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ABSTRACT

Research on the influence of instructional time on student achievement has focused on the concept of academic learning time and its major components--allocated time, engaged time, and level of difficulty. This report reviews three studies that concur that increasing allocated time, in itself, has little influence on student achievement. Walberg notes that time is only one of nine major factors affecting student achievement, and argues for the expansion of "productive time" (allocated plus engaged time) through a classroom emphasis on individual student learning differences and small-group instruction. Dewalt and Rodwell's observations in a rural elementary school and Cotton's review of research findings reinforce the necessity of employing sound teaching methods and classroom techniques in conjunction with increased allocated time. Cotton's recommendations for teachers and administrators are listed. Among 12 other related studies, 1 found a clear positive relationship between allocated time and student achievement; 4 found learning time to be a moderate predictor of school achievement; and 7 suggested that considerable increases in the amount of schooling would be required to produce even modest increases in achievement. A table lists state requirements for minimum school days and hours. (SV)

INSTRUCTIONAL TIME AS A FACTOR IN INCREASING STUDENT ACHIEVEMENT

BY

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Much research has been conducted on the influence of instructional time on student achievement. This line of research has considerable support and has examined time as a factor with several different foci or areas of emphasis. This emphasis has centered around the concept of *academic learning time* with its three major components of allocated time, engaged time, and level of difficulty, all of which originated from the Beginning Teacher Evaluation Study (BTES) in the early 70s. This report considers what impact increasing allocated/learning, or in some instances engaged time, has on student achievement.

Walberg (1988), in his synthesis research on time and learning, re-emphasizes the importance of time on learning but argues that simply increasing allocated time will not automatically lead to increased student achievement. He proposes a new concept he terms *productive time* as the new focus of educational reform for increasing student achievement. *Productive time* combines allocated and engaged time and is the actual time a student spends learning from lessons or individual study. *Productive time* allows students to engage in lessons adjusted to their differences in learning rate and background knowledge.

Walberg recommends that this can be accomplished by designing lessons better suited to individual student learning differences and by teaching small-group and individually managed study skills so that students can concentrate more fully. He recognizes that increasing allocated and engaged time can produce modest gains in student achievement but stresses that *expansion of productive time* will increase student accomplishments more while conserving scarce human time.

The author notes that research has identified nine major factors affecting student learning. Time is only one of these nine factors which is a primary reason why simply increasing allocated and engaged time results in only modest student gains. The other factors affecting learning are student ability and development, student motivation or self-concept, quality of instruction, the classroom learning morale, the "curriculum of the home", the peer group outside school, and *minimum leisure-time* **television** viewing. Since these factors are not constant, varying time alone does not become a powerful determinant of learning. Walberg notes that when students vary substantially in the amount of time they spend in learning--i.e. a semester vs. four years of high school Spanish or a few years of living in Madrid with a Spanish family--then time will appear as a large determinant of learning. His main point is that it will require substantial increases in allocated and/or engaged time to affect student achievement because time is but one of several variable determinants of learning. The researcher concludes by citing several studies in the synthesis supporting his conclusion that increasing allocated time is a necessary but not sufficient condition to increase student achievement.

Dewalt and Rodwell's (1988) results gathered in a rural school setting appear to parallel the recommendations Walberg (1988) makes above. They observed in their study of underachieving students in remedial math classes that increasing the length of instruction did not automatically boost student achievement scores. They found no statistically significant difference between the experimental group of remedial fifth, sixth and seventh grade students receiving 30 additional minutes instructional time and the control group receiving no additional instructional time. The results were determined by SRA Math subtests.

The authors did discover some interesting differences with remedial science students in the same study but in a different randomly selected group than the math students. The conditions for the science students were the same as for the math students described above. The results differed significantly, however, with this group of students. Comparing the students' mean pre- and post-test science scores on the SRA indicated a significant difference between the remedial experimental science group's and the control group's mean SRA science subtest scores.

Content analysis of the teacher interviews and classroom observations suggested two major differences between the remedial science teachers' instruction and the remedial math

teachers' instruction. The math teachers tended to re-teach the same material being taught in the regular math class. In contrast, the science teachers tended to teach material that was different from that being taught in the regular science class.

The second difference was that the science teachers were more interested in getting students involved with the overall ideas or general concepts, while the math teachers were interested in working on specific skills. The content presented in the math classes was described as "more of the same," "frustrating--learn a bit of everything," and "practice". In contrast the content described in the remedial science classes was "different," "more fun," and "pulled the concepts of the discipline together."

Increasing allocated time without varying the content presented to the students or without varying the instructional delivery techniques did not increase student achievement according to the results of this study. Dewalt and Rodwell's results appear similar to Walberg's conclusion that increasing time by itself will only minimally affect student achievement.

Cotton (1990) reviewed research findings to determine what influence increasing allocated time has on student achievement. She reported that an overall strategy of increasing allocated time would at best have uncertain outcomes. Her findings agree with those listed above that simply increasing time holds no guarantee that the additional time will be used to any better purpose than the present time is used. She concludes by recommending that teachers better managing their classroom time is one powerful way to improve student achievement and attitudes.

Cotton details some recommendations for teachers and administrators listed below:

- Begin and end lessons on time.
- Reduce transition time between tasks.
- Select learning tasks resulting in high levels of success.
- Cover content as fully as possible.
- Require frequent responses and samples of work, including assigning, collecting, and grading homework regularly.
- Reduce noninstructional activities whenever possible.
- Make certain that the amounts of time allocated to various curricular subjects truly reflect the relative values placed on these subjects by school staff and community members.
- Encourage inservice activities to help teachers learn to use time more effectively.
- Encourage parents to teach respect for teachers and for schooling as a means to reducing time-consuming disciplinary actions.
- Establish clear school policies about tardies and absenteeism and make certain these are enforced.
- Keep loudspeaker announcements and other interruptions of class time to a minimum. (p.8)

Table 1 provides a summary of the major articles and/or studies supporting the conclusions stated above. You will note that Jacobson (1980) was the only study located which indicated a positive relationship between allocated time and student achievement. In her study of

200 third-grade students this researcher determined that students with increased allocated time for mathematics instruction attained greater achievement in math. Jacobson interprets this as a result of the data being stratified by ability level and the fact that vast amounts of allocated time differences existed between the highest and lowest individual students in the sample. For example, in some instances this amounted to more than 100 percent difference.

Table 2 is a compilation of state minimum time standards that are provided to indicate the great deal of uniformity that exists among the states.

CONCLUSION

Research and practice indicate, almost unanimously, that increasing allocated time by itself has little influence on increasing student achievement. Walberg argues for developing more *productive time* which includes time as only one of nine factors he and other researchers have identified as powerful determinants of learning. Dewalt and Rodwell's and Cotton's research reinforce the necessity of employing sound instructional delivery techniques as one powerful determinant of student achievement. In summary, one should use caution when providing more allocated time and expecting it to be better utilized toward increasing student achievement. Too many other factors are involved in the teaching/learning process which limit the influence time has on student achievement.

TABLE 1: Research on Influence of Allocated Time on Student Achievement

Study or Article	Conclusions
Dempster (1987) Heyns (1986) Karweit (1983) Leinhardt & Bickel (1987)	Time devoted to school learning appears to be a moderate prediction of school achievement.
Pintrich (1986) Karweit (1985) Levin & Tsang (1987) Hossler, Stage & Gallagher (1988) Mazzarella (1984) Quaratoria (1984) Slavin (1987)	Considerable increases in the amount of schooling would be required to bring about even modest increases in student achievement. The costs required to do this are not justified.
Jacobson (1990)	Increased allocated time increased student achievement.

TABLE 2: State Calendars for Minimum Number of Days and Hours in School Year*

State	Number of Hours	Number of Days
Alabama	6	175
Alaska	4(K-3); 5(4-12)	180
Arizona	K: 2; 1-3: 4; 4-6: 5 7-8: 6; 9-12: 4 courses	175
Arkansas	5.5	180
California	5 (4-8); 6 (9-12)**	180
Colorado	5.5 (1-6); 6 (7-12)	176
Connecticut	4	180
Delaware	6	180
Florida	3 (K); 4 (1-3); 5 (4-12)	180
Georgia	4.5 (1-3); 6 (4-12)	180
Hawaii	6	180
Idaho	4.5 (K-6); 6(7-12)	177
Illinois	4 (1-2); 5 (2-12)	176
Indiana	5 (1-6); 6 (7-12)	175
Iowa	Local Boards determine	180
Kansas	6	180 (1-11) 175 (12)
Kentucky	6	185
Louisiana	5	180
Maine	5	180
Maryland	6	180
Massachusetts	5 (1-6); 5.5 (7-12)	180
Michigan	5**	180
Minnesota	2.5 (K); 5 (1-3); 5.5 (4-6); 6 (7-12)	175
Mississippi	5	175
Missouri	3 to 7	174
Montana	2 (K); 4 (1-3)· 6 (4-12)	180
Nebraska	Varies 1032 hrs. (Elem.) 1080 (H.S.)	
Nevada	4 (1-2); 5 (3-6) 5.5 (7-12)	180
New Hampshire	4.5 (1); 5.25 (2-8) 5.5 (7-12)	180
New Jersey	4	180
New Mexico	2.5 (K); 4.5 (1-3) 5 (4-6); 5.5 (7-12)	180
New York	5 (K-6); 5.5 (7-12)	180
North Carolina	6	180
North Dakota	5.5 (1-6); 6 (7-12)	180
Ohio	5	182
Oklahoma	2.5 (K); 5 (1); 6 (2-12)	180

TABLE 2: Continued

State	Number of Hours	Number of Days
Oregon	See Column 3	Oregon adopted an annual calendar in 1989 based on a minimum number of hours rather than days. 450 (K) 810 (1-3); 900 (4-8); 990 (9-12)
Pennsylvania	2.5 (K); 5 (1-6) 5.5 (7-12)	180
Rhode Island	2.5 (K); 5 (1-6) 5.5 (7-12)	180
South Carolina	6	180
South Dakota	2.5 (K); 4 (1-3) 5.5 (4-12)	175
Tennessee	6.5	180
Texas	5.75 (1-3); 6 (4-12)	175
Utah	2.5 (K); 5.5 (1-6) 150 hours per unit of credit (7-12)	180
Vermont	2 (K); 4 (1-2) 5.5 (3-12)	175
Virginia	3 (K); 5.5 (1-12)	180
Washington	2.5 (K); 5 (1-3) 5.5 (4-8); 6 (9-12)	180
West Virginia	2.5 (K); 5.25 (1-4) 5.75 (5-12)	180
Wisconsin	None specified	175
Wyoming	2.5 (K); 5 (1-3); 6 (9-12)	180

*Goetz, Margaret E., State Educational Standards: A 50-State Survey. Princeton, NJ: Educational Testing Service.

**Indicates those states which increase funding to local districts for lengthening the school year.

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