Block Scheduling: A Review of the Literature

AUTHOR: Lisa A. Banicky, Ph.D., Administrative Coordinator
Department of Educational Leadership and Assessment

OTHER CONTACT PERSON: Donald E. Robertson, Ph.D., Assistant Superintendent
Department of Educational Leadership and Assessment

ABSTRACT
According to recent estimates, 36 percent of Virginia’s regular public high schools operate on a 4x4 block schedule and 41 percent operate on an A/B alternating day schedule. This brief provides an overview of both of these models, highlights the potential benefits and challenges of block scheduling, and summarizes the research base. To date, studies examining the impact of block scheduling on teacher- and student-related outcomes have been relatively inconclusive. While most of the research in the area has focused on comparing outcomes under a traditional schedule to outcomes achieved under a block schedule, studies comparing different forms of block scheduling do exist but also yield inconsistent findings. Many authors indicate that the likelihood of realizing the benefits of block scheduling is heavily dependent on changes to teacher practices, the provision of adequate professional development, and securing staff buy-in prior to implementing a change to the schedule.

“The key to liberating learning lies in unlocking time.”
--National Education Commission on Time and Learning (1994)

Introduction
As early as the 1950s, educational reformers were proposing alternatives to the traditional school day schedule to maximize benefits for students and teachers (Queen & Isenhour, 1998). The early 1990s saw a movement toward block schedules where students took fewer but longer classes (Kienholz, Segall, & Yellin, 2003). Prior to this time, high school schedules tended to include anywhere from six to nine periods with classes lasting from 40 to 60 minutes each with lunch counted as one period in many of the eight- and nine-period schedules. Critics viewed the traditional schedule as making high schools impersonal, limiting the amount of time available to meet an increasing number of graduation demands, and limiting instructional options for teachers (Canady & Rettig, 1995).

Overview of 4x4 and A/B Alternating Day Schedules
Many different forms of block scheduling have been proposed and implemented in schools across the nation in the past fifty years. Two of the most common forms include the 4x4 and A/B Alternating Day schedules. Table 1 provides a

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general overview of both of these basic models of block scheduling (Northeast and Islands Regional Educational Laboratory, 1998).

### Table 1
Overview of 4x4 and A/B Alternating Day Block Schedule Models

<table>
<thead>
<tr>
<th>Model</th>
<th>Description</th>
<th>Graphical Depiction</th>
</tr>
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<tbody>
<tr>
<td>4x4</td>
<td>The school day is divided into four long blocks of time with time added for lunch and transitions between classes. Teachers are generally responsible for teaching three courses each semester. The classes meet every day for an entire semester resulting in students enrolling in a total of eight classes over the course of a school year.</td>
<td>Fall: Course 1, 2, 3, 4, 5, 6, 7, 8</td>
</tr>
<tr>
<td>A/B Alternating Day</td>
<td>The school day is organized into three (6-class schedule) or four (8-class schedule) long blocks of time with time added for lunch and transition between classes. Students attend half of their classes on one day and the other half of their classes on the next day. Classes typically meet every other day for the entire year. Students may take additional classes if they choose to forego lunch.</td>
<td>A Day: Course 1, 2, 3, 4, 5, 6, 7, 8</td>
</tr>
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A number of variations, particularly of the 4x4 model, exist to accommodate certain sequential courses and courses with a testing component associated with them (i.e., music courses, language courses, and AP or IB courses). There are also variations of the alternating day plan with models including anywhere from six to eight classes over the alternating days.¹

### Prevalence of Block Scheduling Models

The prevalence of the various block schedule models nationwide is difficult to estimate, as no single source for this information exists. Statewide, approximately 36 percent of Virginia’s regular public high schools operate on the 4x4 schedule, 41 percent operate on an A/B alternating day schedule, and 15 percent operate on a traditional schedule. Information concerning the schedule used at the remaining regular public high schools (8%) was not publicly available. In the Hampton Roads area, two of the seven school divisions use the 4x4 schedule at the high school level, and the remainders, including Virginia Beach high schools, use a version of the A/B alternating block schedule.²

### Research on the Impact of Block Scheduling

A review of the block scheduling literature resulted in many sources that provided bulleted lists of the benefits and challenges associated with block scheduling. In many cases, these lists appeared to be based on anecdotal evidence, personal experience, and expert opinion. Several authors have commented on the state of the research base supporting block scheduling and have characterized it as “rather shallow” (Zepeda & Mayers, 2006, p. 159) and generally based on “theoretical suggestions and suppositions rather than concrete, research-based findings and


recommendations” (Evans, Tokarczyk, Rice, & McCray, 2002, p. 319). With the caveats about the block scheduling research base in mind, Table 2 provides a list of potential benefits and challenges associated with block scheduling (Educational Research Service, 2008; Merenbloom & Kalina, 2007; Northeast and Islands Regional Educational Laboratory, 1998; O’Brien, 2006; Queen & Isenhour, 1998; Rettig, n.d.; Zelkowski, 2010).

Table 2  
Potential Benefits and Challenges Associated With Block Scheduling

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Challenges</th>
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</thead>
<tbody>
<tr>
<td>• Provides opportunities to use a wider variety of instructional strategies</td>
<td>• Often results in less total class time per course</td>
</tr>
<tr>
<td>• Provides time to complete lessons and reduce fragmentation</td>
<td>• Students may have difficulty retaining information if there are gaps in course sequences or if the course is completed in the fall and testing occurs in the spring (e.g., Advanced Placement exams)*</td>
</tr>
<tr>
<td>• Reduces class transitions each day resulting in fewer discipline issues</td>
<td>• Students who miss a class miss more content during their absences</td>
</tr>
<tr>
<td>• Increases time for student/teacher interactions resulting in improvements in rapport and climate</td>
<td>• Student transfers can be difficult to accommodate particularly when the student is transferring from a school with a traditional schedule*</td>
</tr>
<tr>
<td>• Allows students to focus on fewer subjects in greater depth during a school term*</td>
<td>• The breadth of topics addressed in the courses decrease</td>
</tr>
<tr>
<td>• Potentially increases elective offerings depending on the schedule previously in place</td>
<td>• Requires training for teachers to support them in using a variety of instructional strategies</td>
</tr>
<tr>
<td>• Allows students to retake failed courses during the same school year or seek opportunities to accelerate their learning*</td>
<td>• Requires revising curriculum and pacing</td>
</tr>
<tr>
<td>• Increases flexibility for field trips, guest speakers, school-to-work programs</td>
<td>• May require adaptations to the schedule for Advanced Placement, music, and foreign language courses*</td>
</tr>
<tr>
<td>• May increase teacher planning time and decrease teacher workload (i.e., number of preparations, number of students per day) depending on the schedule previously in place</td>
<td></td>
</tr>
<tr>
<td>• Requires fewer textbooks*</td>
<td></td>
</tr>
</tbody>
</table>

*These benefits and challenges appear to apply to the 4x4 model and not the A/B alternating day model.

In a recent synthesis of research on block scheduling, Zepeda and Mayers (2006) analyzed 58 studies of block scheduling and found few outcome areas with relatively consistent findings. The following sections highlight key research findings based on the review by Zepeda and Mayers (2006) and subsequent studies focused on block scheduling as it relates to stakeholder perceptions, student discipline and attendance, teacher practices, and student achievement.
Stakeholder Perceptions of Block Scheduling

Among the more consistent findings from the review by Zepeda and Mayers (2006) was that teachers, students, and administrators generally held positive perceptions of block scheduling. For example, teachers perceived improvements in the areas of student attendance, behavior, and student-teacher interactions. Teachers also tended to perceive that block scheduling resulted in increased flexibility to try new strategies. Students perceived that block scheduling allowed for more interaction with teachers and allowed them to earn better grades. Administrators perceived improvements in discipline and increased opportunity for teachers to employ a variety of strategies in the classroom.

Student Discipline and Attendance

The review by Zepeda and Mayers (2006) found that student discipline appeared to improve under the block schedule but that less consistent results were found when examining the impact of block scheduling on student attendance. The authors indicated that some of the studies examining attendance reported improved attendance while others reported no effects on attendance. Student absences are often cited as an area of concern under block scheduling because each day a student is absent can equate to two days of instruction (4x4 model) or create a wider gap in the time between class meetings (A/B model) which makes it harder for students to catch up on missed work (Rettig & Canady, 1996).

Teacher Practices

One of the promises of block scheduling was that it would provide teachers with the opportunity to implement a variety of classroom strategies and vary the methods used to engage students in the learning process. In their review, Zepeda and Mayers (2006) found mixed results in the studies examining changes to teacher practices. Some of the studies reviewed found teachers engaging in new strategies, and other studies reported little difference between the strategies used by teachers operating under a block schedule and those operating under a traditional schedule. The overuse of lecturing has been cited as one of the biggest problems in block scheduling and as an explanation for mixed results in the literature (Queen, 2002). Several authors point to the need for ongoing professional development for teachers operating within a block schedule, to maximize their use of classroom time and the potential benefits of block scheduling (Biesinger, Crippen, & Muis, 2008; Northeast and Islands Regional Educational Laboratory, 1998; Rettig & Canady, 2003).

Student Achievement

The review conducted by Zepeda and Mayers (2006) revealed that students operating under a block schedule tended to earn better grades in their courses. However, the studies examining the impact of block scheduling on students’ standardized test scores were mixed with some studies demonstrating positive effects, some demonstrating negative effects, and other studies demonstrating no effects. Lewis, Winokur, Cobb, Gliner, and Schmidt (2005) conducted a systematic review of the research on block scheduling and limited their review to quantitative studies examining the impact of block scheduling on standardized test performance. Their review found that block scheduling had a small negative effect on student achievement but that the size of the effect was so small as to have little or no practical consequences.
Research Comparing the 4x4 Model to A/B Alternating Day Model

Most of the block scheduling research has focused on comparing a block schedule to a traditional schedule, and in many cases, the type of block schedule examined was not clearly specified by the researchers. For example, a majority of the studies reviewed by Zepeda and Mayers (2006) did not indicate the type of block schedule examined, and of the studies that did identify the type of block schedule under examination, all but two of them involved the 4x4 schedule. The studies that do specify the type of block and seek to compare the different models also result in mixed findings. For example, the review by Lewis et al. (2005) included a few studies comparing the 4x4 model to the A/B model with respect to their impact on standardized test scores. The results were not conclusive as some of the comparisons favored the 4x4 model and others favored the A/B model, and the effect sizes were all small indicating little to no practical consequences for the differences observed.

In a separate study, Lewis, Dugan, Winokur, and Cobb (2005) compared students’ standardized test performance at one traditionally scheduled high school, one A/B scheduled high school, and one 4x4 scheduled high school operating in the same school division. They used performance on a ninth-grade assessment and an eleventh-grade assessment to calculate gain scores and found that students at the traditionally scheduled high school and the A/B scheduled high school experienced declines over time in reading and mathematics, while students at the 4x4 scheduled high school evidenced increases in both content areas. However, Harmston, Pliska, Ziomek, and Hackmann (2003) found nearly the opposite when examining student performance on ACT assessments. When examining ACT data longitudinally at high schools in two states, they found that eight-period (traditional) and eight-(A/B) block schools demonstrated achievement levels that were similar to one another over time while achievement levels at the 4x4 schools declined over time.

In 2006-2007, Charlotte-Mecklenburg high schools converted from an A/B block schedule to a 4x4 block schedule. Kane (2008) conducted an evaluation of the change in scheduling by comparing the year prior to the conversion to the first year of implementing the 4x4 schedule. The evaluation revealed that for all but one of the end-of-course tests examined, there were no meaningful differences between the two schedule types. Kane (2008) found that attendance was better under the A/B schedule but that discipline appeared to improve with the implementation of the 4x4 schedule, but these effects were of little practical significance. The author did find reduced enrollments in Advanced Placement (AP) courses and electives, particularly physical education and chorus, following the switch to the 4x4 schedule. Student satisfaction with the 4x4 schedule appeared to depend on whether the student was enrolled in an AP course and whether the student was a lowerclassman or an upperclassman. A majority of the students enrolled in AP courses and upperclassmen preferred the A/B schedule while a majority of the lowerclassmen preferred the 4x4 schedule.

The Cost of Block Scheduling

Determining the cost savings associated with a particular schedule depends on the type of schedule being replaced, the extent to which the number of courses offered to students increases, and the teaching load associated with the schedule (Campbell, Brown, & Guy, 2009; Reames & Bradshaw, 2009; Rettig, n.d.). For example, according to Rettig (n.d.), the 4x4 model can be one of the most expensive or least expensive models to operate depending on whether the teacher is responsible for five or seven classes, respectively. In a 10-year longitudinal study of block
scheduling in one school division, Reames and Bradshaw (2009) reported that expenditures increased with the implementation of the 4x4 schedule but that the increased cost was the result of offering more classes to students and hiring more teachers to deliver the additional programming for students. When examining the cost effectiveness of block scheduling, Lare, Jablonski, and Salvaterra (2002) point out that historically, block scheduling has not been implemented as a means to realize cost savings but instead has been implemented to create a more positive school climate and increase course offerings for students. Despite significantly increased expenditures resulting from the 4x4 block, the authors concluded that the added costs were worth it because the two major goals that led to the decision to implement the schedule (i.e., less stressful school climate and more course offerings) were realized.

**Considerations When Changing Schedules**

Many authors indicate that the likelihood of realizing the benefits of block scheduling is heavily dependent on changes to teaching practices, provision of adequate professional development to support teaching in a block schedule, and securing staff buy-in prior to implementing the schedule (Queen, 2000; Rettig & Canady, 2003; Zepeda & Mayers, 2001). Several authors also provided suggestions for schools and divisions contemplating a change to block scheduling (see **Keys for Successful Implementation**). Although most of the suggestions were made when moving from a traditional schedule to a block schedule, the same recommendations apply when considering a switch to a different form of block scheduling (Fager, 1997; Gullatt, 2006; Mowen & Mowen, 2004; Winn, Menlove, & Zsiray, 1997).

**Keys for Successful Implementation**

1. Create stakeholder support for the change.
2. Clearly articulate the purpose for the change.
3. Develop a set of criteria for evaluating the new schedule.
4. Contact other sites for lessons learned and review the literature base.
5. Plan for reflection and evaluation throughout the change process.

**Summary**

Overall, the research findings related to block scheduling suggest that students, teachers, and administrators generally hold positive perceptions of block scheduling and that block scheduling has been associated with higher course grades and a reduction in student misbehavior compared to traditional scheduling. Studies examining the impact of block scheduling on teacher practices, student attendance, and student performance on standardized assessments have resulted in mixed findings. Studies comparing the 4x4 model to the A/B model have also yielded mixed results.

Because there are many different reasons for implementing a block schedule (e.g., addressing increasing core credit requirements for graduation, reducing stress for teachers and students), and because there are a great variety of hybrids available, block scheduling continues to be a viable means of implementing instructional, curricular, and organizational changes at the school level. Harmston et al. (2003) appropriately summarizes the dilemma facing schools and divisions contemplating a change in schedules as follows:

> Ultimately, decision-makers have to balance potential costs and benefits of the schedule change with goals toward deciding whether the potential gain outweighs the potential for loss. In the end, the transition...necessitates answering the question, “Does this schedule change meet our needs, given the unique characteristics of our local school? Will our school better meet its goals and objectives as a result of the change?” (p. 28)
References


