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Around the Block: Evaluating School Schedules

Hannah Cooke **CEPARE Rapid Research Brief** **December 2023**

In an attempt to improve student outcomes, school districts across the United States have experimented with school schedules. Traditionally, students meet with each class daily. Block scheduling offers longer class periods, potentially increasing student success. Studies over the last 25 years have shown inconsistent results. This brief provides a comparison of traditional and block schedules, showing that block schedules do not necessarily stack up. Block scheduling may offer teachers more time to build relationships with students, but there is not strong evidence that it increases student achievement on standardized tests.

The organization of time in schools is an ongoing conversation in the United States. Time was one of the components of the 1983 report on American schools, A Nation at Risk (National Commission on Excellence in Education, 1983) and led to the National Education Commission on Time and Learning, which published Prisoners of Time: Schools and Programs Making Time Work for Students and Teachers (National Education Commission on Time and Learning, 1994). These two reports paved the way for federal and state education policy reforms, such as No Child Left Behind, Race to the Top, and increased standardized testing. However, despite clear recommendations, the length of the school day and number of days in the school year have remained largely unchanged. Schools and districts have, however, experimented with new ways of using time by introducing versions of block scheduling. While certainly a novel invention, there is little research to support the notion that wholesale changes to traditional scheduling structures lead to significant learning benefits for students.

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What is a “Block” Schedule?

Traditionally, secondary school schedules include six to eight courses daily, typically ranging from 40 to 55 minutes. In a block schedule, classes range from 75 to 95 minutes, and students attend fewer classes per day. Longer classes give teachers more time to build relationships with students (Pate et al., 2022). The short classes in traditional schedules can cause teachers to resort to lecture, and the longer blocks provide more time for interactive lessons. Teachers also have more planning time in a block schedule (Pate et al., 2022; Voglar &Schramm-Pate, 2022). Students can take up to eight courses per year in a block schedule, making room for more electives or course retakes (Holley & Park, 2017). Also, with fewer class changes during the day, there are fewer opportunities for unstructured passing time, potentially resulting in less discipline (Morris, 2022). Challenges of a block schedule include teachers needing to learn strategies for planning engaging 90-minute lessons in order that students remain focused (Holley & Park, 2017).

In some block schedules, students take four courses every day for the first half of the school year and then switch to four different courses (often called a 4x4 block). Schools with this schedule operate on a semester schedule, meaning students and teachers follow brand new schedules halfway through the year. Students and teachers can focus on four classes at a time, and students may do better on final exams because of the reduced course load. However, there are large gaps away from discipline-specific content and skills, which may impact spring standardized test scores.

In an A/B or alternating block schedule, classes meet every other day for the entire academic year. This schedule still allows for some of the benefits of longer class periods (e.g., building relationships, more interactive lessons), but students and teachers focus on eight classes throughout the year. Students may perform better on standardized tests, because of the more consistent practice across subjects. Some schools combine the traditional and block schedule into a hybrid weekly schedule. Hybrid schedules provide similar benefits and challenges to alternating block schedules.

Block Schedules

	Semester 1	Semester 2
Period A	Course 1	Course 5
Period B	Course 2	Course 6
Period C with lunch waves	Course 3	Course 7
Period D	Course 4	Course 8

A Day	B Day
Course 1	Course 5
Course 2	Course 6
Course 3	Course 7
Course 4	Course 8

In addition, there are many other modifications to these common schedules, such as flex block, rotating block, and trimester schedules. Some schools add a flex block to the schedule to make time for Advisory, intervention, or other student/school/district needs. A flex block is typically 30 minutes and can occur at the beginning, middle or end of the day. In a school that has multiple lunch waves, a flex block can help balance the schedule.

A drop or cascade schedule has students enrolled in seven or eight classes per year, but they only attend five or six classes each day. If there are eight total classes, the rotation repeats every eight days, which can be difficult to track. This provides slightly longer classes while still taking students' attention spans into consideration. It also ensures that students attend different classes at different times of day, so their best "thinking time" can be spread out over multiple classes. If a student is late to school daily, they would miss different classes rather than the same one or two repeatedly. Because of the variation in day-to-day schedule, it can be challenging to plan guest speakers, field trips, or other non-school based activities.

Monday	Tuesday	Wednesday	Thursday	Friday
Course 1	Course 6	Course 3	Course 8	Course 5
Course 2	Course 7	Course 4	Course 1	Course 6
Course 3 (longer block with lunch waves)	Course 8	Course 5	Course 2	Course 7
Course 4	Course 1	Course 6	Course 3	Course 8
Course 5	Course 2	Course 7	Course 4	Course 1

**The following Monday would start with Course 2*

Mixed Results Across the Board

Little peer-reviewed empirical research has been conducted on the impact of block scheduling in the last decade. The bulk of the research was conducted in the 1990s and early 2000s (see reviews by Dickson et al., 2010; Mizhquiri, 2019; Zepeda & Mayers, 2006) before reforms such as No Child Left Behind, the Common Core, and enhanced teacher evaluation systems were implemented. District- and state-specific factors impact school scheduling, such as size of cafeteria for lunch waves, preparing for spring standardized testing, or dual enrollment partnerships with colleges.

With the variety of options for school schedules, meta-analyses and generalizable studies are challenging. Not only is there a lack of research overall, but the results that do exist show that there

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are both advantages and disadvantages to block and traditional schedules. Most of the studies have focused on student achievement measured by standardized test scores; however, some studies have examined other outcome variables, such as end-of-course tests and teacher preferences. Across many variables and measures, results are inconclusive as to whether block scheduling is more effective than traditional schedules.

Student Achievement by Subject

Research on block scheduling has shown that student achievement may improve in some subjects more than others. In sum, the research suggests math achievement may increase in 4x4 block scheduling, and biology achievement may increase in either type of block scheduling. However, most studies compare different schools in a state or region without controlling for other factors, so the results are correlational at best (Allen Gill, 2011; Vogler & Schramm-Pate, 2022). Focusing on social studies, Vogler and Schramm-Pate (2022) examined seventh-grade scores on the South Carolina Palmetto Assessment of State Standards (SCPASS) in 112 schools from 55 districts. The study investigated four "instructional time configurations:" traditional 45-60 minute classes, 61-79 minute classes, 80-90 minute classes, and A/B 80-90 minute classes. Controlling for poverty, students in the A/B 80-90 minute and traditional 45-60 minute class schedules outperformed their counterparts in schools with the other modified schedules on the SCPASS. The mean scores for the alternating block schedule and traditional 45-60 minute classes were 628.93 and 628.68, respectively. The 61–79 minute block configuration (625.80) and 80–90 minute block configuration (624.83) were significantly lower. The authors suggest, "students seem to retain more information either through relatively short daily instructional periods or by using longer instructional periods with at least a day in between to allow for individual assessment and analysis before the next formal instructional period" (Vogler & Schramm-Pate, 2022, p. 11). Based on the analysis, increasing the amount of instruction does not necessarily lead to higher test scores. They suggest that this may be caused by the attention spans of middle-level students, leading to lower retention rates. These findings support Allen Gill's (2011) study of 43 middle schools in one region of Virginia, which found no significant differences in mean scores on the reading and math Standards of Learning test between 90-minute block and traditional 45-minute schedules. This study also compared different schools without controlling for student achievement in previous years.

Several studies have investigated block scheduling's impact on science achievement, testing the assumption that science classes require longer blocks of time for labs and other hands-on activities. Holley and Park (2017) reviewed 45 studies of high school block scheduling and found little evidence that block scheduling affects science achievement. The authors claim

that their sample of articles came from peer-reviewed journals; however, three of the studies are unpublished dissertations, so their findings have not been subject to extensive peer review. Labak and colleagues (2020) studied high school students' understanding of biology topics in Croatia. Their sample of 281 high school students completed pre- and post-tests before and after taking a biology course in a single (traditional 45-minute classes) or 90-minute block schedule, and all of the participating teachers received "uniform ready-to-use lesson plans" (Labak et al., 2020, p. 3). Only juniors showed higher test scores in block scheduling. Freshmen and sophomores in the traditional schedule achieved better results. Schedule type did not affect the seniors' test scores. In addition, they examined the interaction between students' prior knowledge and schedule-type. Categorizing students into high, medium, and low based on the pre-test, they found that the higher-level students were successful regardless of schedule. Middle-level students improved their test scores significantly in block scheduling, but lower-level students' scores did not improve in block scheduling. While this study offers the strongest evidence of the benefits of block scheduling, the results may not transfer to the United States context, because the Croatian national STEM curriculum for primary and secondary school is structured quite differently (biology is integrated into four years of general science, rather than taken as one course in one year). High school is also not compulsory in Croatia. The authors recommend a hybrid of block and traditional schedules to provide benefits from both approaches, such as longer class times for building conceptual knowledge and more frequent classes for recalling facts.

Additionally, Pate and colleagues (2022) compared student scores on the Georgia Milestones End-of-Course (EOC) Assessments for ninth grade Literature, Algebra I, and Biology in schools with a traditional seven period schedule to those using a 4x4 block semester schedule. On the Algebra I EOC test, students in semester block schedules performed significantly higher than students in schools with a traditional schedule regardless of location (urban, suburban, rural), and the urban block schedule schools performed significantly higher than the urban traditional schools on the EOC biology test. These were the only significant findings, and principal interviews revealed that most students take a "math support class" (p. 11) in the fall of 9th grade, which means students receive 90 minutes of instruction for an entire year. Similarly, Huelskamp (2014) found no significant difference in performance on the average scores of two exams in a college-level biology class between students who attended schools with block and traditional schedules. Semester and alternating AB block schedules were combined into one category to compare to traditional schedules.

Other studies have examined subjects outside of the standard "core" subjects. For example, Smith and colleagues (2015) used the System for Observing Fitness Instruction Time (SOFIT) to examine students' percentage of lesson time spent doing vigorous physical activity during physical education classes in traditional and modified block schedules in four high schools from three districts in California. The sample of schools had a wide range of students of color and students receiving free or reduced lunch. In the traditional schedule schools, students of color made up 47% of students. In the modified block schedule, 90% of students were students of color. Longer physical education classes did not lead to more vigorous physical activity because of time "lost" transitioning to and from the locker room. Because of the small sample of schools and range of demographics of the student

body, additional research is needed to confirm these results. Additionally, Baker (2009) surveyed 443 college freshmen music majors to examine whether high school schedule type influenced their participation in music classes. The most common high school schedules reported were AB block and traditional seven-period days, but a similar number of students in both schedules reported scheduling conflicts (84 and 80, respectively) as a barrier to participation.

One drawback of the 4x4 block schedule is the lack of continuity for skill-based subjects like math and world language. Arguably, all subjects have skills that need some practice. Because most of the research analyzes student achievement based on end-of-course assessments, little is known about the longer-term impact of schedule type on student achievement. If a student takes math in the first semester in their freshman year and second semester of their sophomore year, then they have not practiced math in a full calendar year and may require more time to catch up. Additionally, there is no empirical research on schedule-type and college readiness in particular subjects.

In sum, the few recent studies show some or no correlation between block schedules and subject-specific student achievement. Labak et al. (2020) and Pate et al. (2020) found that block schedules improved students' biology test scores in some contexts and not others. Urban schools with block schedules outperformed urban schools with traditional schedules in 9th grade biology (Pate et al., 2020), but students entering with less prior knowledge may be at a disadvantage in block scheduled schools (Labak et al., 2020). More research is needed to determine the subject-specific and long-term knowledge retention of schedule types.

Differential Impacts by Race/Ethnicity

Several of the studies include differential findings when disaggregating their results by race or gender. In sum, students of color may experience more success in block schedules compared to their white peers. Disaggregating by race, Vogler and Schramm-Pate (2022) found that there was no statistically significant association for gender, schedule type, and test scores. There were significant differences between race/ethnicity groups (white and Hispanic students outperformed their Black classmates by more than 10 points), but only white students had significant differences between schedule type and scores. In Virgina, Allen Gill's (2011) findings showed a higher percentage of Black and Hispanic students scored "pass/advanced" on the reading and math Standards of Learning test in schools with block schedules.

Additionally, Chen and colleagues (2020) found no significant differences for Black male students' scores on the EOC tests in biology, English, and math between high schools with block and traditional schedules, after controlling for free/reduced lunch in a "large urban district of high schools in the southeastern United States" (p. 158). While white male students scored significantly higher on the EOC biology test in traditional schedules compared to block schedules, schedule type was not related to Black male students scores. The authors also point out the significant random effect, indicating that there are many more factors related to student achievement. Further research is needed to investigate the differential impact of instructional time configurations on students of various races.

Impact on Teachers and Teaching

In a 4x4 semester schedule, teachers have fewer preparation periods and more planning time (three classes with about 90 minutes of planning time daily). They also have fewer students, so they may be able to build stronger relationships with students and their families. Studies of teachers' perceptions about scheduling have found that teachers favor block over traditional schedules (Zepeda & Mayers, 2006); however, these results may not hold up in today's context. Longer blocks of time may allow teachers to try out a wider variety of instructional strategies compared to a traditional schedule. In their survey of 2,167 North Carolina high school teachers, Jenkins et al. (2002) found no significant difference between teachers' "opinions about the use and appropriateness of a wide variety of instructional strategies" (p. 201) at schools with traditional and block schedules. They suggest that differences in professional development may be the driving force behind these results. In their review of 58 empirical studies of block scheduling, Zepeda and Mayers (2006) found 14 of the studies were specific to teachers' perception and use of various instructional practices. They found inconsistent results across these studies of teachers' self-reported beliefs and practices in traditional and block schedules. Both Jenkins et al. (2002) and Zepeda and Mayers (2006) call for continued professional development for teachers to make use of the time provided by blocked classes.

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School Performance

Rather than focusing on a subject or specific groups of students within schools, some studies examined school performance. Poppink and colleagues (2019) used the 2007-08 Schools and Staffing Survey results from 1,670 urban schools to analyze the relationship between 15 variables (including block scheduling) and the probability that a school would meet Adequate Yearly Progress (AYP). The results showed a negative association between block scheduling and making AYP. In other words, schools without block scheduling were more likely to make AYP. In Pate et al. (2022), the schools with block schedules scored higher on Georgia's College Career Readiness Performance Index and their school climate rating and that principals in 4x4 block schedules reported more positive school climate. However, Clark (2021) found no statistically significant difference in ACT composite scores and attendance rates at schools following a block versus a traditional schedule; however, the graduation rate was higher when the schools followed a traditional schedule (Clark, 2021). These studies' results suggest that block scheduling may increase some measures of school performance while decreasing others.

Based on the current literature, there is not enough evidence to suggest that block scheduling's advantages outweigh the drawbacks of overhauling the master schedule.

Recommendations

While some scholars (e.g., Morris, 2022) make the claim that block scheduling is a highly effective reform strategy, most empirical studies show mixed results. Most reviews of the literature report conflicting and/or inconclusive results (Holley & Park, 2017; Mizhquiri, 2019; Zepeda & Mayers, 2006). Mizhquiri (2019) reported that very few studies provided strong evidence for block scheduling and many studies were conducted after-the-fact, leading to less control over the variable being measured. Based on the current literature, there is not enough evidence to suggest that block scheduling's advantages outweigh the drawbacks of overhauling the master schedule.

There is much unknown about school scheduling and its impact on students, families, teachers, and leadership. Most of the research is quantitative and requires large sample sizes, which excludes schools that use more creative schedules, like rotating or flex schedules. Some studies are not clear on how they (or their participating schools) define block and traditional schedules. Qualitative or more mixed methods research would help determine how schools' unique contexts influence the choice of school schedule, like district and state graduation requirements, Advisory times, and lunch waves.

Additionally, there is no research published that explores block scheduling in a "post-COVID 19" world. One research brief about the reopening of Tulsa Public Schools notes that secondary schools switched to an alternating block schedule to reduce the number of student interactions, but the impact of this change was not reported. Future research is needed to investigate how school districts modified their master schedules in response to COVID-19 safety precautions and whether these changes have lasting effects.

Regardless of the schedule type, professional development should be specific to either traditional 45-55 minute classes or longer block classes. Keeping students engaged for up to 90 minutes is a challenge, and teachers need support in choosing the most effective strategies for their content, grade-level, and subject.

Conclusion

In sum, this research brief compares traditional and block schedules in schools and evaluates their impact on student achievement and other outcomes. The findings highlight the inconsistent results and lack of strong evidence to support the notion that block scheduling leads to significant

learning benefits, particularly in terms of test scores. While block schedules may offer advantages such as increased teacher-student relationships and more interactive lessons, there are also challenges, including maintaining students' attention for longer blocks of time.

Furthermore, there is very limited recent research on block scheduling, with most studies conducted in the 1990s and early 2000s before the implementation of accountability measures and curriculum reforms. The research findings regarding subject-specific student achievement are mixed, with some studies indicating potential improvements in math and biology, while others show no significant differences. More research is needed to determine the impact of block scheduling on schools that are de facto segregated by race/ethnicity and socioeconomic status. Additionally, little recent research has considered teachers' opinions and practices in block and traditional schedules. Regardless of schedule type, professional development is needed that is practical for the school's schedule.

Overall, there is insufficient evidence to support the superiority of block scheduling over traditional schedules. Further research is needed to explore the contexts and effects of different schedule types. As the landscape of education continues to evolve with new reforms and adaptations to a post-COVID 19 world, more research is needed to determine the impact schedule type on teaching and learning.

References

Allen Gill, W. W. (2011). Middle school a/b block and traditional scheduling: an analysis of math and reading performance by race. *NASSP Bulletin*, 95(4), 281–301. https://doi.org/10.1177/0192636511420998

Baker, V. D. (2009). Scheduling accommodations among students who persist in high school music ensembles. Journal of Music Teacher Education, 18(2), 7–17. https://doi.org/10.1177/1057083708327386

Chen, D. F., Su, K., Cho, U. H., & Henson, R. A. (2020). Examining the effect of block scheduling on african-american males' high school test performance | journal of applied educational and policy research. *Journal of Applied Educational and Policy Research, 5*(1). https://journals.charlotte.edu/jaepr/article/view/977

Clark, S. (2021). *The impact of block scheduling on student achievement, graduation rate, and attendance at the high school level* [Dissertation]. Louisiana Tech University.

Dickson, K., Bird, K., Newman, M., & Kalra, N. (2010). *What is the effect of block scheduling on academic achievement?: A systematic review* (Technical Report No. 1802T). University of London. https://discovery.ucl.ac.uk/id/eprint/10003672/1/Dickson2010What.pdf

Holley, D., & Park, S. (2017). Lessons learned around the block: An analysis of research on the impact of block scheduling on science teaching and learning. In M. Shelley & M. Pehlivan (Eds.), *Education Research Highlights in Mathematics, Science and Technology* (pp. 132–138). ISRES Publishing.

Huelskamp, D. (2014). Traditional/block scheduling, gender, and test scores in college biology course. *The Learning Assistance Review*, 19(1).

Jenkins, E., Queen, A., & Algozzine, B. (2002). To block or not to block: That's not the question. *The Journal of Educational Research*, 95(4), 196–202. https://doi.org/10.1080/00220670209596592

Labak, I., Sertić Perić, M., & Radanović, I. (2020). Effects of block vs. traditional scheduling on high school science success—lessons from biology classes. *Education Sciences, 10*(8), 209. https://doi.org/10.3390/educsci10080209

Mizhquiri, L. (2019). *White paper: The effects of block scheduling and traditional scheduling on high school student achievement* (EDUC 17: What Works in Education?). Dartmouth College. https://digitalcommons.dartmouth.edu/educ17whitepapers/1?utm_source=digitalcommons.dartmouth.edu%2Feduc17whitepapers%2F1&utm_medium=PDF&utm_campaign=PDFCoverPages

Morris, R. C. (2022). Block scheduling and its gift of time: A comprehensive review. *Educational Planning, 29*(2), 61–77.

National Commission on Excellence in Education. (1983). *A nation at risk: The imperative for educational reform: A report to the Nation and the Secretary of Education, United States Department of Education*. The National Commission on Excellence in Education.

National Education Commission on Time and Learning. (1994). *Prisoners of time: Report of the national education commission on time and learning*. Education Commission of the States.

Pate, J. L., Chastain, C. D., Brockmeier, L. L., Lairsey, J. D., Nobles, K. D., & Bochenko, M. J. (2022). The effect of high school schedules on ninth grade student achievement indicators and overall school performance measures. *Journal of Liberal Arts and Humanities, 3*(5), 1–12.

Poppink, S., Ma, X., & Shen, J. (2019). The effects of organizing teaching by time, student grouping, and professional staffing: A national study of student outcomes by urban, suburban and rural schools. *Journal of International Education and Leadership, 9*(2).

Smith, N. J., Monnat, S. M., & Lounsbery, M. A. F. (2015). Physical activity in physical education: Are longer lessons better? *Journal of School Health, 85*(3), 141–148.

Vogler, K. E., & Schramm-Pate, S. (2022). Relationship of instructional time configuration on state-mandated middle grades social studies test scores. *RMLE Online, 45*(5), 1–18. https://doi.org/10.1080/19404476.2022.2056780

Zepeda, S., & Mayers, R. S. (2006). An analysis of research on block scheduling. *Review of Educational Research, 76*(1), 137–170.

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