

What Helps Students Learn?

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An analysis of 50 years of research reveals that direct influences like classroom management affect student learning more than indirect influences such as policies.

Changes in education should be grounded in a knowledge base derived from research, and such a base is now beginning to take shape. By analyzing the content of 179 handbook chapters and reviews,

compiling 91 research syntheses, and surveying 61 educational researchers, we created a knowledge base comprising 11,000 statistical findings that shows reasonable consensus on the most significant influences on learning (Wang, 1990, Reynolds et al. 1992).¹

In general, we found that direct influences have a greater impact on learning than indirect influences. Direct influences include the amount of time a teacher spends on a topic and the quality of the social interactions teachers have with their students. Indirect influences include policies adopted by a school, district, or state, and organizational features such as site-based management.

Accumulating the Data

We summarized the results of our analysis, using a 28-category conceptual framework based on models of schooling that posited influences on learning.² The earlier models included variables such as student ability, motivation, prior knowledge, and background. Classroom instructional variables such as enthusiasm, clarity, feedback, and correctives were also key elements. Increasingly, models of schooling have been extended to include out-of-school variables, social-psychological influences,

instructional delivery systems, program design, and implementation. Figure 1 lists the 28 categories of the conceptual framework we employed and a representative variable for each category.³

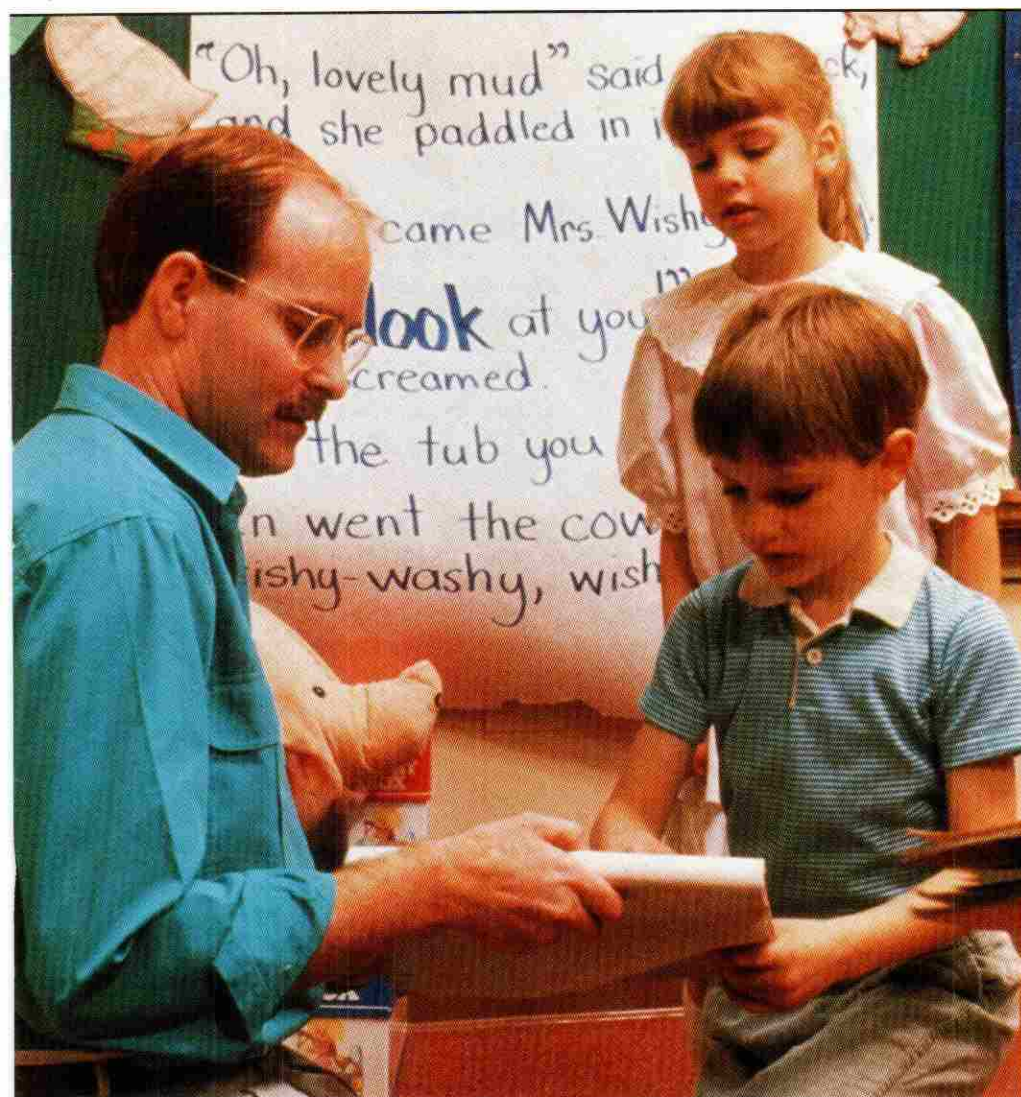
By combining the results from the content analysis, the research synthesis, and the survey of experts, we obtained an average score for each of the 28 categories.⁴ Figure 2 presents the 28 categories of influence from most to least influential. Classroom management, metacognitive processes, cognitive processes, home environment/parental support, and student and teacher social interactions had the greatest influence on school learning. Program demographics, school demographics, state-level policies, school policies and organization, and district demographics had the least influence on learning.

This method of statistically aggregating the findings of many studies varying in sample size, rigor, and characteristics is called *meta-analysis*. Meta-analysis yields estimates of the effect of all studies that can be found for a given method or condition. Thus, the estimates we obtained represent an average or mean effect.

It should be noted that many of the meta-analyses were based only on standardized tests, essay examinations, and other traditional measures of learning outcomes. Few studies employed portfolio ratings, exhibitions, laboratory exercises, and other newly recommended measures, largely because little research has been done on such measures. Nonetheless, the many scholars who participated in our survey showed a high level of consistency in weighing the possible



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effects of some of the methods and conditions on the new outcome measures. The collective judgment of these experts then served as one of the indexes of the effectiveness of each method.

To better understand which influences were most important, we grouped the 28 categories into six broad types of influences: student aptitude, classroom instruction and climate, context, program design, school organization, and state and district characteristics (see fig. 1). Figure 3 lists the six broad categories and their average rating of influence. These averages again confirmed the significant effect of direct influences.

Student Aptitude

Our research indicated that student aptitude was the most influential of the six broad types of influences. Among

the categories of student aptitude, a student's *metacognitive processes*—that is, a student's capacity to plan, monitor, and, if necessary, re-plan learning strategies—had the most powerful effect on his or her learning. Research on metacognitive processes has generated new curriculums and new instructional techniques such as reciprocal teaching and cognitive skills instruction.

Cognitive processes were also identified as highly influential. Cognitive processes include not only variables such as general intelligence, but also prior knowledge, competency in reading and mathematics, and verbal knowledge.

Given the social nature of schooling, *social and behavioral attributes* constitute an important category. Children who frequently engage in disruptive behaviors, such as talking out of turn or hitting other children,

often perform poorly in school, while children who engage in constructive behaviors are more likely to perform well.

The category *motivational and affective attributes* has received increased attention in the past decade. Student motivation determines effort and perseverance. Long acknowledged as significant by classroom teachers, effort and perseverance are now regarded by educational researchers as key attributes necessary for developing self-controlled, self-regulated learners.

Two remaining influences, *psychomotor skills* and *student demographics* (for example, gender and socioeconomic status) were minimally influential.

Classroom Instruction and Climate

When averaged together, the different kinds of classroom instruction and climate had nearly as much impact on

learning as the student aptitude categories. The most influential category, *classroom management*, includes group alerting, learner accountability, smooth transitions, and teacher "with-it-ness."⁵ Effective classroom management increases student engagement, decreases disruptive behaviors, and makes good use of instructional time.

Constructive *student and teacher social interactions* also have a documented effect on school learning. The frequency and quality of these interactions contribute to students' sense of self-esteem and foster a sense of membership in the class and school.

The extensive research on *quantity of instruction* indicates that students need to be fully engaged in their academic pursuits and teachers need to make wise use of instructional time. Other things being equal, the more time spent in instruction, the better (within limits, of course).

Classroom climate refers to the socio-psychological dimensions of classroom life, including cooperation among teachers and students, common interests and values, the pursuit of common goals, a clear academic focus, well-organized and well-planned lessons, explicit learning objectives, an appropriate level of task difficulty for students, and an appropriate instructional pace (Haertel et al. 1981).

Classroom instruction includes the techniques for ensuring that students understand both the goals of instruction and the content being presented. One example of these techniques is direct instruction, which emphasizes systematic sequencing of lessons, including the use of review, the presentation of new content and skills, guided student practice, the use of feedback and correctives, and independent student practice.

Figure 1

Twenty-Eight Categories of Influence on School Learning

Categories	Examples of One Variable in Category
Student Aptitude includes gender; academic history; and a variety of social, behavioral, motivational, cognitive, and affective characteristics.	
1. Metacognitive Processes	<i>Comprehension monitoring (planning; monitoring effectiveness of attempted actions and outcomes of actions; testing, revising, and evaluating learning strategies)</i>
2. Cognitive Processes	<i>Level of specific academic knowledge in subject area</i>
3. Social and Behavioral Attributes	<i>Positive, nondisruptive behavior</i>
4. Motivational and Affective Attributes	<i>Attitude toward subject matter instructed</i>
5. Psychomotor Skills	<i>Psychomotor skills specific to area instructed</i>
6. Student Demographics	<i>Gender and socioeconomic status</i>
Classroom Instruction and Climate includes classroom routines and practices, characteristics of instruction as delivered, classroom management, monitoring of student progress, quality and quantity of instruction provided, student-teacher interactions, and classroom atmosphere.	
7. Classroom Management	<i>Group alerting (teacher uses questioning/recitation strategies that maintain active participation by all students)</i>
8. Student and Teacher Social Interactions	<i>Positive student response to questions from teacher and other students</i>
9. Quantity of Instruction	<i>Active engagement in learning</i>
10. Classroom Climate	<i>Cohesiveness (class members share common interests and values and emphasize cooperative goals)</i>
11. Classroom Instruction	<i>Clear and organized direct instruction</i>
12. Academic Interactions	<i>Frequent calls for substantive oral and written response</i>
13. Classroom Assessment	<i>Assessment used as a frequent, integral component of instruction</i>
14. Classroom Implementation and Support	<i>Establishing efficient classroom routines and communicating rules and procedures</i>

Both *academic interactions* and *classroom assessment* were moderately influential. Academic interactions include teachers' styles for questions, praise, reinforcement, and use of correctives. Classroom assessment, perhaps more than other methods, depends heavily on the nature and implementation of the assessment for its effectiveness. Many studies indicated that frequent assessment and feedback effectively promoted learning. Some researchers, however, were concerned about national and state assessments and outcome-based

education driving educational reform. The mixture of these good results and grave concerns probably accounted for the moderate rating for assessment.

Classroom implementation and support deals with the delivery of instructional services, and staff development and the adequate training of teachers. This category was the least influential of the classroom instruction and climate categories. As with other categories that have been perceived by educators as important but which showed a weak influence on student learning, this category's weak showing

Context includes community demographics, peer culture, parental support and involvement, and amount of time students spend out of class on such activities as television viewing, leisure reading, and homework.

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| 15. Home Environment/Parental Support | <i>Parental involvement in ensuring completion of homework</i> |
| 16. Peer Group | <i>Level of peers' academic aspirations</i> |
| 17. Community Influences | <i>Socioeconomic level of community</i> |
| 18. Out-of-Class Time | <i>Student participation in clubs and extracurricular school activities</i> |

Program Design refers to the physical and organizational arrangements for instructional delivery and includes strategies specified by the curriculum and characteristics of instructional materials.

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| 19. Curriculum Design | <i>Instructional materials employ advance organizers</i> |
| 20. Curriculum and Instruction | <i>Alignment among goals, content, instructions, students assignments, and evaluation</i> |
| 21. Program Demographics | <i>Size of instructional group (whole class, small group, one-on-one instruction)</i> |

School Organization refers to culture, climate, policies, and practices; includes demographics of the student body, whether the school is public or private, funding for categorical programs, school-level decision-making variables, and school-level policies and practices.

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| 22. School Culture | <i>Schoolwide emphasis on and recognition of academic achievement</i> |
| 23. Teacher/Administrator Decision Making | <i>Principal actively concerned with instructional program</i> |
| 24. Parental Involvement Policy | <i>Parental involvement in improvement and operation of instructional program</i> |
| 25. School Demographics | <i>Size of school</i> |
| 26. School Policies | <i>Explicit schoolwide discipline policy</i> |

State and District Characteristics refers to governance and administration, state curriculum and textbook policies, testing and graduation requirements, teacher licensure, provisions in teacher contracts, and district-level administrative and fiscal variables.

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| 27. State-Level Policies | <i>Teacher licensure requirements</i> |
| 28. District Demographics | <i>School district size</i> |

may reflect the lack of implementation of its variables more than its relative influence. Although teachers may receive training on how to implement a particular practice or innovation, they may not be successful at putting these practices into action. This can be due to lack of resources, such as time or materials, or a lack of fit between existing classroom and school routines, instructional goals, and the new innovation.

Even though classroom implementation and support variables did not appear to be strong determinants of

student performance in the present knowledge base analysis, they can have large effects if they are well implemented and well aligned with school and district goals. However, implementation not geared toward the targeted student outcomes may do little to enhance student learning.

Context

The four out-of-school contexts influenced school learning to nearly the same degree as student aptitude and classroom instruction and climate. The category *home environment/parental*

support was among the most influential of the 28 categories. The benefits of family involvement in improving students' academic performance have been well documented, as have its effects on improving school attendance and on reducing delinquency, pregnancies, and dropping out (Epstein 1984, Moles 1982, Peterson 1989, Walberg 1984). According to the data reported in the current research, the *peer group* category also had a strong influence on school learning.

The *community influences* category had less effect on school learning than either the home environment/parental support or the peer group categories. Only recently has the influence of the community on school learning been examined through empirical studies, and the evidence is not yet sufficient to suggest strong effects.

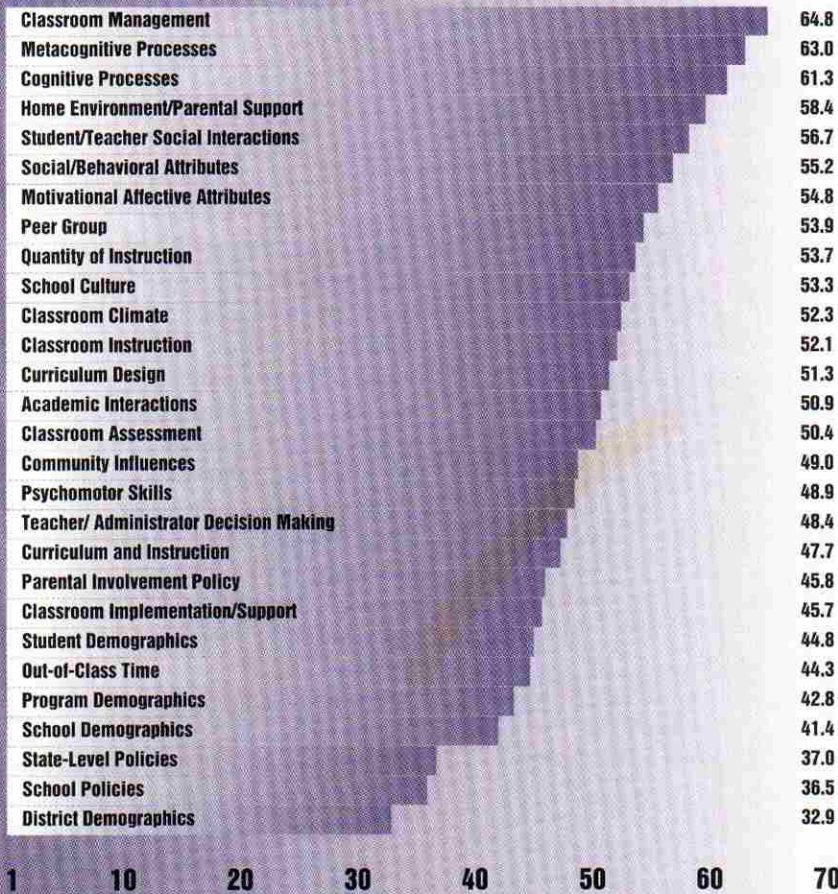
Out-of-class time includes student extracurricular activities and social clubs. These activities had considerably less influence on school learning than the other contextual influences. The lack of measurement of the degree or validity of implementation limits research on student activities. Nevertheless, if well designed and well executed, such activities can contribute much to academic accomplishments. Out-of-class time spent on nonconstructive or nontargeted educationally related activities would not likely yield the expected student outcomes.

Program Design

As a set, the three program design categories had a moderate influence on learning. Well-designed textbooks, appropriate organization of instructional groups, and effective alignment of goals and classroom activities yielded moderate benefits. The degree

Figure 2

Relative Influences on Learning



State and District Characteristics

Of the 28 categories we examined, *state-level policies* and *district demographics* were among the least influential in improving student learning. Most of the variables included in these two categories are associated with school governance and administration. Examples of state-level policies include requirements for teacher licensure and evaluation and guidelines for the development and selection of curriculums and textbooks. Examples of district demographics include per-pupil expenditure, contractual limits on class size, and the degree of school district bureaucracy. Given that state and district influences are many steps removed from day-to-day classroom life, their impact on student learning is understandably limited.

Building on the Base

Although our three independent sources of evidence generally agreed on the impact of the 28 categories on school learning, discrepancies existed, indicating areas for additional research. Hopefully, future studies and syntheses will yield greater consistency, but obtaining precise results has limitations. Due to varying circumstances and implementation, educators should not expect results identical to what others have attained. Practices that work well in some settings and with some students may not work well in others (although evidence for such exceptionality is easier to hypothesize than to show consistently).

The estimates obtained on the effectiveness of various educational strategies for improving student learning provide a set of considerations for formulating educational policies and practices as well as a way of identifying school improvement priorities. Overall, our findings support renewed

of program implementation is one likely determinant of the impact of program design variables on student learning.

School Organization

On average, school organization yielded moderate influence. Of its five categories, *school culture* was the most influential. School culture is an ethos conducive to teaching and learning. For example, a school might convey its academic atmosphere through participation in intramural academic competitions or through the use of incentives to reward student scholarship.

The category *teacher/administrator decision making* focuses on the role of the principal as an instructional leader. Although much attention has been paid to the importance of the principal's role, the research showed no strong link between principal leadership and student performance. The

influence of an outstanding principal may be mitigated by many factors such as a high teacher turnover rate, an inexperienced team of teachers, or a high concentration of students in at-risk circumstances.

Parental involvement policy refers to parent involvement in the improvement and operation of the instructional program. A school may adopt a parental involvement policy, but successful implementation of a policy closely related to student development has a greater impact on student learning.

The last two categories, *school demographics* and *school policies*, had little influence on school learning compared to the other 28 categories. School demographics include the size of the school, the number of classrooms, and the number of teachers and aides. Examples of school-level policies include assertive discipline and telephoning the home when a child is tardy or absent.

Figure 3

Types of Influence	Average Influence
Student Aptitude	54.7
Classroom Instruction and Climate	53.3
Context	51.4
Program Design	47.3
School Organization	45.1
State and District Characteristics	35.0

emphasis on psychological, instructional, and contextual influences.

Paradoxically, the state, district, and school policies that have received the most recent attention appear to have the least influence on learning. Fifty years of research contradict educators' current reliance on school restructuring and organizational variables as key components of school reform. Because indirect influences may only affect direct influences, they appear to be weaker and less consistent in their results. For example, implementing a districtwide policy for teacher evaluation does not guarantee that students in any given classroom will have a competent teacher.

Unless reorganization and restructuring strongly affect the direct determinants of learning, they offer little hope of substantial improvement. Changing policies is unlikely to change practices in classrooms and homes, where learning actually takes place. Better alignment of remote policies and direct practices and more direct intervention in the psychological determinants of learning promise the most effective avenues of reform. ■

¹This research was supported by the Temple University Center for Research in Human Development and Education and by the Office of Educational Research and Improvement of the U.S. Department of Education. The opinions expressed here do not necessarily reflect the position of the supporting agencies. For complete details on the methods and results of the syntheses, see M. C. Wang, G. D. Haertel, and H. J. Walberg, (1993), "Toward a Knowledge Base for School Learning," *Review of Educational Research* 63, 3.

²Models reviewed included those by S. N. Bennett, B. S. Bloom, J. S. Bruner, J. B. Carroll, R. Glaser, and A. Harnischfeger and D. E. Wiley. See G. D. Haertel, H. J. Walberg, and T. Weinstein, (1983), "Psychological Models of Educational Performance: A Theoretical Synthesis of Constructs," *Review of Educational Research* 53: 75-91; M. C. Wang and C. M. Lindvall, (1984), "Individual Differences and School Learning Environments," in *Review of Research in Education, Vol. 11*, edited by E. W. Gordon (Washington D.C.: American Educational Research Association), pp. 161-225; and M. C. Wang and H. J. Walberg, (1985), "Classroom Climate as Mediator of Educational Inputs and Outputs," in *The Study of Learning Environments 1985*, edited by B. J. Fraser (Salem, Ore.: Assessment Research), pp. 47-58.

³The variables listed as part of the conceptual framework were transformed into a 228-item rating form and used to code results from the narrative reviews and research syntheses. Based on the proportions of the confirmatory studies reported, the size of the correlations, or qualitative indicators, we rated the data culled from the narrative reviews and the research syntheses on a three-point scale. A "1" indicated a weak relationship between a given strategy and student learning while a "3" indicated a strong relationship.

⁴To make the results comparable, the data from the three sources were transformed into T scores, standard scores with a mean of 50 and a standard deviation of 10. The relative influences on the variables were calculated by weighing composites of effect sizes and ratings obtained from experts and content analyses of authoritative literature.

⁵The relationship between well-managed classrooms and student achievement is documented in J. Brophy and C. M. Evertson, (1976), "Learning," in *Teaching: A Developmental Perspective*. (Boston: Allyn & Bacon); and in T. Good, (1979), "Teacher Effectiveness in the Elementary School: What We Know About It Now," *Journal of Teacher Education* 30: 52-64.

Some of the earliest and most informative research on classroom management resulted in the new terminology described in J. Kounin, (1970), *Discipline and Group Management in Classrooms*, (New York: Holt, Rinehart & Winston).

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