DOCUMENT RESUME

ED 213 072 EA 014 332

TITLE	Academic Learning Time. The Best of ERIC on Educational Management, Number 65.
INSTITUTION	ERIC Clearinghouse on Educational Management, Eugene, Oreg.
SPONS AGENCY	National Inst. of Education (ED), Washington, D.C.
PUB DATE	Mar 82
CONTRACT	400-78-0007
NOTE	5p.
AVAILABLE FROM	ERIC Clearinghouse on Educational Management, University of Oregon, Eugene, OR 97403 (free).
EDRS PRICE	MF01/PC01 Plus Postage.
DESCRIPTORS	*Academic Achievement; Educational Research; Elementary Secondary Education; Mastery Learning; *Time Factors (Learning); *Time on Task

ABSTRACT

The twelve papers, articles, and reports presented in this annotated bibliography review theories and evidence on the relationship between learning time and academic achievement in elementary and secondary schools. The papers concentrate on three types of learning time: "time on task," which is the amount of time students are actually engaged in learning; "allocated time," the time a teacher schedules for a learning activity; and "academic learning time," the time a student spends successfully learning. Several papers relate time on task to contextual, instructional, and pupil variables and to the match between a particular student and the difficulty of a task. Other papers suggest a model of the relationship of time to learning and note the significance of time in the mastery learning and direct instruction techniques of teaching. A workshop on how to increase academic learning time in the classroom is described in one article, while the final paper examines the relationship of another kind of time, teachers' lesson preparation time, to academic achievement and students' prior achievement levels. (RW)

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ON EDUCATIONAL MANAGEMENT

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ERIC Clearinghouse on Educational Management

Academic Learning Time

Anderson, Lorin W. Learning Time and Educational Effectiveness. NASSP Curriculum Report, 10, 2, December 1980, pp. 1-12. ED number not yet assigned.

In Denver, a mastery learning project was implemented several years ago that led to an increase in student achievement scores and to improvement in teachers' perceptions of their principals as instructional leaders. In San Diego, a decline in reading scores was apparently reversed with an in-service program for principals and their staffs that outlined the major findings and implications of the studies on academic learning time. And in Philadelphia, the Achieving Schools Expectations Project emphasizes the importance of both expectations and their use for scheduling of activities to reach stated goals.

What is common to these and other exemplary programs, says Anderson, is their emphasis on learning time as a key to improving student achievement. In this report, Anderson briefly reviews these diverse programs, discusses the research evidence on learning time and achievement, and explains two successful instructional approaches that emphasize high levels of time on task.

Time on task, also called engaged time, is the amount of time students are actually attempting to learn. Allocated time, on the other hand, is the amount of time a teacher schedules for a specific learning activity.

Research evidence shows that both time on task and allocated time are related to student achievement. Time on task is increased when students are presented with learning tasks that are at a level of difficulty that promotes success. The time a student spends successfully learning has been labeled "academic learning time" by some researchers.

These findings and others have been incorporated into both the direct instruction and the mastery learning approaches to instruction. Research at both the elementary and secondary levels, concludes Anderson, shows that these approaches tend to enhance both time on task and student achievement.

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Bloom, Benjamin S. Time and Learning. *American Psychologist*, 29, 9 (September 1974), pp. 682-88. EJ 105 074.

Only recently has time become an important variable in studies of school learning. While on the surface this does not seem to be a drastic change, says Bloom, I regard it as one of the most fundamental shifts in our attempt to study school learning. In this clear and well-reasoned article, Bloom discusses time and its relationship to learning and marshals evidence from numerous studies that supports the idea of mastery learning.

In mastery learning studies, 90 percent or more of the students achieve the criterion of mastery when time and help are provided and students are motivated to use the time and help available. In the first learning unit, as expected, some students take five times as long as the fastest students to reach the criterion. In succeeding learning units, 90 percent still attain the criterion, but instead of taking five times as long, the slowest students take three or less times as long. Under mastery learning, says Bloom, students become more effective in their learning of the subject and need less and less help and time to reach the criterion of mastery.

The above results were obtained with data on elapsed time of learning. When time on task was observed, it was found that students under mastery learning conditions increased their time on tasks from 65 to 85 percent over several learning tasks, while students in conventional programs decreased from 65 to 50 percent. It seems to us that one group is *learning to learn* more effectively, says Bloom, while the other group is decreasing in their effectiveness as learners. Time on task, Bloom concludes, appears to be a powerful variable underlying achievement differences.

Cornbleth, Catherine, and Korth, Willard. Instructional Context and Individual Differences in Pupil Involvement in Learning Activity. Paper presented at the American Educational Research Association annual meeting, San Francisco, April 1979. 28 pages. ED 171 409.

Numerous studies have clearly documented the relationship between academic achievement and the proportion of time students are actively involved in learning (involved time). What have not been explored, however, are the factors that influence involved time.

To help fill this gap, Cornbleth and Korth studied four urban fourth-grade classrooms to identify the context, instructional, and pupil variables influencing involved time. Context variables studied included subject area (language arts, math, science, and social studies) and day of week. The instructional variable was the format of academic activity (large group, small group, or individual), and the pupil variable was "high prior achievement growth."

In each classroom, two pupils with high prior achievement growth and two with low prior achievement growth were selected for observation. Individual pupil behavior was coded on a minute-by-minute basis during thirty observation periods distributed across

academic subject area, days of the week, and the [illegible] classrooms.

In congruence with previous studies, the pupils studied were involved in academic learning activities [illegible] percent of the observed time. Pupil involved time varied significantly with subject area. Involved time was greater in social science and science than in the subjects that had a greater amount of allocated time: math and reading. A possible implication, say the authors, is that further increasing allocated time in language and math as some have advocated would have a negligible effect on involved time.

Day of the week was also related to involved time, depending on the subject area, but was not related to the total amount of involved time. Contrary to expectations, both the format of the academic activity and the prior achievement growth of the pupils did not correlate with pupil involved time.

4 **Davidson, Jack L., and Holley, Freda M.** "Your Students Might Be Spending Only Half of the School Day Receiving Instruction." *American School Board Journal* 166, 3 (March 1979): pp. 40-41. EJ 197 895.

Public school students usually spend about six and one-half hours in school each day. But how much of that time is actual instructional time—in which students are involved doing assignments or receiving instruction?

The Austin (Texas) school system became interested in this question in the mid-1970s, in part out of concern for the effectiveness of the district's compensatory education programs. In the 1976-77 school year, district researchers studied time use by following a total of 227 students through their entire school day.

What emerged from the study, according to Davidson and Holley, was "a clear picture of how time was used during the school day." Students in all schools, it was found, spend more than 20 percent of each school day involved in "noninstructional management activities: listening to announcements, taking out and putting away supplies, bathroom trips, discipline, or simply waiting for teacher instruction." When this time, as well as recess and lunch times, were subtracted from the total, only three and three-quarter hours were left to spend on actual instruction.

In response to this grim finding, the district publicized the study's results, emphasized time use in the supervision of elementary schools, reduced the time wasted "by the overlap of multiple federal programs," and worked with a local university to improve classroom management activities.

In the 1977-78 school year, the study was repeated. The major finding, state the authors: "*Instructional time could be increased*. Students in various programs received between twenty-three and thirty-four more minutes of instructional time per day, which is equivalent to sixty-five to ninety-five extra hours of instruction per year! During the same period, elementary students at all grade levels showed improved reading and math scores, and gains were also noted in the compensatory programs."

5 **Denham, Carolyn, and Lieberman, Ann**, editors. *Time to Learn: A Review of the Beginning Teacher Evaluation Study*. Sacramento, California State Commission for Teacher Preparation and Licensing, 1980. 251 pages. ED 192 454.

The original purpose of the Beginning Teacher Evaluation Study (BTES) was to identify desirable competencies for beginning teachers. For a variety of reasons, however, the focus of this complex six-year study shifted to the identification of teaching activities and learning conditions that foster student achievement in the classrooms of experienced second- and fifth-grade teachers. In particular, the study came to focus on the relationship between time and learning.

In the past several years, a host of technical reports and articles have appeared describing the BTES and its results. The publication described here, however, with twenty authors and fourteen chapters, is undoubtedly the most comprehensive and well-organized analysis of the "process, findings, and implications" of the BTES to date.

The major contribution of the BTES study was its identification of Academic Learning Time (ALT) as a prime determinant of student learning. ALT, which is the centerpiece of discussion in this report, is defined as "the amount of time a student spends engaged in academic tasks of appropriate difficulty."

Among the authors are the original researchers from the Far West Laboratory, who summarize the BTES and its results; the coordinator of the project, who describes the history of the BTES; several university researchers and teacher educators, who comment on the many implications of the BTES and ALT; and two elementary educators (a principal and a teacher), who discuss their experiences with BTES concepts.

Other authors discuss the key role of the principal in implementing new practices based on BTES research, the difficulties and processes of translating research into practice, and the possible policy-making implications of the BTES. This excellent publication maintains a clear and readable style throughout.

6 **Fisher, Charles; Marliave, Richard; and Filby, Nikola N.** "Improving Teaching by Increasing 'Academic Learning Time.'" *Educational Leadership*, 37, 1 (October 1979), pp. 52-54. EJ 208 058.

In most classrooms, a certain amount of time is usually allocated each day for a particular subject. For some part of that allocated time, students are actively engaged in the academic task. And for some part of the student's engagement time, he or she is experiencing a high rate of success in mastering the learning task.

Fisher, Marliave, and Filby call this last portion of time the "Academic Learning Time" the student is receiving. In the Beginning Teacher Evaluation Study, these researchers and their colleagues studied allocated time, engagement time, and

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Academic Learning Time in forty-six elementary classrooms. They found that all three varied substantially between classes or between individuals within these classes. And they found that all three measures of learning time were positively related to student achievement.

Students who spent more time in high success activities and thus accumulated more Academic Learning Time had higher achievement scores in the spring, better retention of learning over the summer, and more positive attitudes toward school. On the other hand, the proportion of time that students spent in low success activities was negatively associated with learning. Thus, the amount of student learning is influenced not only by the amount of engaged time, but also by the match between the task and the particular student, say the authors.

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7 **Fredrick, Wayne C., and Walberg, Herbert J.** "Learning as a Function of Time." *Journal of Educational Research* 73:4 (March-April 1980), pp. 183-204. EJ 226 530.

In a recent survey, high school administrators ranked skipping class, truancy, and lateness as their top discipline problems. These results, say Fredrick and Walberg, illustrate "the practical importance of time in the minds of school administrators." In this article, these authors review numerous studies relating learning and quantity of instruction and thus illustrate the "theoretical and empirical importance" of time as well.

The studies reviewed are grouped according to the magnitude of time measure used: years of schooling, days of instruction, hours of classes, or minutes of study. Several of the studies are analyzed in detail "to exemplify theoretical, methodological, and interpretative points."

Studies of the effect of years of schooling show a "modest but persistent association" between time and various outcome measures, such as knowledge, intelligence, skills, and language learning. Studies using days of instruction as the time variable, however, showed "inconsistent" results. Groups of studies using hours of instruction and minutes of study both showed "moderate" connections between time and resulting achievement.

Fredrick and Walberg next discuss three theories about time and learning. The theory of "diminishing returns" states that, beyond a certain point, incremental increases in achievement or mastery of a task will take longer and longer to achieve. In the theory of "enrichment," which is now prevalent, time of instruction "remains constant for all students, and the normal curve of achievement is a function of the normal curve of initial ability." In the theory of "acceleration," on the other hand, which is often called "mastery learning," a certain level of achievement is required for all students, and the students are given varying times to achieve it.

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8 **Guthrie, John T.; Martuzza, Victor; and Seifert, Mary.** *Impacts of Instructional Time in Reading.* Pittsburgh: Learning Research and Development Center, University of Pittsburgh, 1976. 71 pages. ED 155 645.

The Coleman report (1966) and similar studies came to the conclusion that schools had little influence on student achievement. The school factors measured in these studies included the presence in the school of a speech therapist and librarian, the principal's education, experience of teachers, and so forth. But none of these factors, state Guthrie, Martuzza, and Seifert, "have any direct concrete bearing" on what and how children are taught, or what they learn.

Reading teachers and researchers have been "blissfully free of doubts raised by others" and have not questioned whether instruction is a determinant of learning. Instead, these sensible educators have attempted to determine *what* types of teaching are most effective. The authors of this report continue in this tradition and analyze here the impact on student achievement of time allocated to instruction and other instructional characteristics.

The data the authors analyze were originally collected by the Educational Testing Service in a study of compensatory reading programs. Achievement gains were measured with standardized tests of second- and sixth-graders in 264 schools, while other variables were measured through principal and teacher questionnaires.

The findings suggest that time in formal reading instruction is an educational variable that is likely to increase achievement in reading," the authors conclude. Children in compensatory programs and children in the second grade appeared to be more strongly influenced by increased reading instruction than regular or sixth grade students.

The type of instructional emphasis appeared to have less impact on achievement than instructional time. And socioeconomic level and sex of pupils appeared to have no influence on achievement.

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9 **Harnischfeger, Annegret, and Wiley, David E.** *Teaching-Learning Processes in Elementary School: A Synoptic View. Studies of Educative Processes. Report No. 9.* Berkeley, California: Far West Laboratory for Educational Research and Development, 1975. 86 pages. ED 124 509.

"It is abundantly obvious that—when circumstances such as aptitudes and supporting conditions do not vary—the more time an individual spends trying to learn, the more he will learn." Unfortunately, say the authors of this excellent report, most research efforts in education have ignored this important factor in achievement and, instead, have focused on studying variations of aptitude and supporting conditions.

"Usually," the authors continue in their entertaining style, "investigators voluntarily don blinders which take root and grow into an integral part of their research personality." Only rarely do researchers study "integrant parts of schooling" or attempt to link such issues to educational policy. The authors elaborate on this view of educational research and then begin to construct their own "comprehensible model for classroom teaching-learning processes."

This model, based on the ideas of J. B. Carroll and Benjamin Bloom, assumes that "the total amount of active learning time on a particular instructional topic is *the* most important determinant of pupil achievement on that topic." It further assumes that there is "enormous variation" in individual students' learning times.

The model leads from "Quantity of Schooling" as defined by district policy to student achievement." In between are the "pivots" of "Pursuit Time" in a curricular area, "Active Learning Time," and, finally, "Comprehended Content." Only the active portion of the time assigned to a task is effective for learning. Thus, the goals of a teacher in this model are to maximize active learning time and channel the active learning into comprehension.

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10 **Lomax, Richard G., and Cooley, William W.** "The Student Achievement-Instructional Time Relationship." Paper presented at the American Educational Research Association annual meeting, San Francisco, April 1979. 30 pages. ED 179 598.

In recent years learning time has become a frequent topic of discussion in the educational research literature. "In these discussions," say Lomax and Cooley, "there has been almost universal agreement as to the importance of instructional time as a major explanatory variable of student achievement."

But how consistent are the research results on the student achievement-instructional time relationship? To find out, the authors reviewed the research literature on this topic, in particular those studies that dealt with reading and mathematics instruction in

the elementary grades. In this paper they also discuss several methodological concerns that should be addressed in future research on this topic.

Since 1963, when J. B. Carroll proposed his time-related model of student achievement, three bodies of literature have appeared on the time-learning relationship: general classroom research, instructional time research, and attention research. Tomas and Cooley describe and critique studies in each of these areas and compile their results in four tables, which are appended.

We have found in reviewing the research, they conclude, that the relationship between instructional time and student achievement has not been as strongly and consistently substantiated in the literature as most educational researchers have believed. This relationship, however, could be stronger if certain methodological guidelines were followed in future studies.

Instructional time, for example, should be defined as the time a student is actually engaged in learning or is paying attention. Also, the curriculum and the achievement test used should have significant overlap. Finally, data plots should be used to detect nonlinear relationships, a smaller number of variables should be used, and observation time should extend for as long as funding will permit.

11 **Sally, Mary.** Free the Teacher Laboratory Helps Educators Break the Bonds That Restrict Their Teaching Time. *Educational R & D Report*, 4, 3 (Fall 1981), pp. 8-12. ED number not yet assigned.

A recent study has shown that student achievement can be increased by making good use of the time allocated to instruction, by increasing the percentage of time students are actually engaged in learning, and by assuring that students spend at least half their time working on tasks in which they experience high success. Another study has shown that available instructional time is increased in classrooms in which the teacher firmly establishes and communicates classroom rules during the first few days of school.

These research findings and others form the basis for a successful school improvement workshop now being offered by the Mid-continent Regional Educational Laboratory (McREL), which Sally here describes. According to Sally and educators interviewed in this article, the McREL workshop series is unusual in that it *successfully* translates research findings such as those above into useful and specific classroom and school management strategies.

The first step in the McREL approach to increasing academic learning time in a school is to have the school's teachers calculate their own allocations of time during the day, and to observe one another's classrooms to determine student engaged time and success rates on activities. Once these data are collected and appropriate targets for improvement have been decided on, the workshop actually four one-day sessions over a several-month period) concentrates on presenting strategies in classroom management, building management, and student time.

Principals are particularly important in this school improvement program, Sally stresses. The principal must make sure participants carry out the improvement efforts for their buildings and must take the lead in implementing schoolwide improvement strategies.

10 **Talmage, Harriet, and Rasher, Sue Pinzur.** A Study of the Effects of Three Dimensions of Instructional Time on Academic Achievement. Paper presented at the American Educational Research Association annual meeting, San Francisco, April 1979. 21 pages. ED 173 327.

Research has confirmed that the more time teachers spend on direct instruction, the more time students are actively engaged in academic tasks. As expected, a positive relationship also exists between the amount of direct instruction and student achievement. But what, ask Talmadge and Rasher, is the relationship between teacher preparation time and achievement? And how does the extent of curriculum coverage influence academic achievement?

To find out, the authors studied 165 elementary school classes throughout the United States that were all using a sequential nutritional education curriculum. The teachers were encouraged during inservice training to spend about twenty hours on each instructional unit, and to keep an instructional log of time in minutes spent on both preparation and direct instruction. Most teachers were also observed on at least three occasions during the experimental period.

The researchers found that an increased amount of direct instructional time was "positively related to higher posttest scores of students with low prior achievement." Students with high prior achievement, however, showed decreasing posttest scores with increasing direct instruction. On the other hand, increased teacher planning time appeared to benefit students with high prior achievement and hinder those with low prior achievement.

The authors speculate that teachers use their preparation time "to work out imaginative, higher cognitive thought process activities." Previous research shows that "challenging activities enhance academic achievement in high ability students," but tend to lower achievement in low achieving students.

This publication was prepared with funding from the National Institute of Education, U.S. Department of Education, under contract no. 400-78-0007. The opinions expressed in this report do not necessarily reflect the positions or policies of NIE or the Department of Education.

Prior to publication, this manuscript was submitted to the Association of California School Administrators for critical review and determination of professional competence. The publication has met such standards. Points of view or opinions, however, do not necessarily represent the official view or opinions of the Association of California School Administrators.

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