a way to eliminate lock-step class time meetings by varying the length of class time based on the predicated needs of the subject matter (Canady & Rettig, 1995). The flexible modular schedule was abandoned for a variety of reasons, including problems with student discipline. In part, this was because 30% to 40% of the school day was allocated “to unscheduled student time to be used for independent study and individual tutorials” (Canady & Rettig, 1995, p. 14), which neither students nor instructors could manage.

The flexible modular schedule gave way to other alternate forms of scheduling in the 1980s and the 1990s after the release of *A Nation at Risk: The Imperative for Education Reform* (National Commission on Excellence in Education, 1983). Catapulting a reform agenda that would extend to present day, the framers of *A Nation at Risk* emphasized that “the educational foundations of our society are presently being eroded by a rising tide of mediocrity that threatens our very future” (p. 3). This report called for numerous reforms geared primarily to high schools. They included setting higher standards by focusing more time on learning, holding higher expectations for students, and increasing graduation requirements to 4 years of English, 4 years of math, 3 years of science, 3 years of social studies, and a half of year of computer science.

Following the release of *A Nation at Risk* and adding to the tenor of accountability debates were a proliferation of reports, national summits, and legislation aimed at tackling the abovementioned “tide of mediocrity.” In chronological order, the Appendix provides details about the national focus on accountability, standards, and reform movements that emerged following the publication of *A Nation at Risk*.

Portrayals of high schools were found in several books, including *High School: A Report on Secondary Education in America* (Boyer, 1983); *A Place Called School: Prospects for the Future* (Goodlad, 1984); *Horace’s Compromise: The Dilemma of the American High School* (Sizer, 1984); *The Shopping Mall High School: Winners and Losers in the Educational Marketplace* (Powell et al., 1985); and *Horace’s School: Redesigning the American High School* (Sizer, 1992). Each of these books addressed the use of time by examining numerous issues related to the state of affairs in high schools.

Goodlad (1984) emphasized that reform in high schools needed to include the creation of smaller schools, the development of a core curriculum, the elimination of tracking systems, and the reexamination of time because “time is virtually the most important resource” available to schools (p. 30). Sizer (1984) asserted that “the clock is king,” that there is “a frenetic quality to the school day, a sense of sustained restlessness” in which “the student rushes from class to class to collect knowledge” (pp. 79–80). Similarly, Boyer (1983) reported, “Just as the arrangement of space is standardized in the American classroom, so is the use of time. If ideas are to be thoughtfully examined, time must be used wisely. Time is the student’s treasure” (p. 141).

Both Goodlad (1984) and Sizer (1984) called for restructuring how students interact with subject matter and their teachers, eliminating the meaningless exchanges that characterized teaching and learning. Although Goodlad and Sizer were not championing any form of block schedule, they sought systemic reform for the practice of schooling adolescents. Goodlad’s message was clear:

We must not stop with providing only time. I would always choose fewer hours well-used over more hours of engagement with sterile activities. Increasing [time] will in fact be counterproductive unless there is, simultaneously, marked improvement in how time is used. (1984, p. 283)

With the typical high school day punctuated by up to six class meetings, totaling 30 periods per week, the block schedule was seen as a way to increase the depth of coverage by extending classroom periods while reducing the fragmentation experienced by students moving from one class to the next (Cawelti, 1994).

The 1994 report, *Prisoners of Time*, exhorted that “Learning in America is a prisoner of time” (National Education Commission on Time and Learning, p. 7). Observing that the perennial problem of schools running on a “fixed clock” continued to promote educational inequalities, the Commission urged schools to “[r]einvent [themselves] around learning, not time, and to fix the design flaw [by using] time in new and better ways” (p. 29). In a study examining time during school restructuring from the perspective of the limitations that are placed on teachers’ work, Watts and Castle (1993) stated:

The schedule is God. You can implement any innovation you want in your classroom as long as you don’t mess with the schedule. Traditional, inflexible scheduling is based on administrative and institutional needs. New, more flexible scheduling patterns are based on pedagogical practices, the educational needs of students, and the professional needs of teachers. (pp. 306–307)

Block scheduling patterns offered hope for altering the ways that teachers worked and students learned.

Block scheduling as a restructuring effort for the high school emerged as a means to accomplish the following:

- Include more “hard subjects” in the curriculum
- Increase graduation requirements
- Implement more rigorous standards
- Reorganize the day through alternate schedules
- Promote smaller learning communities

During the 1990s, an increased number of high schools examined alternative schedules as possible ways for improving teaching and learning, and, it has been reported, “In just the four-year span between 1992 and 1995, the proportion of U.S. high schools on block schedules rose from 4 percent to over 40 percent” (Texas Education Agency, 1999, p. 1). Similarly, Canady and Rettig (1996) claimed that approximately half of the high schools had adopted or considered adopting some type of block schedule. If the move to block scheduling has maintained similar momentum, then approximately 8,998 of the 17,997 high schools are on or have considered some type of block schedule.¹ As the numbers of high schools that implemented block schedules increased, so did the volume of literature published on the subject.

Block scheduling has been promoted as a tool through which instructional time in schools may be maximized (Canady & Rettig, 1995). Specifically, block scheduling has been given credit for

- Reducing the number of students for whom teachers must prepare and with whom teachers interact each day and/or each term
- Reducing the number of classes, and the assignments, tests, and projects that students must address during any single day of the term
- Reducing the fragmentation in traditional schedules, a complaint that is especially pertinent to classes requiring extensive practice and laboratory work, such as science, agriculture, and technology courses
- Providing teachers with blocks of time that allow and encourage the use of active teaching strategies and greater student involvement
- Allowing students variable amounts of time for learning without lowering standards, and without punishing those who need more or less time to learn (Hottenstein, 1998)

The Study

As a reform strategy, changing how time is used by modifying the schedules in which students learn is only a superficial change until people dig deep to answer questions such as, Why change? and, What are the intended and unintended consequences of change? To answer them, one must consider what students and adults are able to accomplish in a given time slot. Schlechty (1997) has vigorously asserted, “The way time, people, space, knowledge, and technology are organized clearly determines what students will be likely to do” (p. 44). In the articles and research reports included in this analysis, it was interesting to note that not one of the 58 studies indicated why the schools included went to a block schedule, and none discussed the process used to lead a school toward its implementation. Similarly, few articles recounted a school or district’s experience in implementing a new schedule or offered suggestions for how to choose or implement a block schedule. A search that was narrowed to research on block scheduling at the high school level produced 58 empirically based articles or research reports (e.g., conference papers, ERIC documents) examining the potential merits or limitations of block schedules. Articles and research reports detailing research on the block schedule in middle school were eliminated, with the exception of one article that made comparisons between middle and high schools (Cobb et al., 1999).

This article presents an analysis of the empirically based research across five groupings: teachers’ instructional practices and perceptions of block scheduling,

change and block scheduling, effects of implementing block scheduling, effects of block scheduling on student learning, and students' perceptions of block scheduling.

Methodology

The analysis discussed in this article was completed in three phases: (1) an extensive search of the research concerning block scheduling, (2) construction of a matrix depicting the results of the search, and (3) analysis of the studies included in the matrix. We first undertook a search for research on block scheduling using both traditional and electronic search engines. In addition to a search of hard copies of journals across the various disciplines in the field of education, a search of electronic databases including ERIC, FirstSearch, EBSCO, and FindArticles was conducted. A copy of each article located was secured. Articles and research reports that reported empirically based studies of block scheduling at the high school level were separated for closer examination.

In all, 58 of the articles or reports on block scheduling that we located during the search detailed empirically based studies. A matrix, 45 pages in length, was constructed to assist the authors in organizing the studies for analysis. For each study, the matrix included full citation material, a brief description of the methodology used, a list of the specific research questions examined, identification of the population studied, the variables used in the researchers' analysis, the method of analysis employed, the major findings, and the limitations. Following construction of the matrix, analysis of the studies began.

The studies were analyzed by the methodology used, by the populations studied, and by the research questions posed in the studies. In each of these broad categories, possible patterns of inquiry were sought. As patterns were identified, the authors checked for connections across patterns as a means to delimit for further analysis. Focusing on the research questions posed within the studies, the initial analysis resulted in the identification of eight categories in which studies were clustered. These included

- Teachers' practices and block scheduling
- Teachers' perceptions of block scheduling
- Change and block scheduling
- General effects of implementing block scheduling (e.g., student attendance, discipline, grade point averages)
- Effects of block scheduling on student learning (e.g., standardized exams such as college entrance exams, state-mandated achievement exams, advance placement exams)
- Student perceptions of block scheduling
- Block scheduling and 1st-year teachers
- Parent perceptions of block scheduling

Two categories—block scheduling and 1st-year teachers, and parent perceptions of block scheduling—consisted of one study each. Since these categories did not lend themselves to the same type of analysis as the remaining categories, the two studies were eliminated as outliers. Analysis of the remaining studies revealed robust similarities between two sets of categories, convincing the authors that further refinement of the categories was needed. After completing the analysis, five major categories or “groups” of block scheduling studies emerged, including teach-

ers' instructional practices and perceptions of block scheduling, change and block scheduling, effects of implementing block scheduling, effects of block scheduling on student learning, and students' perceptions of block scheduling. These categories are further elaborated in Table 1.

The final step in the analysis was to examine the studies within each category. This analysis sought to examine methodologies used, research questions asked, populations studied, settings in which the studies were conducted, methods of data analysis used, and limitations discussed. Findings are reported for each of the five groups. A discussion across groups is provided following the report of findings.

Findings

Our analysis of the block scheduling research is presented by group: teachers' instructional practices and perceptions of block scheduling; change and block scheduling; effects of implementing block scheduling; effects of block scheduling

TABLE 1
Final groupings of studies on the block schedule

Category	Number of studies	Descriptions of the studies
Teachers' instructional practices and perceptions of block scheduling	T = 14 N = 5 L = 3 M = 5 U = 1	These studies examined teachers' use of different instructional strategies and teachers' perceptions of the effects of block scheduling on their ability to present the required curriculum.
Change and block scheduling	T = 6 N = 0 L = 4 M = 2 U = 0	These studies examined motivations for implementing block scheduling and how stakeholders responded to the changes.
Effects of implementing block scheduling	T = 20 N = 4 L = 2 M = 13 U = 1	These studies examined block scheduling as a strategy for restructuring, using a wide lens that included attendance records, disciplinary records, and student GPAs. Teacher and student perceptions were also examined.
Effects of block scheduling on student learning	T = 12 N = 8 L = 1 M = 3 U = 0	These studies examined the effects of block scheduling on student learning based primarily on standardized tests such as AP exams, state-mandated achievement tests, and college admissions exams.
Students' perceptions of block scheduling	T = 6 N = 1 L = 1 M = 3 U = 1	These studies examined student perceptions of block scheduling based on students' beliefs. In some cases, graduation rates were examined.

Note. T = total number of studies, N = number of quantitative studies, L = number of qualitative studies, M = number of mixed method studies, U = unknown, GPA = grade point average, AP = advanced placement.

on student learning; and students' perceptions of block scheduling. Within each category, trends are discussed in terms of methodologies used, types of data collected and analyzed, populations and settings studied, variations of block scheduling examined, limitations listed, and patterns discernible in the findings.

*Group 1: Teachers' Instructional Practices
and Perceptions of Block Scheduling*

Methods and Designs

The authors located 14 studies that specifically examined teachers' perceptions of and instructional practices in a block schedule. Of these, 5 used quantitative methodologies. Baker and Bowman (2000) used a 30-item, 5-point Likert scale instrument to determine if there was a relationship between teachers' years of experience and their perceptions of block scheduling in general, and its effects on agriculture education programs. Jenkins, Queen, and Algozzine (2002) surveyed 2,167 teachers and used chi-squared analysis to compare instructional practices of block teachers with those of nonblock teachers. Staunton (1997) used a 50-item, 5-point Likert scale survey to learn how block scheduling affected teachers' instructional practices. Two studies, both conducted by Wilson and Stokes (1999a, 1999b), used a multiple group design and an ANOVA analysis to examine teachers' views of block scheduling.

Three Group 1 studies reported using qualitative methodologies. Benton-Kupper (1999) used a multiple case study design to explore the experiences of three high school English teachers during their 2nd year on a block schedule. Two studies reported using qualitative methods, but the authors provided no other detail about the methodologies (Hurley, 1997a; Staunton & Adams, 1997).

Mixed methodologies were reported in 6 studies. Bugaj (1999) used a survey consisting of 20 Likert scale items and 1 open-ended question to examine the effects of block scheduling on the instructional practices of teachers of gifted students. Veal and Flinders (2001) used a 5-point Likert-scaled item questionnaire combined with classroom observations, interviews, and artifact collection to study the effects of block scheduling on teaching practices at a large Midwestern high school. Two studies used a Likert scale survey, interviews, classroom observations, and collected artifacts to study the effects of block scheduling on teachers' practices in the areas of teaching strategies, assessment of student learning, and the use of homework (Matthews et al., 1998; Veal, 1999).

Moore, Kirby, and Becton (1997) used a mixed methodology consisting of a 28-item Likert scale questionnaire with unspecified qualitative methods to study the effects of block scheduling on agriculture teachers' practices and Future Farmers of America programs. Bryant and Claxton (1996) studied the effects of block scheduling on physical education instruction, using an instrument that allowed participants three possible responses for each item: increased, decreased, no change. The survey also included one open-ended item.

Research examining teachers' perceptions and instructional practices in block scheduling was conducted using a wide range of population sizes and offered some important insights into teachers' preparation for teaching in block schedules. However, interpreting what these studies mean for teachers and administrators working in such schedules is somewhat problematic because of the information the researchers failed to report. This included the type of data collected, the type of block schedule being studied, and the settings in which the studies were conducted.

Populations Studied

The block scheduling research on teachers' perceptions and instructional practices examined various population sizes, including populations ranging from $N = 3$ participants (Benton-Kupper, 1999) to $N = 2,167$ participants (Jenkins et al., 2002). Such a range of population sizes offers the reader both a wide-lens view of teachers across different school sites working in block schedules and insights into individual classrooms.

These studies also include populations within subject areas and across subject areas. For example, Benton-Kupper (1999) conducted a multiple case study of three English teachers; Baker and Bowman (2000) collected quantitative data from agriculture teachers; and Bryant and Claxton's (1996) population was limited to physical education teachers. Other studies reported on teachers across subject areas at the high school level (Hurley, 1997a; Matthews et al., 1998).

Settings

The studies in this group were conducted in diverse parts of the country. The states represented are California (Staunton, 1997; Staunton & Adams, 1997), Kentucky (Baker & Bowman, 2000), North Carolina (Bryant & Claxton, 1996; Hurley, 1997a; Jenkins et al., 2002; Moore et al., 1997), and Pennsylvania (Bugaj, 1999). Some studies were conducted within the same school district (Benton-Kupper, 1999; Staunton, 1997; Veal & Flinders, 2001), while other studies were conducted across multiple school districts (Bugaj, 1999; Moore et al., 1997).

The settings of these studies were not always well defined. Of the 14 studies, only 3 identified the type of setting in which they were conducted. Two studies were conducted in suburban settings (Staunton, 1997; Staunton & Adams, 1997), and 1 study compared rural and suburban block teachers' perceptions of teaching in extended class periods (Bugaj, 1999). The remaining 11 studies gave no specific indication of the types of sites at which they were conducted. Perhaps even more problematic was the striking homogeneity of the type of block schedule in use at the research sites.

Seven of the 14 studies in this group involved schools using a 4×4 block schedule (Benton-Kupper, 1999; Bryant & Claxton, 1996; Hurley, 1997a; Matthews et al., 1998; Veal, 1999; Wilson & Stokes, 1999a, 1999b). The other 7 studies gave no indication of what type of block schedule was in place at the research sites. None of the studies reported in this group were identified as being conducted in any type of schedule other than a 4×4 block schedule.

Findings

The findings in the studies in this group provided a mixed picture of teachers' views of block scheduling. Participants in Bryant and Claxton's (1996) study reported that block scheduling did seem to provide them with more time on many of their instructional objectives and the ability to experiment with different teaching strategies to present those objectives. Other advantages of block scheduling were decreased absenteeism rates (Bryant & Claxton, 1996), fewer class preparations (Hurley, 1997a), and a decrease in student anxiety (Veal & Flinders, 2001). Staunton and Adams (1997) asserted that the teachers in their study reported that extended class periods enabled them to experiment with new teaching strategies and increased interactions with students. These teachers also reported feeling less stress. Several other studies (Baker

& Bowman, 2000; Matthews et al., 1998; Veal, 1999) reported that teachers learned new teaching strategies. However, other studies reported contrasting conclusions.

Analyzing 4-point, Likert scale items ($p < .01$), Jenkins et al. (2002) reported that their study of 2,167 North Carolina teachers indicated little difference between the instructional strategies used by block teachers and those used by nonblock teachers. The data also suggested that there was little difference between block and nonblock teachers concerning which teaching strategies were felt to be most appropriate. Teachers in this study believed that the selection of teaching strategies depended more on the learners in the classroom and the kinds of staff development made available to them than on the type of block schedule being used.

This view was further supported in the Moore et al. study (1997), in which North Carolina agriculture teachers reported that block scheduling did not have any real impact on their instruction. In stark contrast, 92 Kentucky agriculture teachers asserted that block scheduling had a positive impact on their teaching strategies (Baker & Bowman, 2000).

Another area of disagreement in the findings is the relationship of teacher experience to teacher perceptions. Wilson and Stokes (1999a) reported that there was no significant relationship between teachers' years of experience and their opinions concerning block scheduling ($p < .01$). However, other researchers report results that seem to disagree. Staunton (1997) asserted that teachers with 4 or more years' experience had more positive perceptions of block scheduling than did their less experienced colleagues (overall mean = 3.104; mean for teachers with 4 years = 3.652). This finding stands in opposition to Baker and Bowman's (2000) conclusion, using Scheffe's post hoc test: that teachers with less experience were more likely to perceive block scheduling positively (in terms of teacher-student rapport, and quality of student work) than their more experienced counterparts. No significant differences were reported in terms of the effect of block scheduling on teachers' ability to meet student needs.

Group 2: Change and Block Scheduling

Methods and Designs

The 6 studies in Group 2 examined block scheduling as change. Four of the Group 2 studies used qualitative methods, and 2 used mixed methods. Zepeda (1999) used a case study approach to examine the supervisory practices of nine principals of urban high schools that had recently implemented a block schedule. Corley (1997) and Adams and Salvaterra (1998) examined teachers' reactions to change using semistructured interviews. Corley's research was conducted in a rural setting. Adams and Salvaterra collected data at two public rural high schools, a parochial urban high school, and a public suburban high school. Bruckner (1997) attended teacher sharing sessions in northeastern Nebraska to document experiences during the change to a block schedule.

Two studies used mixed method approaches to examine the change to a block schedule (Davis-Wiley, George, & Cozart, 1995; Davis-Wiley & Cozart, 1996). Davis-Wiley et al. (1995) surveyed and interviewed teachers and administrators, while Davis-Wiley and Cozart (1996) reported on surveys and interviews of students. Data for these studies came from one urban and one suburban high school.

The studies in this group examined three major questions: why schools changed to a block schedule (Corley, 1997), what was done to prepare for the change (Davis-

Wiley, George, & Cozart, 1995), and what instructional leadership strategies relative to instructional supervision changed after the implementation of the schedule (Zepeda, 1999).

Populations Studied

The populations used in the Group 2 studies varied in size. The smallest populations were $N = 7$ teachers (Corley, 1997) and $N = 9$ principals (Zepeda, 1999). Davis-Wiley et al. (1995) collected data from 238 teachers and 10 administrators and in a follow-up study; Davis-Wiley and Cozart (1996) surveyed 150 parents and 300 students. Although the data collection protocol did include some teachers, Zepeda's (1999) study focused only on the supervisory practices of nine high school principals. Davis-Wiley and Cozart examined the change to a block schedule from the perspectives of the parents and the students.

Settings

The studies of block scheduling and change were, for the most part, conducted in limited settings. Two studies (Bruckner, 1997; Corley, 1997) were conducted in a single school. Davis-Wiley and Cozart (1996) collected data in 2 schools, and 2 studies examined block scheduling and change across 4 schools (Adams & Salvaterra, 1998; Zepeda, 1999). In 1 study, the researchers did not reveal how many schools were involved (Davis-Wiley et al., 1995).

As with Group 1 studies, either the Group 2 studies examined schools using a 4×4 block, or the researchers failed to identify which type of block had been implemented. The study by Davis-Wiley et al. (1995) and its follow-up study by Davis-Wiley and Cozart (1996) examined block scheduling and change in a setting in which a 4×4 block had been implemented. None of the remaining 4 studies identified the type of block schedule used at the research sites.

Findings

While the 6 studies in this group examined different areas of block scheduling and change, Corley's (1997) was the only study to examine events prior to the implementation of the block schedule. The results indicated that teachers were resistant to the idea of implementing a block schedule; Corley attributed their resistance to poor communication between administration and the teachers, a lack of trust that led to suspicion concerning the real reason for the move to a block schedule, and complacency among the teachers.

Bruckner (1997) reported on "sharing sessions" (p. 43), consisting either of teachers only or of teachers and administrators combined, to chronicle changes in a Fremont, Nebraska, high school during the implementation year of a block schedule. Results indicate that teachers and administrators transitioned from first quarter discussions of how to solve immediate problems that teachers encountered to discussions in the fourth quarter on how to help at-risk students and create rubrics to help teachers self-assess instructional practices while teaching in a block schedule.

Davis-Wiley et al. (1995) studied teacher reactions to implementation of a block schedule. Their findings suggested teachers believed that adequate staff development was necessary for them to be prepared to teach in a block. The teachers reported that their preparation time increased dramatically. English, science, and foreign language teachers indicated experiencing increased stress due to larger class sizes.

Teachers' common concerns included covering the required curriculum, maintaining discipline, and keeping students on task. Overall, the teachers reported that teaching in a block schedule was less stressful than in a traditional schedule, and their planning periods were more productive. Although modified Likert scale data were collected and "analyzed by hand calculating a mean for each response" (p. 7), no means were reported. The only numbers provided by the researchers were these: "[O]nly three teachers expressed a desire to return to the six period day. Sixteen teachers were completely neutral on the issue" (p. 8).

Adams and Salvaterra (1998) reported that although teachers initially attempted new teaching strategies, some experienced a "regression effect" (p. 102), in which they reverted to reliance on lecture as a primary instructional strategy. The researchers reported some teachers' courses were a good fit for block and therefore their "personal cost of change was not dramatic" (p. 101). Innovative teachers were more positive about block scheduling "than those who tried to force traditional methods and activities into the new schedule" (p. 101).

In the only study of the effects of block scheduling on principals' supervisory practices, Zepeda (1999) concluded that conferencing and observation practices were altered, and that administrators relinquished some control over staff development to meet the new learning needs of teachers after moving to a block schedule. Participants reported the need for longer pre-observation conferences, extended classroom observations, and post-observation conferences. Results also indicated that during the 1st year, teachers were hesitant to talk to administrators about their learning needs.

Group 3: Effects of Implementing Block Scheduling

Methods and Designs

The 20 studies in Group 3 examined how the implementation of a block schedule affected schools in multiple areas, including attendance, student discipline, and teacher's instructional practices. Three studies from Group 3 used only quantitative methods to study block scheduling (Fletcher, 1997; Khazzaka, 1998; Stader, 2001), and 2 studies used qualitative methods (Evans, Tokarczyk, Rice, & McCray, 2002; Weller & McLeskey, 2000).

Fletcher (1997) used chi-squared analysis to determine whether there was a significant difference between the perceptions of student and teachers, between male and female teachers, and between male and female students about the block schedule ($p < .05$). Using t tests, Khazzaka (1998) compared student data (grade point averages, attendance records, disciplinary referral records) and teacher survey data collected before and after implementation of a block schedule at the same six high schools. Stader (2001) compared block scheduling with traditional scheduling using t tests.

Evans et al. (2002) used interviews and focus groups of teachers, students, and parents to examine overall perceptions of block scheduling. Weller and McLeskey (2000) used a phenomenological approach to examine the impact of block scheduling on the work of teachers in an inclusion program. One study gave no information about what research methods were used in comparing a school that implemented a 4×4 block with a school using a trimester schedule (Matthews, 1997).

Most of the research concerning implementing a block schedule was conducted with a mixed method approach. For example, Knight, De Leon, and Smith (1999) used an ANCOVA to analyze quantitative data such as grade point averages, AP exam

scores, and focus group interviews to compare student achievement, instruction, and school climate in schools with block and traditional schedules. At one high school in Indiana, Snyder (1997) used student grade point averages, AP and ACT exam scores, disciplinary records, and media center circulation records, along with data from an opened-ended qualitative questionnaire administered to students and teachers to examine the effects of block scheduling. Queen, Algozzine, and Eaddy (1998) evaluated the overall effects of implementing a 4×4 block at three high schools, using questionnaires, interviews, and observations.

Populations Studied

The populations included in Group 3 were large and included a wide range of participants (e.g., teachers, guidance counselors, students). In the study with the largest number of participants, Duel (1999) used records representing 49,830 students, in addition to surveying 72 teachers and 30 guidance counselors, to examine what effects block scheduling had on student attendance, discipline, and academic achievement. Fletcher (1997) examined the effects of block scheduling on grades, attendance, and student and teacher perceptions using a population of 280 teachers and 2,059 students. Pisapia and Westfall (1997a) surveyed 727 teachers and interviewed 12 administrators to learn how classroom behavior and student test performance were effected by block scheduling.

The only small population, 7 regular education teachers and 7 inclusion teachers, was the focus of an inquiry about the effects of block scheduling on teachers' work in an inclusion program (Weller & McLeskey, 2000). However, 8 studies gave no indication of the number of participants involved (Evans et al., 2002; Hamdy & Urich, 1998; Matthews, 1997; Queen et al., 1996, 1997, 1998; Skrobarcek et al., 1997; Snyder, 1997). Of these, 2 studies provided no information about the populations studied (Matthews, 1997; Skrobarcek et al., 1997).

The populations for the Group 3 studies were more diverse in the categories of stakeholders represented. In addition to students and regular education teachers, other participants included inclusion teachers (Weller & McLeskey, 2000), counselors (Duel, 1999), and, in one study, school board members and the superintendent (Lare et al., 2002). Perhaps because of the wider scope of the research questions, Group 3 studies tended to involve more categories of persons within the studies as well. For example, Queen et al. (1997) and Pisapia and Westfall (1997b) included parents, teachers, students, and building administrators in their studies. One study involved students, parents, teachers, building administrators, board members, and the superintendent in its examination of the effects of block scheduling on a single district (Lare et al., 2002).

Settings

The studies in Group 3 represented a wider range in types of settings (e.g., urban, suburban, rural) than did the studies in either Group 1 or Group 2. However, the sites chosen for these studies were limited by type (e.g., urban, suburban, rural) and number of sites participating. This discussion of sites will address types of sites, the number of sites represented by individual studies, and geographic diversity within and across studies in Group 3.

Group 3 studies provided results from all three major types of settings: rural, suburban, and urban. However, only four studies examined data across all three types of

sites (Evans et al., 2002; Limback, 1998; Pisapia & Westfall, 1997a, 1997b). Eight studies gave no indication as to whether the research sites were urban, suburban, rural, or some combination (Fletcher, 1997; Matthews, 1997; Payne & Jordan, 1996; Queen et al., 1996, 1997, 1998; Stader, 2001; Weller & McLeskey, 2000).

Of the 20 studies in Group 3, 12 included data from 3 or fewer sites. Six studies were conducted at a single high school (Knight et al., 1999; Lare et al., 2002; Matthews et al., 1998; Skrobarcek et al., 1997; Snyder, 1997; Weller & McLeskey, 2000). Two other studies were conducted at only 2 schools (Hamdy & Urich, 1998; Payne & Jordan, 1996), while 4 other studies included data from 3 schools (Evans et al., 2002; Queen et al., 1996, 1997, 1998).

The geography represented within Group 3 studies showed some diversity. However, almost all of the studies in this group were conducted in the east or in the southeast. The settings included Florida (Duel, 1999; Hamdy & Urich, 1998), Georgia (Payne & Jordan, 1996), Indiana (Snyder, 1997), Missouri (Limback, 1998; Stader, 2001), New Jersey (Evans et al., 2002), North Carolina (Queen et al., 1997), Tennessee (Fletcher, 1997), and Virginia (Pisapia & Westfall, 1997a, 1997b). Other studies offered only general geographic descriptions of the setting such as the Midwest (Weller & McLeskey, 2000), the Southwest (Knight et al., 1999) or the West (Lare et al., 2002).

Findings

The studies in Group 3 examined the effects of block scheduling across four primary areas: student performance on standardized tests, student grade point averages, discipline, and student attendance. With the increased emphasis on student performance and accountability and federal legislation as in the No Child Left Behind Act (2002), it was hoped that these studies would be informative for schools considering restructuring using a block schedule. Unfortunately, the results reported are contradictory.

Student performance on standardized tests. Eleven studies in Group 3 examined the effects of block scheduling on standardized test scores, including state-mandated tests, AP tests, and college entrance examinations. Using student test score means, Snyder (1997) reported a significant increase in scores on ACT exams and state-mandated tests, a moderate increase in SAT (Scholastic Aptitude Test) exam scores, and slightly decreased AP test scores. Contradicting Snyder's (1997) findings, Evans et al. (2002) reported that after block scheduling was implemented, AP test scores and standardized test scores increased. Payne and Jordan (1996) concluded that block students performed better on the Georgia State High School Graduation Test than did traditionally scheduled students.

Other studies, however, told a different story. Duel (1999), using a nonequivalent, pretest–posttest design, concluded that block scheduling had no significant effect on standardized test or AP exam scores. Based on a chi-squared analysis and descriptive statistics, Lare et al. (2002) reported that block scheduling had no significant effect on AP or ACT exam scores. In contrast to the impact on standardized test scores, Snyder (1997) concluded that AP scores dropped slightly after the implementation of a block schedule. Knight et al. (1999) also reported lower AP exams scores.

Four other studies (Pisapia & Westfall, 1997b; Queen et al., 1996, 1997, 1998) reported on the effects of block scheduling on test scores. Queen et al. (1996, 1997, 1998) reported that following implementation of the block, state-mandated test scores

initially increased and then later decreased. Pisapia and Westfall (1997b) reported that more schools experienced increased SAT verbal scores than increased SAT math scores. AP exam scores declined. The results of studies examining grade point averages were as inconsistent as those investigating test scores.

Student grades and grade point averages. Of the 20 studies in Group 3, 8 reported on the effects of block scheduling on students' grades or grade point averages. Although the results were mixed, most of the researchers reported favorable outcomes for block scheduling. Five studies reported that grade point averages increased following the implementation of a block schedule (Duel, 1999; Fletcher, 1997; Khazzaka, 1998; Knight et al., 1999; Snyder, 1997). Duel's conclusions were based on an examination of the percentage of students receiving grades of A, B, C, D, and F. The difference between means ($p < .05$) was significant for all letter grades except D.

Students in a block earned more A's, B's, and C's and fewer D's and F's. Using t tests, Khazzaka (1998) determined that these differences were statistically significant at the .01 level when the student was used as the unit of analysis. Based on ANOVA and ANCOVA analyses, Knight et al. (1999) reported that student grade point average increases on block scheduling were statistically significant.

Reporting percentages, Lare et al. (2002) concluded that although the number of students on the "A" honor roll increased, the number of students on the "B" honor roll was unchanged, and the percentage of students receiving D's and F's showed little change. Skrobarcek et al. (1997) concluded that after block scheduling, failure rates increased. Pisapia and Westfall (1997b) reported that students who were enrolled in a 4×4 block schedule had higher grade point averages than did those enrolled in an alternating (A/B) block schedule.

Student discipline. The results were more consistent in the area of student discipline than in other areas. Evans et al. (2002), Khazzaka (1998), and Stader, (2001) reported that the number of disciplinary referrals decreased following the implementation of a block schedule. Duel (1999) concluded that student misconduct was reduced because of block scheduling. Less encouraging results came from Hamdy and Urich (1998), who reported teachers experiencing more difficulty in managing student behavior in classrooms.

The three studies conducted by Queen et al. (1996, 1997, 1998), using interview data from teachers, students, parents, and administrators, reported that fewer than half of the students participating believed that discipline had improved on the block schedule. However, students and teachers had differing views on the effects of the 4×4 block on discipline. In all three studies (Queen et al., 1996, 1997, 1998) teachers reported using only 15% of their time on classroom management. However, students at the same research sites were less positive, with 52% of the students reporting discipline as being improved and 48% believing discipline remained constant or declined.

Student attendance. Eleven of the 20 studies in Group 3 reported on the effects of block scheduling on student attendance. Here, too, the results were inconsistent; some studies claimed attendance gains on the block while others reported less encouraging results. Snyder (1997) reported a significant ($p \leq .05$) improvement in attendance after the implementation of a block schedule. Duel (1999), Khazzaka (1998), and Queen et al. (1996, 1997, 1998) detailed similar results.

Two studies—Lare et al. (2002) and Pisapia and Westfall (1997b)—reported that block scheduling had no effect on student attendance. Skrobarcek et al. (1997), Matthews (1997), and Weller and McLeskey (2000) reported that teachers believed student absences were more problematic following implementation of a block schedule.

Group 4: Effects of Block Scheduling on Student Learning

Methods and Designs

The studies in Group 4 specifically examined the effects of block scheduling on student learning, most of which were conducted with quantitative methods. In sum, 9 of the 14 studies in this group were quantitative studies. Using a control/experimental design, Spencer and Lowe (1994) examined the differences between block and nonblock Alabama high school students' end-of-course grades and standardized test results. In a Midwestern setting, Veal and Schreiber (1999) performed ANCOVA tests to examine the effects of a trimester system on student learning in language arts and mathematics. Cobb et al. (1999) used an ANOVA with repeated measures to study the effects of block scheduling on mathematics achievement and grade point averages at both the middle and high school levels.

Lawrence and McPherson (2000) used *t* tests and descriptive statistics to compare test scores for block and nonblock North Carolina high school students across the four core content areas (English, mathematics, science, and social studies). Using mean-scaled scores, Arnold (2002) compared block and nonblock students standardized test scores. Gruber and Onwuegbuzie (2001) compared block and nonblock student scores in the four core content areas of the Georgia High School Graduation Test using *t* tests. Conducted at high schools across Virginia, Wallinger's (2000) study used one-way ANOVA tests to study end-of-course French I test scores in the areas of speaking, reading, writing, and listening. Hess, Wronkovich, and Robinson (1999) used a pretest–posttest design with a repeated measures analysis to compare block and nonblock student achievement in biology and English.

Only one study used a qualitative methodology. Using a case study approach, Howard (1997) studied the effects of block scheduling on instruction in an AP mathematics classroom. The three remaining studies used mixed methodologies. Nichols (2000) used percentages and interview data to examine the effects of block scheduling on student grade point averages and failing rates. In a suburban setting, Shockey (1997) used a pretest–posttest format and interview data to study the effects of block scheduling on student retention rates. Wronkovich, Hess, and Robinson (1997) used standardized test scores and open-ended survey questions to investigate the effects of block scheduling on mathematics achievement.

Populations

The populations included in 10 of 12 of the studies that specifically examined the effects of block scheduling on student learning were, for the most part, composed only of students; the populations were large. In contrast, Nichols (2000) interviewed administrators from six high schools, and the population in Wronkovich et al. consisted of 10 teachers and 164 students.

Of the student-only studies, Lawrence and McPherson (2000) had the largest population (2,706 traditionally scheduled students and 2,053 block-scheduled students); the smallest population had 67 students (Spencer & Lowe, 1994). Arnold's study

(2002) failed to identify the number of participants included, and Hess et al. (1999) indicated that their study's population was the "sophomore class of one high school."

Settings

The settings for the Group 4 studies were poorly defined by type. Of 12 studies in Group 4, only 5 identified the type of setting. Three of these studies were conducted in suburban settings (Hess et al., 1999; Shockey, 1997; Wronkovich et al., 1997). Nichols (2000) collected data in both suburban and urban settings, and Arnold (2002) collected data in rural, urban, and suburban settings.

As was the case with Group 3 studies, most of the studies in Group 4 were conducted in the Eastern United States. Among the states included were Alabama (Spencer & Lowe, 1994), Georgia (Gruber & Onwuegbuzie, 2001), North Carolina (Lawrence & McPherson, 2000), Ohio (Hess et al., 1999; Wronkovich et al., 1997), Texas (Howard, 1997), and Virginia (Arnold, 2002; Wallinger, 2000). Two studies provided general geographic descriptions of the setting, one in the Midwest (Veal & Schreiber, 1999) and one in the Great Lakes region (Nichols, 2000). Two studies offered no indication of the geographical location of their research sites (Cobb et al., 1999; Shockey, 1997).

Findings

The studies in Group 4 provide a concentrated look at student learning in terms of the impact of block scheduling on standardized test scores and subject matter (e.g., mathematics, English). As with previous findings, the results were somewhat inconsistent. According to Arnold (2002), AP test scores were reported to be lower in block-scheduled schools. Gruber and Onwuegbuzie (2001) provided additional support for Payne and Jordan's (1996; see Group 3 discussion) assertion that block-scheduled students scored higher on the Georgia High School Graduation Test than traditionally scheduled students.

Nine of the 12 studies in this group addressed the effects of block scheduling in specific content areas; most concentrated on one or more of the four core areas (English, mathematics, social studies, and science). Three studies (Arnold, 2002; Cobb et al., 1999; Wronkovich et al., 1997) reported lower math achievement for block students than for traditionally scheduled students. In contrast, Hess et al. (1999), using an ANCOVA, concluded that block-scheduled students significantly outperformed traditionally scheduled students ($p < .05$) across content areas including English, biology, world history, and geometry. Spencer and Lowe (1994) concluded that block-scheduled students outperformed traditionally scheduled students in English.

Two studies (Gruber & Onwuegbuzie, 2001; Lawrence & McPherson, 2000) examined student achievement across all four core areas (English, mathematics, science, and social studies). Both studies concluded that traditionally scheduled students performed better in all four core areas than block-scheduled students. Cobb et al. (1999) and Nichols (2000) also examined grade point averages. Cobb et al. reported that block-scheduled students had higher grade point averages, but Nichols found no difference between block and traditionally scheduled students. Cobb et al. (1999) also concluded that males experienced greater increases in grade point average on the block than their female counterparts.

Group 5: Students' Perceptions of Block Scheduling

Methods and Designs

Six studies examined student perceptions of block scheduling: 1 quantitative, 1 qualitative, and 1 using mixed methodologies. Wilson and Stokes (2000) used chi-squared analysis, *t* tests, and Pearson product moment correlations to investigate the relationship between students' perceptions of block scheduling and the number of years they had been in block schedules, as well as whether there was a relationship between the type of diploma sought (e.g., general, college-bound) and students' perceptions of block scheduling. Hurley (1997b) collected qualitative data to explore student perceptions of block scheduling.

Salvaterra, Lare, Gnall, and Adams (1999) combined a 12-item, 6-point Likert scale survey and participant interviews to explore whether students who attended block high schools believed they were adequately prepared for college-level coursework in the areas of foreign language, mathematics, and science. Using a survey of 5-point Likert scale questions and focus-group interviews, Pisapia and Westfall (1997c) compared student perceptions of traditional scheduling, 4 × 4 block scheduling, and alternative (A/B) block scheduling.

Marchant and Paulson (2001) used factor analysis and Likert scale data to determine if there was a relationship between achievement level and students' perceptions of block scheduling. Oxford and Litcher (1995) reported using surveys to examine student perceptions of block scheduling, but the researchers gave no information about what type of survey was used, what type of data was collected, or how the data were analyzed.

Populations

The populations of all 6 studies in Group 5 consisted of students only. The population sizes were, as a rule, large; however, the number of schools from which the populations were drawn was quite small. The smallest population used was 37 students (Hurley, 1997b). Two studies reported on populations of more than 2,000 students (Marchant & Paulson, 2001; Pisapia & Westfall, 1997c). Oxford and Litcher (1995) included data from 66 students and Salvaterra et al. (1999) included data from 90 students. One study, Wilson and Stokes (2000), gave no indication of the number of students in its population.

The largest number of schools represented in any Group 5 study was 13 (Pisapia & Westfall, 1997c). Hurley (1997b) reported on data collected at 5 schools, Wilson and Stokes (2000) collected data at 4 schools, and Salvaterra et al. (1999) involved students from 2 schools. Two studies confined data collection to a single school (Marchant & Paulson, 2001; Oxford & Litcher, 1995).

Settings

The studies in this grouping were conducted in the eastern United States. The locations represented included Alabama (Wilson & Stokes, 2000), North Carolina (Hurley, 1997b; Oxford & Litcher, 1995), Pennsylvania (Salvaterra et al., 1999), and Virginia (Pisapia & Westfall, 1997c). In one study, Marchant and Paulson (2001) described the setting of their study as Midwestern. Only 3 of the Group 5 studies identified the type of setting used. Pisapia and Westfall (1997c) collected data at urban, suburban, and rural schools, and Salvaterra et al. (1999) conducted their

research at a rural school and a suburban school. Marchant and Paulson (2001) examined block scheduling at a suburban school. The remaining studies (Hurley, 1997b; Oxford & Litcher, 1995; Wilson & Stokes, 2000) gave no indication of the type of settings from which data were collected.

Findings

Although there was some inconsistency in the findings of the Group 5 studies, most suggested that students' perceptions of block scheduling were positive. Salvaterra et al. (1999) and Hurley (1997b) both reported that students' perceptions of block scheduling were overwhelmingly positive. Hurley cited better grades, more time for in-depth learning, and increased individual attention from teachers as the reasons for their support of block scheduling. Salvaterra et al. (1999) reported that students believed that the block schedule was a positive experience and that they were well prepared for college. Pisapia and Westfall's (1997c) results also reported positive student reactions, suggesting that the perceptions of student in a 4×4 block schedule were more positive than those of students in an alternating block schedule.

Two studies (Marchant & Paulson, 2001; Wilson & Stokes, 2000) conducted a more tightly focused inquiry. Marchant and Paulson reported that average- and high-achieving students who believed that school was important were more satisfied with block scheduling than were their low-achieving counterparts ($F = 33.50, p < .001$). Wilson and Stokes (2000) investigated the relationship between student perceptions of block scheduling and the number of years that the students had attended school in a block schedule, and found no significant relationship. Oxford and Litcher (1995) collected data on student perception of block scheduling during the 1st year of implementation. The researchers stated that their results were inconclusive.

Discussion

Implementation of a major change such as block scheduling requires detailed planning by a variety of stakeholders. Many decisions lay the groundwork for more active forms of planning. Questions that need to be answered include: Do we implement a block schedule? What type of block schedule best fits the context of our school? and, What challenges will we need to overcome to be successful? One major source of information about scheduling alternatives for schools and for researchers is the existing research on block scheduling. Below, we summarize what our analysis has revealed.

Group Summaries

After analyzing 58 studies of block scheduling, we identified 5 major groupings of studies: *teachers' instructional practices and perceptions of block scheduling, change and block scheduling, effects of implementing block scheduling, effects of block scheduling on student learning, and students' perceptions of block scheduling.* The purpose of this discussion is to identify what is known about block scheduling and to offer suggestions for further research.

Group 1: Teachers' Instructional Practices and Perceptions of Block Scheduling

The populations represented by the Group 1 studies ranged from $N = 2,167$ to $N = 3$; these studies reported data from teachers both within subject areas

(e.g., English, mathematics) and across multiple subjects. Although the studies were conducted in several states, only 3 (two suburban and one comparing a rural school to a suburban school) identified the type of site at which the research was conducted. Only half of the studies identified the type of block schedule in use at the research sites. The other 7 studies were conducted at schools using the 4×4 block schedule. This analysis suggests that the research on block scheduling and teachers' practices is of limited value, at best. Teachers who work in urban settings and those who work in a block schedule other than the 4×4 will find little in this body of research to inform their practices.

The findings of the Group 1 studies were mixed. Teachers reported decreased student absenteeism, fewer student discipline problems, less class preparation, and decreased student anxiety. While teachers were generally positive about block scheduling, the relationship between teachers' experience and their perceptions of block is still unclear and mixed. While one study reports no relationship, another asserts that the more-experienced teachers were more positive about block scheduling. A third study concluded that less-experienced teachers were more positive about block than were teachers who were more experienced.

The data on whether teachers changed their instructional practices were just as perplexing. Some studies reported teachers using more interactive teaching strategies, but others suggested that teachers did not change their teaching strategies or assessment practices after the implementation of a block schedule.

Group 2: Change and Block Scheduling

The second group of studies was those examining change and block scheduling. Four of the 6 change studies used qualitative methods; the other 2 employed mixed methodologies. Because of the prevalence of qualitative studies in this group, the populations involved were small. The 2 mixed method studies used large groups for the quantitative data collection.

The settings for these studies were also small. Three of the 6 studies reported data from either 1 or 2 schools. Two others included data from 4 schools, while the 6th study gave no indication of the number of schools participating. Only 2 studies identified what type of block schedule was in use at the research sites: a 4×4 block. The settings in which these studies were conducted represented urban and rural schools. One study included both a rural school and a suburban school.

The results of the Group 2 studies suggest that establishing communication and trust among teachers and administrators before implementation is critical to teachers' ownership of and support for change. Not surprisingly, staff development prior to and after the implementation of a block schedule was a key ingredient for helping teachers to make the best use of instructional time on the new schedule. However, teachers in 1 study reported experiencing a regression effect in which they began reverting to methods used prior to the implementation of the block schedule. If teachers are to transfer learning into practice, staff development must be ongoing (Hirsh & Ponder, 1991) and embedded in their daily work (Wood & Killian, 1998).

Research suggests that principals play a key role in the implementation of change in schools (Hall, 1988). However, only 1 study in the block scheduling research examined principals' practices and their work with teachers. The results of this study indicated that supervisory conferences and observations became longer with the block schedule.

Group 3: Effects of Implementing Block Scheduling

The 20 studies in Group 3 focused on the effects of block scheduling on a variety of indicators, including attendance, discipline, and teachers' instructional practices. Most of these studies (15 of 20) used a mixed methodology. The populations involved were large, and data were reported from students, teachers, administrators, parents, and counselors. One study also included school board members and the superintendent. Almost half of these studies (8 of 20) provided no information about the number of participants.

The settings for the Group 3 studies included urban, suburban, and rural sites. However, only 4 of the 20 studies examined data across all three types of sites, nearly half (8 of 20) gave no indication of the type of site studied, and 13 of 20 studies were conducted at 3 or fewer schools. Eight states were identified as locations for studies in this group—all of them in the eastern United States. One study was described as being conducted in a small western town. The lack of research site information limits teachers' and administrators' ability to decide whether reported results could be applicable to their schools, limiting the value of these studies for those considering the adoption of a block schedule.

The findings of these studies were discussed across four areas: standardized test scores, grade point averages, discipline, and student attendance. Results indicate that although students in blocks tended to have higher grade point averages, the effect of block scheduling on test scores was inconsistent. Most studies assert that student discipline improved on a block schedule. While attendance rates were generally improved, several studies reported that block scheduling had no effects on attendance; and in others, teachers reported that maintaining discipline in the classroom was more stressful in the extended class periods provided in block scheduling.

Group 4: Effects of Block Scheduling on Student Learning

The studies in Group 4 focused entirely on the question of whether block scheduling had any discernable effect on student learning. Predictably, most of these studies used quantitative methods and populations composed entirely of students. Only 5 studies in Group 4 identified the setting in which the research was conducted. As with the Group 3 studies, nearly all of the Group 4 studies were conducted in the eastern United States.

Four of these studies examined test scores and reported inconsistent results. In some studies, block-scheduled students scored higher on standardized tests than their traditionally scheduled counterparts; in other studies, block-scheduled students did not perform as well. While 1 study asserted that block-scheduled students significantly outperformed traditionally scheduled students across four content areas (English, biology, world history, and geometry), 2 other studies reported opposite results. Mixed results were also reported about grade point averages.

Group 5: Students' Perceptions of Block Scheduling

Six studies comprised the final grouping. Four of these used a mixed methodology. All participants of Group 5 studies were students. The number of schools involved in these studies ranged from 1 to 13. All of these studies were conducted in areas in the eastern United States. One study included data from urban, suburban, and rural sites, 1 used suburban and rural sites only, and a 3rd used only a suburban site. Three studies gave no indication of the type of setting used.

Results indicate that students were generally positive toward block scheduling. High-achieving students who believed school to be important were more positive about block scheduling than were lower-achieving students. One study reported that block-scheduled students believed they were well prepared for college, and another study asserted that there was no relationship between the number of years a student spent in a block schedule and that student's perception of block scheduling.

Analysis Across Groups

Three major themes across the five groups of studies emerged from this analysis. First, many of the research studies failed to report information that is customarily found in formal writing such as journal articles and convention papers. Second, the majority of the studies, with few exceptions, reported positive perceptions of block scheduling among teachers, students, and administrators. Third, the research presents mixed messages concerning the effect of block scheduling on teachers' instructional practices and on student achievement.

Missing Information

Consumers of research need to be able to develop a clear picture of a study to make informed decisions about the validity of the findings. Information that is needed to create such a picture includes descriptions of the participants, the research setting, the data collection procedures, and the data analysis techniques used. Of the 58 studies that we reviewed for this article, 18 failed to provide any description of how data were analyzed, and 31 provided no specific description of the type of setting (e.g., urban, suburban, rural) in which the research was conducted.

Despite the existence of various block scheduling formats, 31 of 58 studies (53%) failed to identify the type or types of block scheduling in use at their research sites. Forty-seven of the studies included no description of possible limitations of their studies. Three studies provided no information about the methodologies used, the data collected, or how the data were analyzed.

Consistent Reports of Positive Perceptions of Block Scheduling

Across the five groups, the studies portrayed teacher, student, and administrator perceptions of block scheduling as positive. Teachers reported increased student attendance rates, better student discipline, increased interaction with students, and the opportunity to try new teaching strategies. Students reported that they had more interactions with teachers and earned better grades. Administrators asserted that teachers had the opportunity to experiment with new teaching strategies and that student discipline improved.

Inconsistent Findings in the Block Scheduling Research

In two major areas, the results of the block scheduling research were inconsistent. Several studies specifically examined the question whether the implementation of a block schedule had any effect on teachers' instructional practices. Some studies reported that teachers were using more interactive teaching strategies, while others concluded that the block schedule had no effect on teachers' instructional practices. The other inconsistency was in findings on the effects of block scheduling on student achievement test scores.

Across the 58 studies, researchers examined the effects of block scheduling on state standardized tests, college admission tests, and advanced placement tests. Although far from robust, the studies examining the effects of block scheduling on state standardized test scores were the most consistent and the most positive. However, 1 study reported, based on 3 years' data, that scores on state-mandated tests initially increased slightly, then returned to former levels.

The research results on the effects of block scheduling on college admissions tests were less consistent than those examining state standardized tests. Studies of the effects of block scheduling on college entrance tests were divided equally between those reporting that test scores increased and those reporting that test scores decreased. Scores on AP exams declined after implementation of a block schedule.

Generalizations About Block Scheduling and Implications for Further Research

An analysis of the block scheduling research reveals a rather shallow literature. Because of the paucity of research on block scheduling and the unique characteristics of individual schools, generalizations about the effects of block scheduling are problematic at best. If the purpose of research is to inform (Gall et al., 2003), then exactly what does the block scheduling research tell practitioners and those who seek to reform and restructure the use of time in schools? While reorganizing time into extended class periods for instruction has been linked in the literature to improved school climate, increased student learning, and more in-depth instruction, these links are tenuously addressed, at best, in the research that we reviewed.

We were reminded of Schlechty's (1997) message that it is futile to understand change when "[t]oo few teachers and leaders recognize that achieving substantial change in schools and classrooms requires accommodating changes in the structures and systems in which these schools and classrooms are embedded" (p. 16). From the lack of description within and across the studies of the groupings, it was clear that research focused primarily on smaller units within the schools, without much attention to examining change in light of the contexts in which the studies were conducted.

Based on the existing research, what is really known about block scheduling? On the basis of this analysis, two generalizations seemed to be supported in the literature. First, many teachers and students apparently liked block scheduling. What is unclear is *why* students and teachers liked it. One clear answer was supported by the research: Teachers and students both reported opportunities for increased teacher-student interaction as an advantage of block scheduling. Moreover, students believed that they received better grades. Other potential answers to this question cannot be confidently asserted from the existing research. We cannot state with confidence that teachers' instructional strategies changed or, if there were changes, what long-term effect the changes had on student learning; therefore, a claim of *improved* instruction is difficult to support. Improvement in test scores is not consistently supported in the literature, either.

The second generalization about block scheduling that received consistent support in the literature is that student grades and grade point averages increased. The reasons are not clear, however. One possible explanation is that because less content was covered (and there is some support for this claim), there was less to remember for tests. Another possible explanation centers on teachers' assessment and grading

practices; however, we do not know whether those practices changed when block scheduling was implemented. The lack of further support for increased student learning in the research on block scheduling and test results is disturbing. Grades typically represent immediate student achievement, whereas standardized tests measure long-term achievement. One could hypothesize that additional longitudinal studies of block scheduling are needed.

Because thousands of high schools across the country have adopted some type of block scheduling, it behooves practitioners and scholars to continue an inquiry that has the potential to assist teachers, students, and administrators in making the best use of extended class periods. Recommendations for future block scheduling research might include the need for more longitudinal studies. This could help to clarify the mixed messages that we are currently receiving about student achievement by allowing students and teachers more time to acclimate to the new schedules and by generating more stable data.

Because many claims surrounding block scheduling involve change (e.g., changes in teachers' instructional practices, changes in student achievement and attendance rates), one would expect to find a healthy base of longitudinal studies examining these questions. However, analysis of the block scheduling research reveals a pattern of "one-shot" studies using data collected over a short period. It is telling that 44 of the 58 studies reported on only 1 year's worth of data. Three studies did not provide enough information about the data collection for the reader to determine how many years' data were used. One study (Oxford & Litcher, 1995) acknowledged that its data, collected during a high school's 1st year on a block schedule, yielded little in the way of meaningful results. With longitudinal studies that depict block scheduling over time, perhaps some of the existing ambiguities could be resolved.

Further, more research on the effects of block scheduling in urban settings is needed. Only 5 of the 58 studies that we analyzed focused on block scheduling in urban settings. This need seems particularly pressing in view of the increasing percentage of student attending schools in urban settings. Finally, more research on forms of block scheduling and the variations in block scheduling could be helpful. Twenty-one of the 58 studies focused on schools using a 4 × 4 block schedule. In contrast, only 1 study focused on schools using alternating block schedules, and only 1 study examined the use of a trimester system. Thirty-two studies failed to identify the type of block schedule in use at the research site.

If the purpose of research is to inform practice (Gall, Gall, & Borg, 2003), then empirical research should provide answers to two fundamental questions about block scheduling: Is there sufficient evidence in the empirical literature to justify implementing a block schedule? and, Does the implementation of a block schedule result in real reform or merely a change in the bell schedule?

Justifying the Implementation of a Block Schedule

Many claims have been made about block scheduling. In general, the popular literature promotes block scheduling as a means to improve teaching and learning, as well as to improve school climate by lowering student and teacher stress levels (Canady & Rettig, 1996; Hottenstein, 1998; Lybbert, 1998). Typically, in the popular literature, teaching and learning are measured in terms of teaching strategies used, student grade point averages, and standardized test scores. The "barometer"

of school climate customarily comprises student discipline referrals and student attendance rates.

However, are the assertions of the popular literature supported by the *empirical* literature? To answer this question, and the ultimate question of how to justify the implementation of a block schedule, an examination of some specific indicators of teaching and learning is required. These indicators include depictions of teachers' instructional practices, student grade point averages, standardized test results, student attendance rates, and discipline referral records.

Does the empirical literature support the assertion that block scheduling changes teachers' instructional practices? The studies that examined teachers' instructional practices and block scheduling were inconclusive on this point. Jenkins et al. (2002) and Moore et al. (1997) reported that block scheduling had no effect on teachers' instructional practices. However, Staunton and Adams (1997) and Veal (1999) asserted that teachers' practices did change with the implementation of block scheduling (but without details on how they changed).

From the research, we did not get a sense that teachers were really changing their practices as a result of the implementation of the block schedule. Nor did we get a sense of how student learning had changed, if at all. Although none of the studies specifically discussed in detailed fashion the implementation of block scheduling, we found some clues in the research that suggested that the implementation of block scheduling was worth examining. There is no magic formula for implementing a block schedule; however, the literature provided some key areas to check:

- Were the school's stakeholders ready to implement a block schedule?
- What administrative support was offered to assist teachers in changing their practices?
- What kinds of instructional supports increased student learning in a block schedule?

Only one study directly addressed readiness to implement a block schedule. Corley (1997) concluded that some reservation about readiness for the block existed at the research site. Teachers questioned why a change was needed and whether they would be supported during the change. Implementing a block schedule requires that the change agents (teachers) be fully prepared to take advantage of the extended instructional periods. Teachers need time to learn new teaching strategies, ways of transitioning from one strategy to the next in the same class period, and techniques for managing student behavior for longer periods of time.

Several studies reported the need for teachers to vary their instruction in the block schedule (Adams & Salvaterra, 1998; Evans et al., 2002; Fletcher, 1997; Queen et al., 1997), and a few others reported the need for staff development to support this needed learning (Hamdy & Urich, 1998; Skrobarcek et al., 1997; Snyder, 1997). But only Davis-Wiley and Cozart (1995) reported teachers' belief that they had received adequate staff development in preparation for the block schedule. Alarming, teachers in a Pennsylvania study (Adams & Salvaterra, 1998) reported that once block scheduling was implemented, the staff development opportunities dwindled. We found little support in the research for the contention that teaching changes during block scheduling.

We also investigated student learning. Although not completely consistent, most relevant research suggested that students earned better grade point averages on a block schedule (Duel, 1999; Fletcher, 1997; Khazzaka, 1998; Snyder, 1997). The research on the effects of block scheduling on standardized test scores reported mixed results. Snyder (1997) indicated that students in a block schedule achieved higher scores on ACT and SAT examinations. Increased AP examination scores by block-scheduled students also were reported by Evans et al. (2002). In contrast, Knight et al. (1999) and Snyder (1997) reported that AP examination scores dropped after implementation of a block schedule. Adding even more inconsistency to these results, Duel (1999) reported that block scheduling had no significant effect on standardized or AP examination scores.

Studies examining student discipline indicated that implementing block scheduling did help reduce the number of disciplinary referrals (Khazzaka, 1998; Stader, 2001). Queen et al. (1996, 1997, 1998) reported that teachers on block scheduling used only 15% of their class time on classroom management. Because the researchers provided no pre-block data for comparison, the significance of this finding is difficult to assess. The research examining the effects of block scheduling on attendance were less consistent. Some studies reported an improvement in student attendance (Duel, 1999; Khazzaka, 1998; Snyder, 1997), while others found no effect (Lare et al., 2002; Pisapia & Westfall, 1997b).

Does the empirical literature provide sufficient support to justify the implementation of a block schedule? There is some support for improvements in student grade point averages and discipline under block scheduling, but the research does not provide support for claims of improved test results, better student attendance, or changes in teachers' practices. Given the pervasiveness of standardized testing since the passage of the No Child Left Behind Act, the lack of robust support for block scheduling as a reform that boosts test scores might give pause to stakeholders considering adopting such a schedule.

What guidance can be offered to schools considering implementing a block schedule? Lessons from restructuring tell us that the implementers of change must be ready to do the work necessary for the change to be successful. Teachers, as the guardians of instructional time, are the stakeholders most in need of readiness when a block schedule is implemented. Thus, on the basis of the limited pieces of the puzzle available in the block scheduling research, combined with what is generally known about implementing change in schools, we offer the following "to do" list for implementing a block schedule:

- Determine why a change in the schedule is necessary and desirable.
- Involve all stakeholders.
- Identify available internal and external resources.
- Provide ongoing professional development to support teachers' efforts to change their classroom practices, namely instruction, assessment, and management.
- Conduct periodic evaluation of the new schedule. (Jenkins et al., 2002; Northeast and Islands Regional Educational Laboratory, 1998; Zepeda & Mayers, 2000)

The above list is not meant to be exhaustive. It should, however, provide the backdrop necessary for addressing whether, in the long run, block scheduling is a real reform.

Real Reform or a Change in the Bell Schedule?

Is block scheduling a real reform strategy for schools, or is it merely a different bell schedule? Given that educational reform is the implementation of change with the purpose of improving teaching and learning (Schlechty, 1997) and that “successful change starts and ends at the individual level” (Hall & Hord, 2001, p. 7), we argue that if block scheduling is to be a real reform, it should produce convincing empirical evidence of behavioral change in teachers and students who work in the context of a block schedule.

Our analysis revealed a body of research characterized by inconsistent findings reported in studies that in many cases did not provide the kind of information about settings, populations studied, and methodologies expected in scholarly writing. Moreover, much of the research was based on limited data collected at schools where block scheduling had only recently been implemented. The research failed to provide the evidence necessary to declare unequivocally that teachers’ practices and student learning had changed and, therefore, that block scheduling was a real reform. Yet the research also failed to provide convincing evidence that block scheduling was *not* a real reform. In fact, the research provided little at all that could be *definitively* said about block scheduling.

Further research might offer more definite conclusions. Stakeholders of the nation’s high schools need research studies providing detailed descriptions of the contexts in which block schedules were implemented, what types of schedules were implemented, and what steps were taken to prepare teachers and students for the new schedules. Moreover, stakeholders need research that reports a sufficient amount of data, collected over time, to enable informed conclusions to be drawn. This kind of detail would help to fill the gaps in much of the current research—gaps that significantly hinder our ability to determine whether block scheduling constitutes a true reform.

If changes in the beliefs of teachers and administrators concerning how teaching and learning occur can be documented, then perhaps the answer is yes, block scheduling can be an effective tool for school restructuring. However, if the only real changes are in the beginning and ending times of class periods, then perhaps all that has been achieved is a phantom restructuring.

Note

¹The total number of high schools was calculated by adding the numbers in Columns 5–9 in Table 99 of the Digest of Education Statistics, 2002 (National Center for Education Statistics).

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(Appendix follows)

APPENDIX

Accountability, standards, and reform movements: A Timeline

The 1980s

- 1983—*A Nation at Risk: The Imperative for Education Reform* (National Commission on Excellence in Education) is published.
- 1986—*A Time for Results*. This National Governors Association report suggests benchmarks to assess results.
- 1989—The First National Education Summit produces the National Education Goals, which sets targets to be met by the year 2000, including that all students in Grades 4, 8, and 12 should demonstrate competency in English, mathematics, science, foreign languages, civics and government, economics, arts, history, and geography (Miller, 2000).

The 1990s

- 1991—The Secretary's Commission on Achieving Necessary Skills produces the report *What Work Requires of Schools* (U.S. Department of Labor), challenging schools, parents, and businesses to help all students develop competencies in basic skills, thinking skills, and personal qualities required for success in the workplace.
- 1994—Congress passes the Educate America Act, an expanded version of the National Education Goals, and provides funding to enable schools to meet Education Goals 2000, originally adopted in 1989 during the First National Education Summit (Goals 2000, 1994).
- 1995—*The Current State of High School Reform* (Shore) is published by the Carnegie Corporation of New York, calling for higher standards, personalization, relevance, and flexibility with instructional strategies, time, and resources.
- 1996—The Second National Education Summit is sponsored by the Education Commission of the States and the National Governors Association. The participants agree to develop internationally competitive education standards, assessments to measure the achievement of those standards, and accountability systems (Miller, 2000).
- 1999—The Third National Education Summit makes a commitment to improving teacher quality and providing equal opportunity for all students to meet the standards adopted at the Second National Education Summit (Miller, 2000).

The 2000s

- 2002—The No Child Left Behind Act requires all schools to achieve “adequate yearly progress” based on the results of high-stakes testing for Grades 3–8, and stipulates that all students have a highly qualified teacher.
- 2003—*High Time for High School Reform: Early Findings From the Evaluation of the National School District and Network Grants Program*, a report prepared by the American Institutes for Research for the Bill and Melinda Gates Foundation, advocates small high schools of no more than 400 students to personalize teaching and learning in high school (American Institutes for Research).
- 2004—*Crisis or Possibility? Conversations About the American High School*, published by the National High School Alliance, identifies seven key “levers” for transforming high schools: K–16 education as an integrated unit; college preparation as the default high school curriculum; improvement of teaching preparation and professional development; universal literacy; reduction of high school dropout rates; smaller, more personalized high schools; and standards (Harvey & Housman).
- 2004—*Profiles in Leadership: Innovative Approaches to Transforming the American High School*, published by the Alliance for Excellent Education, promotes a transformation of American high schools and recommends the following approaches: holding high expectations for all students; focusing on relevant, rigorous, and

assessment-driven instruction; providing excellent teachers and principals; cultivating broad-based community engagement in schools; and developing leaders for learning and leaders for change.

- 2005—Achieve, Inc., and the National Governors Association publish *An Action Agenda for Improving America's High Schools*, resulting from the National Education Summit on High Schools. The report promotes restoring value to the high school diploma, redesigning high schools, giving students the excellent teachers and principals they need, and measuring progress.
- 2005—*One-Third of a Nation: Rising Dropout Rates and Declining Opportunities*, published by the Policy Evaluation and Research Center of the Educational Testing Service, reports the need for multiple solutions to rising high school dropout rates (Barton).
- 2005—A study conducted by Hart Research Associates for Achieve, Inc., entitled *Rising to the Challenge: Are High School Graduates Prepared for College and Work?* reports the need to raise expectations for high school students by requiring them to take more challenging coursework with more rigorous testing (Peter D. Hart Associates).
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