DOCUMENT RESUME

ED 435 127 EA 030 111

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TITLE Improving Student Achievement by Extending School: Is It Just a Matter of Time?

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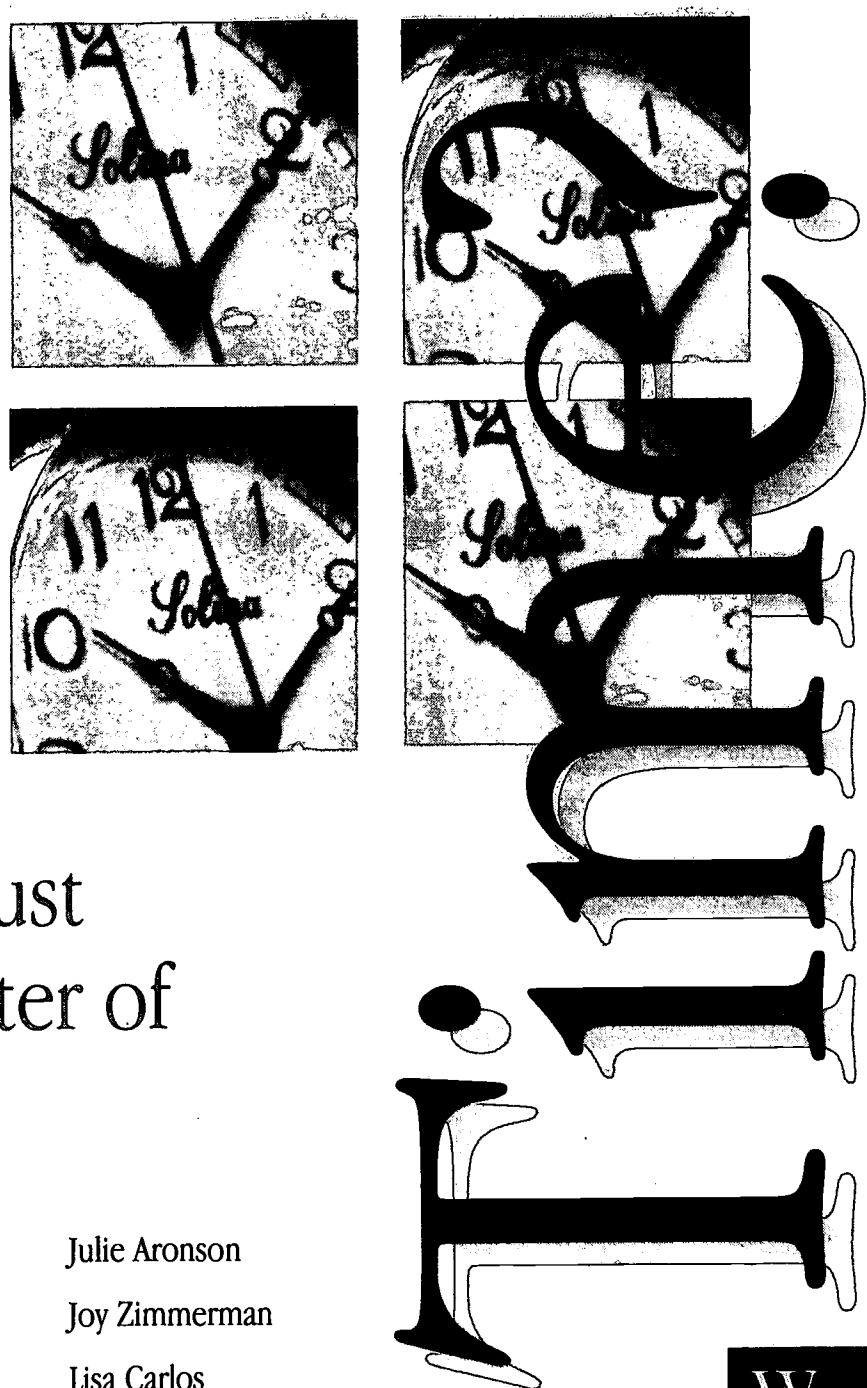
SPONS AGENCY Office of Educational Research and Improvement (ED), Washington, DC.
PUB DATE 1999-00-00
NOTE 21p.; "This paper was originally presented for the PACE Media/Education Writers Seminar (April 20, 1998)."
PUB TYPE Information Analyses (070)
EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS Academic Achievement; *Educational Improvement; Elementary Secondary Education; *Extended School Day; *Extended School Year; Flexible Scheduling; Instructional Effectiveness; Learning Processes; *Time Factors (Learning); Time Management

ABSTRACT

This document explores ways in which time can be used as an education resource. It opens with an overview of studies that indicate that American students trail their counterparts in other leading industrialized nations in academic achievement. It discusses research on the relationship between time and learning, explores the limitations of existing research, and defines the terms used in research, such as allocated time, engaged time, and academic-learning time. It offers the basic findings of these studies, including the conclusion that there is little or no relationship between allocated time and student achievement, that there is some relationship between engaged time and achievement, and that there is a larger relationship between academic-learning time and achievement. The text encourages educators to focus on the time that matters; research indicates that there is no consistent relationship between the amount of time allocated for instruction and the amount of time students spend engaged in learning activities. The document examines the costs of adding time and some of the key factors in maximizing existing time, including classroom management, the appropriateness of instruction and curriculum, and student motivation. The booklet concludes that time, albeit a critical factor, exhibits little impact on student performance when considered alone. (Contains 31 references.) (RJM)

Improving Student Achievement by Extending School



Is It Just a Matter of Time?

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WestEd
Improving education through research, development, and service

This paper was originally prepared for the PACE Media/ Education Writers Seminar (April 20, 1998).

Funding for this paper is partially provided by the U.S. Department of Education, Office of Educational Research and Improvement. The contents of this document do not necessarily reflect the views or policies of the U.S. Department of Education.

Introduction

The widespread concern that American schools are not serving up a quality education for all students has been fueled in part by international comparisons of student achievement, which seem to show American students lagging behind their counterparts in other leading industrialized nations. Some of these same studies also indicate that American students spend considerably less time in school than those in some of the countries that outperform us.[1]

That apparent correlation of time and achievement reinforces a common assumption that when it comes to time in education, more is better. If the American school year or day were longer, the theory goes, our students would learn more. Yet the relationship of time to learning is neither as direct nor as simple as it might initially seem. Rather, as this paper will point out, it's a complex and intriguing equation, with results depending in large part on how we use time as an education resource.

Introduction

Recent History

The question of time in education, specifically how much to require, has been visited periodically throughout the history of the American school. Yet the basic September-June school calendar that originated in America's rural past has remained largely intact.

Then, in the early 1980s came The National Commission on Education Excellence and its seminal report, *A Nation at Risk,* which urged education leaders to look at three big issues: expectations, content and time. Of this last, the report argued that if American students were to compete effectively in a global economy, they would need to spend substantially more time in school.

This call for more time raised public consciousness on the issue, but once again, the traditional school calendar proved solidly ensconced. Although proposals to extend the school year were considered in 37 states during the seven years following *A Nation at Risk,* very few were actually approved.[2] Moreover, none of the states passing legislation during that time increased the school day beyond 6-1/2 hours or the school year beyond 180 days, which was and remains the high end of the U.S. norm. Instead, legislation focused on addressing unusually low standards in certain states, merely increasing the time so that it was closer to the national norm.[3]

In fact, some states and districts that have tried to significantly increase school time have subsequently backed off. The Oregon legislature, for example, in 1991 adopted the Education Act for the 21st Century, which was intended in part to lengthen the school year from 175 to 220 days over the next two decades. But in 1995, before the first incremental jump was required, the Legislature repealed that provision of the act, having determined that the state simply couldn't afford it.[4]

Meanwhile, in 1991, prompted by continued concern about America's poor showing in international student achievement comparisons, federal legislation established a special commission to look specifically at the relationship of time and learning in America's schools. *Prisoners of Time,* the 1994 final report of the National Education Commission on Time and Learning, notes that while American education had been progressing on two of the three "big issues" mentioned in *A Nation at Risk* – content and expectations, as embodied in the emergence of standards-based reform – it had stalled out on the third issue. Alluding to the persistence of the traditional school calendar, the report notes that "learning remains a prisoner of time .... American students will have their best chance at success when they are no longer serving time, but when time is serving them."

Moved in part by the sentiments underlying that admonishment, by the pressures of global competition and by concomitant domestic pressures to improve achievement, education policy makers and practitioners across the country have once again begun focusing on the role of time in education. According to the National Conference of State Legislatures, during the 1997-98 legislative session alone, 14 states considered bills related to the length of the school year.[5]

Given the continued interest in extending education time and given the high expectations that often accompany such interest, it is essential to start focusing in on the facts: what research exists about how time affects learning and what does it say?

The Research

The research literature on the relationship of time to learning spans the course of at least three decades, most of it falling into the following categories:

- empirical, data-based research and reviews or syntheses of existing research;
- policy reports, which often combine education theory with empirical research; and
- anecdotal, experientially-based periodical publications, usually explaining one school's experience implementing a certain time-related policy.

While much of the theoretical and anecdotal literature is compelling, in order to provide policy makers with a solid basis on which to evaluate the efficacy of extending education time, this review focuses primarily on the empirical evidence about the relationship between time and achievement.

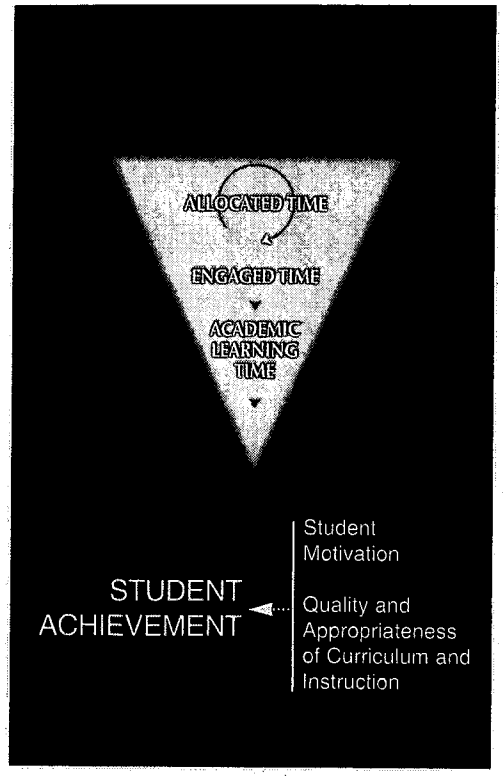
Limitations of Existing Research

Despite the considerable number of research studies and reviews of research, the body of empirical literature is limited in some respects. While many studies have examined the relationship between school time and student learning, most have relied heavily on correlational data. There has yet to be a controlled study, employing an experimental design, that directly measures the impact of significantly extending the school year on student achievement outcomes.[6] Without this, estimates of how great an impact a given increase in time would have remain somewhat speculative. In addition, there have not been any longitudinal studies of the impact of increasing education time on student achievement. This has led one researcher to speculate that, while increasing education time appears to lead to only modest achievement gains in the short run, the cumulative impact of increased time might be considerable.[7]

Defining the Terms

Any examination of the research on the relationship between time and learning is complicated by the variety of ways in which researchers talk about time. While some studies define it somewhat generically, (e.g., "the school day"), others make distinctions between different subsets of time depending on how it is used by schools, teachers and students. If one is to compare findings among studies, understanding the definitional distinctions is critical.

Education time as researchers view it is perhaps best understood as a vertical continuum of sorts. Picture an inverted pyramid. At the top is time most broadly described, most easily measured, most abundant and most easily mandated: the number of hours in a school day and days in a school year. At the bottom is time most narrowly focused, most difficult to measure, most elusive and most difficult for policy makers to influence: those moments when learning is actually taking place.



Allocated time. At the top of the continuum is the most generic type of education time, allocated time, which refers to the total number of days or hours students are required to attend school. Moving down the continuum, allocated time can then be broken into *instructional time* and *non-instructional time.* The former is time spent in class, whether for core academic subjects like math, science and language arts or for non-academic electives, such as driver's education. Non-instructional time, by contrast, is that portion of the day devoted to lunch and recess, to passing between classes, to school assemblies and to other non-classroom activities.

Engaged time. Next on the continuum — a subset of instructional time — is engaged time, during which students are participating in learning activities. While any 50-minute class period (so called instructional time) may nominally be devoted to a particular subject, such as history, in reality, some portion of the period is almost always consumed by activities having little or nothing to do with learning, such as roll call, disciplinary issues and interruptions by announcements coming over the public address system. Thus, in trying to understand the relationship of time to learning, researchers narrow their focus yet again, this time honing in on that portion of the period when students are both in class and participating in instructional activities. Engaged time is also referred to in the literature as "time-on-task."

Academic learning time. Finally, at the bottom of the continuum is that time when learning actually occurs. Simply because a student is engaged in instructional activities does not necessarily mean he or she is learning. For example, an advanced student who is asked to spend 30 minutes going over material he has already fully mastered, will not be learning because there is nothing for him to learn. Similarly, a student who is involved in an instructional activity that covers advanced material for which she is not yet prepared is also unlikely to learn. With this in mind, researchers have focused in on academic learning time as *that precise period when an instructional activity is perfectly aligned with a student's readiness and learning occurs.*

Research

The Basic Findings

The majority of studies dealing with the relationship of education time to student achievement look at allocated time, while other studies focus on engaged time or academic learning time. In some cases, the time variable being studied is not clearly specified. This inconsistency can make it difficult or misleading to compare studies. It also helps explain why, looking at the entire body of research on time and learning, there appear to be mixed findings about the degree to which time influences student learning.[8] However, despite this variability, the literature reveals a fairly consistent pattern:

- There is little or no relationship between allocated time and student achievement.
- There is some relationship between engaged time and achievement.
- There is a larger relationship between academic learning time and achievement.[9]

In short, time *does* matter. How much or little it matters, however, depends greatly on the degree to which it is devoted to appropriate instruction. Remembering the inverted pyramid, any addition to allocated education time will only improve achievement to the extent it is used for instructional time, which must then be used for engaged time, which, in turn, must be used effectively enough to create academic learning time.

Focusing in on the Time That Matters

By and large, most researchers and policy makers interested in the relationship of time to learning have focused on allocated time. Researchers' propensity to look primarily or exclusively at the total amount of school time persists, in part, because quantity is easier to identify and measure than is *quality;*[10] measuring engaged time and academic learning time, by comparison, requires systematic and, to some extent, subjective judgments about how time is used. Allocated time is also the crudest and least helpful measure in trying to assess how time relates to learning precisely because it fails to consider how schools, teachers and students are using time and the quality of instructional activities.

A review of the research literature on how time is divided up during the school day shows that a large portion of potential learning time is typically eaten up by non-instructional activities, which have little relationship to student learning.[11] This leaves a relatively small portion of the school day for instructional time, in general. By extension, even less time remains, then, for instructional time in academic subjects – time that is essential to student achievement.[12]

Within the classroom, potential learning time is often further eroded by such factors as inefficient classroom management, disciplinary activities, ineffective instructional techniques, inappropriate curriculum and student inattention or absence. Based on such factors, classrooms vary greatly with respect to the proportion of time that could be considered engaged time. But, in most cases, at the end of the school day – or year – the amount of engaged time ends up having been but a small subset of the overall time originally allocated for learning. For example, one study found that students were engaged in learning activities only 28 to 56 percent of the total time spent in school in a given year.[13] Another calculated that only 38 percent of a typical school day was devoted to "engaged time" in the schools it studied.[14] Studies have shown that the proportion of allocated school time in which students are engaged in learning activities varies by state, by district *and* by classroom.[15]

Research studies show no consistent relationship between the amount of time allocated for instruction and the amount of time students spend engaged in learning activities.[16] In other words, the length of a particular school day or year says nothing about how much time is devoted to learning activities. This means that increasing the amount of allocated time would not produce a predictable increase in students' engaged time.[17] In fact, increasing the length of the school day or year might not lead to any increase at all in the amount of time students are engaged in learning. Therefore, policies aimed at increasing the length of the school year could potentially have little impact on student learning.

Taking into account both the variability of allocated time to engaged time and researchers' tendency to focus on allocated time, it's little surprise that research findings about the degree to which allocated time influences learning are mixed: some studies find no consistent relationship between allocated time and student achievement and others find a small positive relationship.[18] But most studies conclude that allocated time, while necessary for producing learning outcomes, by itself doesn't suffice.

The Costs of Adding Time

Despite the fact that increasing allocated time offers no guarantee of improved student learning, policy makers are still drawn to increasing time as a lever for reform. As evidenced by Oregon's experience, however, the costs alone can be daunting. In fact, the high cost of extending allocated time has been a primary reason that more states and districts have not substantially increased the length of their school day or year.[19]

Cost estimates for increasing allocated time in school vary widely. According to one estimate, lengthening the school year would cost states between $2.3 and $121.4 million for each additional day, depending on the state, or an estimated $1.1 billion nationally.[20] It would cost the state of California approximately $50 million annually for each district to add a single instructional day, according to another recent estimate.[21] What's more, increasing allocated time to the extent called for in *A Nation at Risk* – from about 180 days to 210 or more days – would by most estimates cost in the tens of billions of dollars nationally.[22] One relatively recent estimate, prepared for the National Education Commission on Time and Learning, predicted that increasing the school year nationally to 200 days would cost between $34.4 and $41.9 billion annually.[23]

Pointing to the small achievement gains that could be expected from adding even substantial amounts of time to the school calendar, many researchers have concluded that the cost could not be justified, and that other education reforms would likely provide more impact.[24] Unfortunately, there has been little comparative research on the cost effectiveness of various school reform efforts. One study, by the Institute for Research on Educational Finance and Governance, examined the relative merits of four variables -- time, peer tutoring, class size reduction and computer-assisted instruction. It found that increasing time was the least cost-effective of the four interventions in terms of math performance and the next to least effective for reading performance.[25]

Maximizing Existing Time: Key Factors

Given the weak link between allocated time and student learning, and given the expense of adding time, how should we begin rethinking education time? The body of research evidence suggests that before simply adding more of it, schools and districts should, instead, make better use of existing time.[26] And since the majority of studies find that increasing students' time-on-task leads, at best, to modest increases in achievement,[27] schools must, minimally, find ways to increase the proportion of time students are involved in instructional activities.[28] From a school site policy perspective, this means ensuring, first, that adequate allocated time is devoted to instruction in those core academic subjects in which we seek improved student performance. Further, school administrators must find ways to minimize activities that reduce the potential for engaged time in any class, such as the public address system announcements that can greatly interrupt learning time.

But even creating more engaged time, as important as it is, does nothing to advance achievement unless the instructional activities lead to real learning. Here the quality of teaching is key. One research review reveals that when coupled with good teaching methods – particularly, timely and specific feedback, attention to what a student already knows and the active participation of the teacher – time has a significant impact on achievement.[29] Another review concludes that the "combination of additional time with effective teaching strategies and curricula designed to engage students is a powerful tool for enhancing academic performance."[30] In this instance, engaging students means choosing the instructional strategies and curriculum that will enhance a student's motivation to learn.

Tailoring engaged time to the needs of individual students is essential if *all* students are to learn more. The research suggests that the higher the quality of instruction, *especially* as it accommodates students' differing education backgrounds, abilities and learning styles, the greater the academic achievement.[31]

Thus, as many studies point out, unless you can somehow ensure that any added school time would be devoted to instruction, with students engaged in well-designed and appropriate learning activities, providing more time per se cannot be expected to have a major affect on student achievement.[32]

So what factors help ensure that classroom time becomes true learning time? The research literature points to three key quality factors that, in conjunction with time, contribute to improved student learning. Two of them – classroom management and appropriateness of instruction – fall largely to teachers. The third – student motivation – lies partly in the lap of the student, partly in the lap of his or her teachers and partly in the lap of the broader community.

Classroom management. Site level policy makers could reschedule the school day to include more instructional time, but how teachers use that time once the classroom door closes is difficult to regulate. As described earlier, research has documented great variation in the amount of allocated time devoted to instructional activities. Of course, some non-learning activities that occur in the classroom are beyond the control of any teacher, such as interruptions by p.a. announcements, fire drills, or the need to take roll, for example. However, studies show that much of the variation is due to teachers' behaviors, including their relative skills in classroom management. Several studies found that poor classroom management resulted in teacher and students losing considerable amounts of instructional time to student disruptions, waiting, long breaks between activities, student tardiness and various management and discipline activities.[33] One of the studies found that more than half of elementary school class time was occupied by non-learning activities, such as waiting, general management activities and other non-instructional activities.[34] By one estimate, 70 percent of teachers need to improve their classroom management skills.[35] According to one research review, even though research is inconclusive about the most effective and practical ways to increase time, most researchers concur that improving teachers' time management techniques would be a good place to start.[36]

Appropriateness of instruction and curriculum. There is consistent research evidence that, in order to enhance student learning, instruction must be provided at a level of difficulty appropriate to the individual student. In other words, the subject matter provided must be matched to the readiness of students to learn it. When this is the case, time matters most. Based on a review of the research literature, one report concluded that the amount of time students spend engaged in learning activities that are appropriately challenging has a powerful and consistent effect on the amount of learning that occurs.[37] Various studies have shown that appropriate instruction consists of learning activities that are geared to the learners' abilities and background, such that students are both challenged and able to experience success. As noted earlier, instructional practices that promote student achievement include timely and specific feedback, attention to prior learning and active participation of the teacher.[38]

It is also critical that instructional practices be geared to student learning differences, including differences in how quickly students learn and how much time they require to learn.[39] Research has demonstrated that it is a waste of time to have students repeatedly go over materials they have already mastered and, equally so, to present materials to students that they are not prepared to learn.[40] In fact, as several researchers warn, such practices can be detrimental to students, reducing their motivation to apply themselves to academic learning and leading, eventually, to frequent absences or even to dropping out of school all together.[41]

For teachers to plan and deliver appropriate instruction requires that they have the ability to see the content – whether mathematics, science or anything else – through the eyes of their students and to know what instructional experiences and subject matter can be used to capitalize on a student's thinking. If they are to do so, teachers must start with a deep understanding of the content they teach. The advent of standards-based education makes this all the more essential: if student achievement is to rise to the high standards being set for what we expect students to know and be able to do, the curriculum must reflect the higher standards and teachers must be able to teach to the higher standards.

Student motivation. Students themselves play an important role in determining the extent to which the time they spend in school will be truly educational. If existing or additional time is to be put to good use, students must be motivated to learn. As one researcher suggests, students make their own decisions about how they will allocate their time and effort to learning tasks,[42] and students who are highly motivated to learn will do so. According to one study, when students are highly interested in a learning activity, they will learn more in a given period of time than when they are less engaged.[43] In addition, increasing student motivation has been demonstrated to lead to better student attendance, thus increasing the amount of time students spend in school,[44] and, therefore, their potential to benefit from appropriate instruction.

Motivation may derive extrinsically from rewards (or punishments) such as grades, promotion, jobs and opportunities. Traditionally, schools, communities, teachers and parents have relied heavily on such extrinsic rewards to motivate students to apply themselves to learning tasks. But, some researchers have suggested that traditional extrinsic rewards may be less of a motivation for students than they once were.[45] After all, for example, graduating from high school, in and of itself, no longer ensures students of being able to go on to college or to get a good job.

Motivation can also be intrinsic, with a student finding the process of education rewarding in itself. A teacher can seed motivation by involving students in exciting, challenging and relevant instructional activities. Conversely, a teacher may squelch a student's motivation through poor instructional practices, such as repetitive seat work, lessons that lack real-world relevance for students and frequent testing.

There is some research evidence that intrinsic motivation may be more powerful than extrinsic motivation when it comes to academic performance. For example, several studies have shown that students are motivated by working in cooperative groups or teams, rather than competing as individuals, and that teamwork increases both achievement and motivation.[46] Another study demonstrated that regardless of how well they perform, students were more motivated by the idea of improving their personal performance than by performing better than their classmates.[47]

So if Time Isn't the Issue, Why Are We Behind?

As mentioned earlier, one reason policy makers and the general public are drawn to the idea of an extended school year is the perception that some of our international counterparts outperform us because they spend more time in school. As with the relationship between time and student performance, the explanation for why U.S. students lag behind their international counterparts appears to be more complex than merely a difference in how much time they spend in school.

At the middle school level, findings from the Third International Mathematics and Science Study (TIMSS) reveals no clear pattern in the relationship between the number of in-class hours teachers reported spending on instruction in math and science and student performance in those subjects.[48] The same is true at the fourth grade level: in four of the seven nations that outperform the U.S. in mathematics, students spend less time in class per week than do U.S. students and also less than the international average.[49] The TIMSS research also suggests that instead of adding time, greater attention should be paid to curriculum, specifically, to the depth and breadth of subject matter covered.[50]

Another study – a review of the literature comparing U.S. and Asian education systems – found, as did the TIMSS study, that factors other than time appeared to account for differences in student performance.[51] This study, like much of the research already cited, concluded that it was not the quantity of time that mattered, but how the time was spent. It found that what seems to account most for differences in achievement are factors such as the quality of teaching and curriculum and the role of parents. There also appear to be important cultural differences with respect to the value placed on education. Specifically, many Asian cultures place a higher priority on education. Academic learning is considered a primary responsibility for students, who consequently spend less time playing sports, working, doing household chores and engaging in leisure activities, such as watching television. Instead, Japan, for example, students spend large amounts of time outside of school doing homework and receiving tutoring, which increases the amount of learning time.

Implications of the Research

There is ample evidence that time plays an important role in student learning outcomes. However, as the research described above makes clear, it is the *quality of education* time that is the critical determinant of how much students will learn. When combined with good school and classroom management and with effective instruction, time becomes an important variable in student learning. To the extent that students spend more time actively engaged in learning activities, particularly when at an appropriate level of difficulty, their achievement will increase. Inherent in this analysis of research on time and learning are the following implications:

1. *In cases where time is already well utilized, such that there is a high proportion of engaged and academic learning time, extending the length of the school day or year is likely to have the desired outcome of increasing student achievement.*

As the research literature demonstrates, the degree to which education time is related to student learning depends on the quality of the time. When school schedules maximize the amount of time available for learning; when instructional time is devoted in large part to academic subjects; when classroom time is well managed; and when curriculum and instruction are appropriate and motivating, students can be expected to learn. Under these conditions, increasing time for learning is likely to lead to increased student learning.

2. *In cases where time is not already well utilized, increasing allocated time is not likely to produce substantial gains in student achievement. In such cases, the first step should be to improve the quality of existing time.*

As the research literature suggests, allocated time by itself has little if any direct impact on student learning. Thus, increasing allocated time – the one time variable state level policy makers can affect – does not translate directly to increased student achievement, because it does not necessarily increase the amount of engaged or academic learning time. Most studies conclude that, without first improving the quality of instruction, extending time by itself is not likely to lead to significant improvements in student learning. While a very large extension of time – adding several weeks to the school calendar, for example – may produce student achievement gains, the cost of doing so would likely be prohibitive. Moreover, available research suggests it would not be as cost-effective as other reforms aimed at increasing student achievement. Historically, state policy makers and public opinion have rejected such dramatic time extensions, in large part because of the associated price tag.[52]

Implications

At the school level, strategies such as better time management, increasing the proportion of time spent on academic subjects and adopting alternative academic calendars can help to maximize the amount of time available for student learning.

As the research literature suggests, in many instances existing education time is eroded by school schedules that devote too much time to activities not directly leading to student learning. Efforts to reduce the time given over to school assemblies, disruptive announcements over the public address system and passing between classes, for example, can increase the time available for learning. Schools might also consider requiring that students spend more of their time taking academic courses, perhaps making elective courses available before or after the formal school day.

In addition, alternative schedules can maximize the time available for learning. Year round schedules, for example, have been demonstrated to shorten the long "summer of forgetting," reducing the amount of time needed for review each fall.[53] The periodic vacation breaks in a year-round schedule, known as intersessions, can be used for remediation or acceleration activities, thereby accommodating students' differing needs.[54] Block scheduling has been shown to maximize instructional time, allowing for more in-depth instruction and interdisciplinary instruction.[55] Block scheduling also reduces the time traditionally devoted to passing between shorter class periods and to starting and stopping activities.[56]

The key to increasing student learning is to maximize the amount of academic learning time; that is, to utilize education time so that students are actively engaged in learning at appropriate levels of difficulty.

This involves, most importantly, improving instructional techniques that engage students and accommodates their different learning backgrounds and styles. As the research indicates, this requires teachers to engage students in learning activities that are appropriately challenging, that provide sufficient opportunities for students to experience success and that are, therefore, motivating. Techniques such as small group work, peer tutoring, providing specific feedback on student work and providing clear expectations have been demonstrated to be particularly effective. As the research evidence suggests, such activities are likely to encourage students to stay in school, reducing their likelihood of dropping out and further increasing the amount of education time students receive.

The research evidence also strongly suggests that teachers must improve their classroom management skills to reduce the large amount of potential instructional time typically lost to non-learning activities.

Standards-based education increases the need to give students more academic learning time.

Standards-based education accentuates the need for more time. Students will need considerably more time if they are to master more challenging curriculum content. In addition, since different students learn in different ways and at different rates, more time will be needed to ensure that ***all*** students are able to attain standards for what they know and can do. Holding all students to the same high standards means that some students will need more time, while others need less time, to attain and demonstrate mastery in a given area. This will necessitate schools providing the flexibility and creativity that would allow students to move through curriculum at their own pace and receive the support they need to master content, as well as to demonstrate that they have done so. Mastering world-class standards will require more time for almost all students.

Teachers also need more time, especially for professional development.

Teachers will also require substantially more time in a standards-based education system. In particular, they will require substantial professional development in areas of curriculum development, teaching standards-based curriculum and assessment.[57] In addition, in order to make the most out of existing instructional time, many teachers will need training in classroom management. As noted earlier, the research evidence suggests that the majority of teachers need to improve the manner in which they use instructional time. Professional development, when done correctly, has been shown to be an effective means of improving both the way teachers use classroom time and the quality of instruction they provide, so that more classroom time is used for academic learning time.[58]

Time outside of school can be used to enhance student learning.

There are a number of ways to increase time for learning outside of the time allocated for school. Homework can extend the amount of learning time beyond school hours.

Starting in the middle grades, when the quality and quantity of assignments are appropriate, homework has been shown to have beneficial effects on achievement. Parent involvement is another important factor; student achievement increases when parents are aware of what students are doing in school and provide support. Other factors, such as how students spend their free time, can effect learning outcomes. For example, watching too much television or working too many hours per week can be detrimental, while extracurricular activities such as internships, community service activities, part-time jobs and sports can enhance student learning opportunities.

Conclusion

In conclusion, it appears that time is but one of several important variables in the complex equation that determines how much students learn in school. The research literature suggests that, while time is certainly a critical factor, by itself it has little direct impact on student performance. Simply adding time to the school year or day would not likely produce large scale gains in student achievement.

Rather, what research studies repeatedly find is that in education, quality is the key to making time matter. Of particular importance is providing curriculum and instruction geared to the needs and abilities of students, engaging them so they will return day after day, continuing to build on what they have learned. In other words, educators must – to the greatest extent possible – make every hour count. What matters most are those catalytic moments when students are absorbed in instructional activities that are adequately challenging, yet allow them to experience success.

This then – maximizing the time during which students are actively and appropriately engaged in learning – is one lens through which any education reform measure should be viewed. Policy makers and practitioners should evaluate any potential reform with an eye to whether and how it will contribute to increasing the amount of time when students are truly learning. Only when time is used more effectively will adding more of it begin to result in improved learning outcomes for all students.

Conclusion

Endnotes

[1] As it turns out, American students are not so far behind in the amount of absolute time they spend in school each year as compared to their foreign counterparts. The American school year, by and large, ranges in length from 175 to 180 days, while the typical school day runs about six hours. In nearly 80% of some 38 countries surveyed in the Third International Mathematics and Science Study, the school year varies from about 190 to 209 days, with the mean being 194. Yet some countries whose students outperform ours in mathematics and science actually have a shorter school year. In Sweden, for example, whose students were among the high performers at the senior high school level, the school year is only 170 days long. This type of time variation even among top performing countries leads TIMSS researcher Senta Raizen to conclude that the issue "isn't time per se, but how it's used." (personal communication 4/6/98)

[2] Barrett, M.J. (1990), as cited in Funkhouser et al. (1995).

[3] IBID.

[4] Personal Communication, Tanya Gross, Education Program Specialist, Oregon State Department of Education.

[5] Because no one has been closely tracking this issue in recent years, knowledge about the intent, history or experience of different states, districts and schools remains sporadic and largely anecdotal.

[6] Hossler et al. (1988). In large part, this is due to the complexity of the undertaking. Given the many factors that influence student achievement, as well as the number of reforms often being implemented in one school, attempting to separate out the impact of one variable -- in this case time -- is extremely difficult. In addition, few districts or schools have extended their calendars to the degree that has been called for, limiting the potential number of sites that could be studied.

[7] Levin (1984).

[8] See, for example, the discussion of Walberg & Frederick (1983), in Karweit (1985).

[9] It is important to keep in mind that most studies have used allocated time as the time variable. Because of the complexity of measuring how time is used at the classroom level, fewer studies have looked at engaged time, and only a small number of studies have attempted to measure academic learning time. However, findings from those studies tend to support this general conclusion. See Cotton, K. & Wikelund (1990).

[10] Moore and Funkhouser (1990). With allocated time, one simply needs to determine the length of the school year and day. When looking at a more refined measure of time, such as engaged time or ALT, one must systematically observe classrooms and carefully estimate the amount of time spent on various activities, which varies by classroom, by teacher, and even by student.

[11] See, for example, Copple et al. (1996); Hossler et al. (1998).

[12] IBID.

[13] This range was reported by Nancy Karweit, as reported in a 1987 report by the National Education Association.

[14] This estimate was calculated by the Beginning Teacher Evaluation Study (BTES), as reported in Karweit (1985).

[15] For example, Kemmerer (1978), as cited in Hossler (1988), found significant variations in the use of instructional time in fifth grade classrooms in different districts; Karweit & Slavin (1981) found that students in 12 classrooms they studied in the same district had spent very different amounts of time "on-task", and that very different proportions of class time were spent on classroom management.

[16] Karweit (1985).

[17] See, for example, Hossler et al. (1988); Karweit (1985).

[18] Quartarola (1984); Moore and Funkhouser (1990).

[19] Funkhouser et al. (1995).

[20] Reported in Copple et al. These estimates were calculated by the National Association for Year-Round Education (1991), based on 1989-1990 data from the NEA.

[21] Sacramento Bee (3/4/98), "Longer Year Put to Test: Oxnard Experiment Adds School Days". Refers to California state budget, which allocates $50 million per year through 2005 for one additional school day annually.

[22] For example, NAYRE estimated the annual cost to be $33 billion per year, while the ECS estimated the cost (for adding only 20 days) to be more than $20 billion nationally. Moreover, these estimates are from 1991 and 1984, respectively, and thus do not reflect current costs.

[23] This estimate, developed by Picus (1993), is for increasing the school year to 200 days, and the school day to 7 hours for all K-12 students nationwide.

[24] See, for example, Ascher (1988); Ellis (1984); Levin (1984); Hossler et al. (1988).

[25] Stanford University, California Institute for Research on Educational Finance and Governance, as described in Levin, 1984.

[26] See, for example, Quartarola (1984); Hossler et al. (1988); Moore & Funkhouser (1990); NECTL (1994).

[27] See, for example, references to Leinhardt (1977), and Wolf (1979), cited in Hossler et al. (1988). Leinhardt (1977) found that a modest positive relationship existed between the amount of instructional time and student achievement. Wolf (1979) concluded that time spent on task was moderately related to student achievement.

[28] Studies also show that, when engaged time in a *particular* subject area is increased, there is a fairly consistent increase in student achievement in that subject area.

[29] Quartarola (1984).

[30] Moore and Funkhouser (1990).

[31] See, for example, Moore and Funkhouser (1990); Quartarola (1984); Hossler et al. (1988); Karweit (1985); Levin (1984).

[32] Because of this, many studies or syntheses of studies conclude that, rather than increasing the length of the school day or year, districts and schools should focus on using existing time better, especially in terms of reducing the amount of instructional time lost to poor classroom management.

[33] Kane (1994). The research reports summarizes, for example, research findings by Karweit (1987); Walberg (1991); and Rosenshine (1990).

[34] Walberg (1991), as described in Kane (1994).

[35] Brandt (1982), as reported in Copple et al. (1992).

[36] Hossler et al. (1988).

[37] Walberg (1988), as described in Kane (1994).

[38] Quartarola (1984).

[39] See, for example, Nelson (1990); Copple et al. (1992).

[40] Copple et al. (1992).

[41] See, for example, Levin (1984); Hossler et al. (1988).

[42] Levin (1984).

[43] Harnischfeger (1985), as reported in Copple et al. (1992).

[44] Funkhouser et al. (1995).

[45] Copple, et al. (1992).

[46] See Copple et al. (1992), for references to studies by Allen and Van Sickle (1984); Okebukola (1985); Slavin (1985); and Sherman & Thomas (1986).

[47] Slavin (1986) in Copple, et. al. (1992).

[48] Beaton, et al. (1996).

[49] Mid-Atlantic Eisenhower Consortium for Mathematics and Science Education and Research for Better (RBS) Schools, *Third International Mathematics and Science Study: A Sourcebook of 4th-Grade Findings*. p. 47.

[50] Schmidt et al. (1996)

[51] Stevenson & Stigler, "The Learning Gap," as described in Funkhouser et al. (1995).

[52] Funkhouser et al. (1995).

[53] Bradford (1990); Funkhouser at al. (1995).

[54] Cooper et al. (1996).

[55] Epstein (1990); Diffily (1991), as cited in Copple et al. (1992).

[56] IBID.

[57] In order to keep up with changing content standards, teachers will need substantial, ongoing coursework in their subject areas, at the same time they are teaching.

[58] See, for example, Denham & Lieberman (1980); Smyth (1985); both in Copple et al. (1992).

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