TEACHING

Opportunities to Learn in America's Elementary Classrooms

Analysis of elementary school classrooms in the United States returns a discouraging report on the quality of students' experiences.

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America's students are tested regularly, and the results serve as justification for closing schools, firing principals, awarding merits, and focusing professional development and curriculum reform. However, little attention is paid to measuring the opportunities to learn that teachers create in classrooms—the quantity and quality of classroom instruction and relationships between teachers and students. Nearly all state certification standards for "highly qualified teachers" focus on degree status (*1*, *2*). However, despite evidence that teachers' instructional practices and relationships with students account for a substantial portion of the "added value" derived from attending school (*3*–*5*), observations of classroom experiences for large samples of students and teachers are limited.

The Study

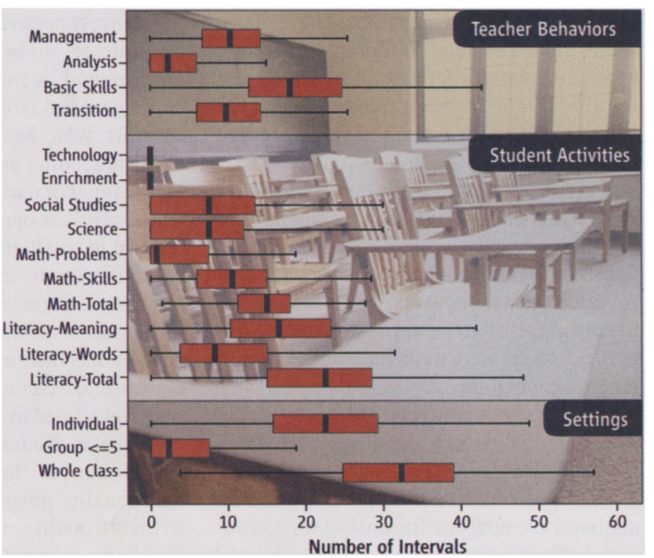
Here, we describe results from a study of elementary school classroom experiences for more than 1000 American children recruited at birth from 10 U.S. sites and enrolled in more than 2500 classrooms in more than 1000 elementary schools and 400 school districts. Our investigation approximates an epidemiological study of opportunities to learn in U.S. classrooms, although the sample was not nationally representative. Of teachers observed, 90% were credentialed by their state; all had a bachelor's degree and 44% had a master's degree. These teachers meet many states' standards for highly qualified elementary school teachers (*1*).

Observation of classrooms complements student test performance as a measure of quality in the educational system and can document opportunities to learn that are reflected in students' performances on tests. We observed first, third, and fifth grades. First, we coded the presence of 44 behavioral events for 80 one-minute intervals. In a given school day, intervals were clustered into eight 10-minute cycles of coding, in which 30-second periods of observation alternated with 30-second periods of recording. Next, we rated nine dimensions of the quality of the emotional and instructional climate on the basis of 20 minutes of observation, again across eight cycles during the day. We used these codes and ratings to assess opportunities to learn (*6*, *7*).

Experiences in the Classroom

The results for fifth grade (see chart) are similar to those for first and third grades (*8*, *9*). In fifth grade, children spent most of their time (91.2%) working in whole-group or individual-seatwork settings. Students spent little time (7%) in small-group instruction (two to five students). In fifth grade, 37% of instruction was in literacy and 25% was in math; in first and third grade, more than 50% of instruction was in literacy and less than 10% was in math. Science and social studies activities occurred in 11 and 13% of intervals in fifth grade, respectively. The average fifth grader received five times as much instruction in basic skills as instruction focused on problem solving or reasoning; this ratio was 10:1 in first and third grades. Teachers in fifth grade spent 17% of their time instructing students on managing materials or time.

Classroom emotional and instructional climate was rated with the use of a seven-point scale, in which higher ratings were more positive (*8*, *9*). In correlational studies, relatively higher ratings predicted gains on standardized tests of reading and math in pre-kindergarten (*10*), reading in first grade (*3*), and math in fifth grade (*9*). Emotional climate of classrooms was moderately positive—the mean rating over all classrooms for "teacher sensitivity" and "positive classroom climate" was about 5. Children in the classrooms we observed were often working on assignments, with "productive use of time" rated 4.9. However, quality of instructional climate received a low rating. "Richness of instructional methods," reflecting conceptually focused instruction, averaged 3.6, and "evaluative feedback" on student performance averaged 3.44. Typically, over the course of a 20-minute period, instruction involved only one method or mode (e.g., vocabulary worksheet or watching the teacher do math problems), and teachers gave generic feedback on correctness rather than encouraging extension of student performance or discussing alternative solutions. Ratings of instructional and emotional quality in fifth grade were similar to those for first and third grades.



Learning in fifth-grade classrooms. Number of time intervals in which the specified activities were observed. Black whiskers, range; red boxes, 25th to 75th percentiles; gray bars within boxes, overlapping median and mean.

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Predicting Classroom Climate

Composites reflecting our ratings of the quality of the emotional and instructional climate were examined with various teacher, student, child, and family factors (table S5). Teacher credentialing was not investigated because nearly all teachers met state requirements.

Larger class size was associated with less positive emotional climate. (Class size ranged from 10 to 42 students.) Quality of instructional climate was higher when teachers had fewer years of teaching experience, earned higher salaries, and reported more influence on school policy and efficacy. The magnitude of these significant associations was very small, and causal direction is unknown. The total variance attributed to emotional and instructional climate accounted for less than 10% of the differences in observed quality of the classroom environments. Children with more highly educated mothers and with higher family income were more likely to be enrolled in classrooms with higher observed emotional and instructional climates. These associations with family characteristics were statistically significant but small.

Consistency of a Child's Experience

A child's classroom experience was not particularly consistent from first to third to fifth grade. Results were not a function of (some) children switching schools. Quality of emotional environment was modestly stable from first grade to third grade ($r = 0.17$, $P < 0.05$) and from third grade to fifth grade ($r = 0.25$, $P < 0.05$), but corresponding across-grade analysis for quality of instructional climate did not show statistically supported correlations. We divided climate composites into terciles at each grade. Children were classified as "consistently" in high-quality classrooms if they were enrolled in a high-tercile class in two or more grades and were never enrolled in a classroom in the lowest tercile. Students in "consistently" low-quality classrooms were enrolled in accordingly low-tercile classes and never in the highest tercile. Only 17% of children experienced classrooms with consistently high emotional climate, and 19% experienced classrooms with consistently low emotional climate. Comparable figures for instructional climate were 14 and 20%, respectively. Across all three grades, 7% of children experienced classrooms high on both instructional and emotional climate.

We predicted each child's enrollment in our consistency classifications using the child's scores on standardized tests of reading and math at age 54 months, prior to school entry, and family income-to-needs ratio (using federal guidelines for poor, near poor, and not poor) as predictors. Children from nonpoor families and who scored high on achievement at 54 months were most likely to experience classrooms high in positive emotional or instructional climate throughout elementary school. Poor children were highly unlikely (only 10%) to experience classrooms with high instructional climate across multiple grades.

Discussion

In this multistate observational and longitudinal study of children in U.S. primary-school classrooms, opportunities to learn for this sample of mostly middle-class students proved highly variable and did not appear congruent with the high performance standards expected for students or for teachers as described by most state teacher certification and licensure documents. Rather, experiences in fifth grade, although highly variable, were geared toward performance of basic reading and math skills, not problem-solving or reasoning skills or other content areas. Few opportunities were provided to learn in small groups, to improve analytical skills, or to interact extensively with teachers. This pattern of instruction appears inconsistent with aims to add depth to students' understanding, particularly in mathematics and science. Classroom dynamics were not related to teachers' degree status or experience. Teachers met credentialing standards, but their classrooms, even if emotionally positive, were mediocre in terms of quality of instructional support. Children who needed support were unlikely to receive it consistently. These results are consistent with arguments that a focus on standards-based reform and teacher credentialing may lead to instruction that is overly broad and thin.

It is troubling that opportunities to learn in classrooms are unrelated to features intended to regulate such opportunities and that students most in need of high-quality instruction are unlikely to experience it consistently. If metrics and regulations for high-quality teaching continue to rely on teachers' credentials or school attributes, actual opportunities to learn may not be driven to improve (*2*). These results confirm the need for rigorous designs that test effects on observed instruction of specific knowledge- or skill-focused teacher training interventions.

This study relied on direct observations of classrooms and used instruments that correlate with students' gains in achievement (*11*). Emotional and instructional support contribute to the elimination of the achievement gap in first grade (*3*), predict growth in children's functioning (*10*), and predict reading and math achievement growth and social functioning through fifth grade in our sample (*12*). A study in England reported a similar pattern of effects for elementary students (*5*). Others concur that these features of teacher-child interaction are indicative of good teaching (*13*, *14*). Collectively, these investigations demonstrate that classroom experience can be observed reliably in large numbers of classrooms and that such observations capture a portion of the "value-added" effect of enrollment in a given classroom (*4*, *15*). Experimental interventions that include such observations may yield results useful for improving classroom teaching and the preparation of teachers (*5*) by revealing the mechanisms by which classrooms influence children's development. Science and policy aimed at producing and maintaining effective teaching are needs as pressing as are curriculum reform and assessment of student performance.

References and Notes

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16. This research is directed by a steering committee (see supporting online material) and supported by NICHD through a cooperative agreement.

Supporting Online Material

www.sciencemag.org/cgi/content/full/315/5820/1795/DC1

10.1126/science.1139719