Research Points

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Essential Information for Education Policy

Time To Learn

Calls for more school instructional time are coming from multiple quarters. Academic standards and frequent assessments have changed the nature — but not the length — of the instructional day. Schools find themselves "robbing Peter to pay Paul," taking time from the arts, recess, and physical education to give to reading and math, subjects that carry heavy weight in state accountability systems. But does simply increasing the amount of time spent on specific subjects result in more learning?

The Learning Time Equation

In 1963, scholar John Carroll hypothesized that given the right amount of time and appropriate methods, a student would succeed in learning a specified body of knowledge. Carroll's celebrated "Model of School Learning" expressed the learning process with this simple mathematical formula:[1]

$$\text{Degree of learning} = \frac{\text{Time spent learning}}{\text{Time needed to learn}}$$

Since then, multiple studies have confirmed what Carroll proposed: Students who spend more time engaged at the appropriate level of difficulty on tasks central to the curriculum have higher achievement than those who spend less time. But in the course of confirming this apparently simple equation, scholars also have uncovered some complexities that will have to be addressed as schools work to provide the time that today's students need to meet academic expectations.

It is not just the amount of time spent that determines students' degrees of learning, but also how engaged students are during that time and the extent to which they are engaged in tasks relevant to curriculum expectations and assessments. Researchers generally distinguish sharply between Allocated Time — the time on the school calendar for a given content area — and Academic Learning Time — the amount of time students are working on rigorous tasks at the appropriate level of difficulty for them.[2] Mediating these is student engagement — the time students are paying attention. However, the rate of engagement is influenced by how well structured the teaching is with respect to individual students. Engagement rates can vary widely, ranging from an average of 50 percent for low engagement to 90 percent for high engagement.[3]

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Academic Learning Time clearly is critical to student achievement. When school schedules maximize time available for learning, when instruction is well structured and engages students, and when classroom time is targeted to important instructional content, students can be expected to learn.[4] When time is not well used, allocating additional time may simply mean "more of the same," with very little change in learning. Policymakers interested in increasing learning, therefore, are likely to be disappointed if they apply a simple prescription of adding more time and do not attend to how it is used.

The Role of Instructional Time in Meeting Standards

In 1994, the National Education Commission on Time and Learning called for extending the school day and year and doubling the instructional time spent on the core academic curriculum, reasoning that if all American students are to meet world-class standards, all children will need more academic time.[5] Since then, although virtually every state has instituted some form of standards, few have altered the length of the instructional day. Because students come to school with differing levels of knowledge, holding all students to today's high standards means that at least some students will need more Allocated Time, with the expectation that more Academic Learning Time will result.

The Changing Student Population

Providing the time needed to learn has taken on new importance with the increasing proportion of English Language Learners (ELLs) in U.S. schools today. Nationally, ELLs make up about 10 percent of the student population, although some estimates are closer to 50 percent in certain states. Many of these students must learn the curriculum *and* learn academic English, effectively doubling the work they must do but not the time they have to do it. ELLs' performance on standardized tests makes clear the difficulty these students have in our schools. On the 2005 National Assessment of Educational Progress, 96 percent of eighth-grade ELLs scored below the basic level.[6]

Research on instructional time has consistently found that extended time has the most powerful impact on learning in schools serving low-performing students.[7] In a number of studies of ELL students in California, researchers have found that additional instructional time was crucial for increasing and sustaining achievement gains.[8]

Time Matters for Deep and Robust Learning

When there is too much content to cover, a natural response of educators is to spend less time on each topic in the curriculum. But when the goals include deep understanding of difficult content, less Allocated Time also means less Academic Learning Time.

An important study shows what happens when students are expected to cover a large amount of material in a reduced amount of time.[9] In the study, a total of 3,000 eighth-grade students were taught by the same science teacher using increasingly streamlined versions of the same curriculum. All students were given tests before and after the course of study to assess their knowledge.

With a full 12 weeks of instruction, more than 70 percent of students understood the main concepts and demonstrated their knowledge on exams that included multiple-choice questions as well as required written explanations. When less time (six weeks) was allocated to teach the same content, students still performed well on the multiple-choice questions, but their conceptual learning — as demonstrated by their responses on the essay questions — plummeted by half. And when the time allocated to cover the content was reduced to only three weeks, students maintained their performance on the multiple-choice questions, but their conceptual learning fell even further. These results illustrate how reduced time may allow content to be "covered" but not really learned deeply.

Finding Time

Where does the time go? Extensive research in a large urban school district found that 20 percent to 25 percent of the school day is eaten up by lunch, recess, trips to the bathroom, and so on. These findings suggest that a 300-minutes-a-day instructional program must be nested within a school day that is between 360 and 400 minutes long.[6]

Is this enough? If, for example, 100 minutes per day are allocated to reading in elementary school, an aver-

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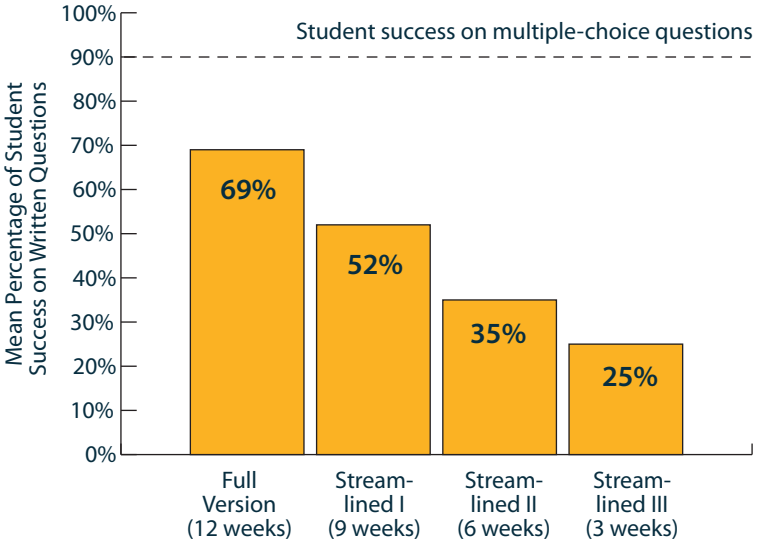
The Impact of Instructional Time

Giving students more time to cover content increases their conceptual understanding. In one study, different students were taught the same content by the same teacher using increasingly streamlined versions of the curriculum. Results show that as the curriculum was streamlined, students' performance on written questions, which assess their conceptual understanding, plummeted, although they still performed well on the multiple-choice questions. These results illustrate how reduced time may allow content to be covered but not really learned deeply.



Source: Adapted from Clark, D., Linn, M.C. (2003). "Designing for Knowledge Integration: The Impact of Instructional Time," **The Journal of the Learning Sciences, 12(4),** ***p. 463.***

Beyond Allocated Time

Academic Learning Time is a fraction of Allocated Time in any school subject (Figure 1), but it is the most important factor related to learning. Simply doubling the amount of Allocated Time might not increase the amount of Academic Learning Time. Figure 2 shows how doubling Allocated Time might net no gain in Academic Learning Time. By contrast, a smaller increase in Allocated Time, well used, might result in a higher amount of Academic Learning Time (Figure 3).

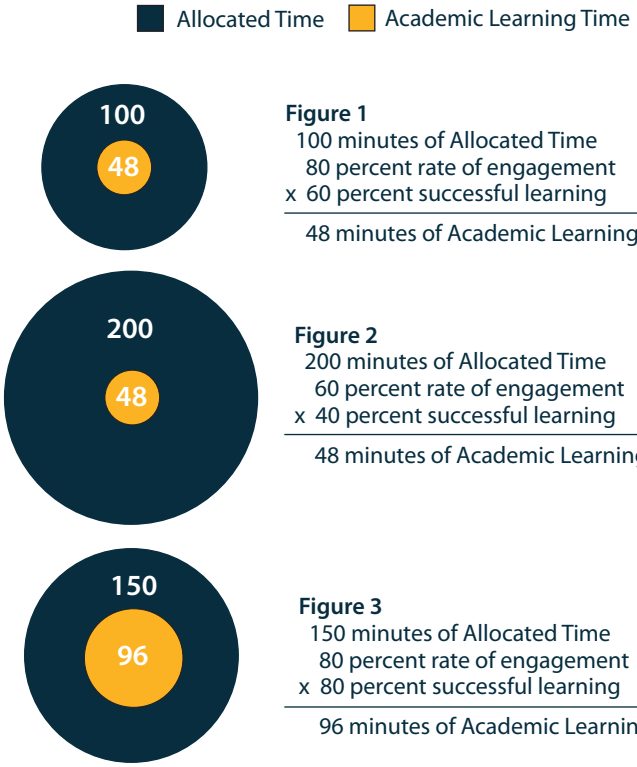


Figure 1
100 minutes of Allocated Time
80 percent rate of engagement
x 60 percent successful learning
48 minutes of Academic Learning Time

Figure 2
200 minutes of Allocated Time
60 percent rate of engagement
x 40 percent successful learning
48 minutes of Academic Learning Time

Figure 3
150 minutes of Allocated Time
80 percent rate of engagement
x 80 percent successful learning
96 minutes of Academic Learning Time

Facts at a Glance

- Expanding Academic Learning Time is critical to student achievement; just squeezing more content into less time can reduce understanding.
- Allocating more time is only part of the solution; using it well is equally crucial.

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age student pays attention 80 percent of the class period (a high rate of engagement), and 60 percent of Engaged Time is spent successfully learning, the student will have an Academic Learning Time of only 48 minutes. For some students, this may be enough. Other students may need more Engaged Time, and many may need instruction better matched to their level. Thus, to provide more Academic Learning Time, it may be necessary to extend Allocated Time.

Some New Approaches

A number of innovative programs, often in charter schools where there is more flexibility, are starting to experiment with different schedules. A well-known example, the Knowledge is Power Program,[10] has redesigned the school day to run from 7:30 a.m. to 5 p.m. during the week. The schedule also includes four hours on Saturdays and several weeks in the summer. In another example, a statewide initiative in Massachusetts has offered funds to add 90 to 120 minutes to the daily schedule, with more time for math, reading, and science as well as electives and recess.[11]

Nationwide, some schools have changed their start times to 9 a.m. to allow for intervention sessions from 8 a.m. to 8:50 a.m. for students who need extra help. In each of these efforts, the aim is to adapt the school schedule to provide help for students who may need more time and to find ways to engage and motivate students to learn.

Can We Afford To Allocate More School Time? Can We Afford Not To?

The cost of significantly extending Academic Learning Time can appear prohibitive, especially if it means hiring extra teachers or paying existing ones more. One way to reduce new expenditures is to build on existing school-based after-school programs, such as the federal government's 21st Century Community Learning Centers.[12] However, these programs will be most effective if they focus on high-level tasks. Financial constraints may dictate the length and target population of these programs. Extended school time may need to be limited to those who need it most, and care must be taken that the extended learning programs really are adapted to students' needs — both motivational and cognitive — or efforts with the best intentions may produce little.

What Should Policymakers Do?

First, schedule more instructional time for the core academic subjects.

Second, extend the school day and calendar as necessary to meet these needs and still maintain time for non-core subjects, such as gym, art, or library.

Third, make sure that extended allocations of time for core curriculum are used for high-demand academic learning adapted to individual students' needs.

Fourth, focus additional funds on the students who need it most.

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