DOCUMENT RESUME

ED 137 933 EA 009 409

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TITLE The Distribution of Instructional Resources to Students of Varying Ability.
PUB DATE Apr 77
NOTE 42p.; Paper presented at the Annual Meeting of the American Educational Research Association (New York, New York, April 4-8, 1977)

EDRS PRICE MF-$0.83 HC-$2.06 Plus Postage.
DESCRIPTORS Ability Grouping; *Academic Achievement; Elementary Education; Instructional Materials; Learning Specialists; *Reading Instruction; *Resource Allocations; Socioeconomic Status; Statistical Analysis; *Student Ability; Student Characteristics; Students; Tables (Data); Teacher Aides; Teachers; Time; *Time Factors (Learning)
IDENTIFIERS New York

ABSTRACT

Much interest has been directed toward instructional resources and their effect on student achievement. Results of studies show positive, negative, and no effects of some of these resources on achievement. This paper analyzes the distributions of reading instructional time, materials, and personnel of four New York State school districts with respect to age, grade, and student reading ability, using the student as the unit of analysis. In general, students of low ability received more instructional time than students of middle or high ability, especially when such instruction was provided by a reading specialist or paid aide. Since low-ability students do not achieve as well as high-ability students in spite of the increase in the amount of resources, these resources may appear to have negative effects. (Author)

The Distribution of Instructional Resources to Students of Varying Ability

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Paper presented at the annual meeting of the

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New York, New York

April 1977

Abstract

Much interest has been directed toward instructional resources and their effect on student achievement. Results of studies show positive, negative, and no effect of some of these resources on achievement. This paper analyzes the distributions of reading instructional time, materials, and personnel of four New York State school districts with respect to age, grade, and student reading ability, using the student as the unit of analysis. In general, students of low ability received more instructional time than students of middle or high ability, especially when such instruction was provided by a reading specialist or paid aide. Since low-ability students do not achieve as well as high-ability students in spite of the increase in the amount of resources, these resources may appear to have negative effects.

Distribution of Instructional Resources

to Students of Varying Ability

In a time of rising costs, budget cuts, and increasing public demands on schools, administrators and other decision makers are hard pressed to use existing educational resources in the most effective way. Since the Coleman Report in 1966, there has been much discussion concerning school and non-school resources and their effect on achievement. Coleman, Campbell, Hobson, McPartland, Mood, Weinfeld, and York (1966) found that family background accounted for more variance in verbal achievement than quality of schooling. Since the school has no immediate control over family background, there are those who have contended that schools can do little to improve achievement (Jencks, Smith, Ackland, Bane, Cohen, Gintis, Haynes, and Michelson, 1972). It has ev n been shown that there is greater variance in achievement within schools than there is between schools.

Most studies of school effectiveness have relied on regression analysis based on school or district level aggregates. The results often include complex student-by-treatment interactions that are difficult to interpret. In lieu of this approach an examination is needed of the day-to-day instruction a student

receives. As Luecke and McGinn conclude,

> We need to look more closely at what teachers, principals, and superintendents do as they assign resources to students, teachers, and schools, and to pay more attention to the direct effects of their actions. (1975, p. 348)

McDonald (1976) reported a study of reading and mathematics instruction in the second and fifth grades that seems to focus on within-school problems. This study involved the direct observation of teaching practices and the use of instructional resources for individual students. He concluded that there was no single teaching approach that was equally effective in both subjects and grades. The detailed findings by McDonald (1976) lend support to studies designed to determine which instructional practices and resources are best suited for particular students by subject, student age, and/or ability.

Within this context, it seems that instructional time would be an appropriate measure of resource utilization for such studies. Both Bloom (1974) and Garner (1971) have suggested the desirability of time as a measure of resource utilization. If one measures the amount of time in which resources such as personnel and materials are utilized, he can do so with as much precision as needed.

> The measures of time have properties that are almost impossible to secure in our conventional measures of academic achievement; equality of units, an absolute zero, and clear and unambiguous comparisons of individuals. (Bloom, 1974, pp. 683-684.)

Carroll (1963) presented a model of school learning based on time spent learning and time needed to learn. An elaboration of Carroll's model was developed by Wiley and Harnischfeger (1974).

The utility of time as a measure of instructional resources was also examined in a study of productivity in school reading programs by Kidder, O'Reilly, and Kiesling (1975). This study involved the collection of data through teacher interview to determine the amount of reading instruction in minutes per week each student received. The analyses suggested that instructional time is significantly related to student performance, even while controlling for school, student, and teacher effects. However, several variables involving instruction outside the classroom, such as instruction by a reading specialist, seemed to have negative effects on student achievement. Kidder et al.(1975) suggested that this was due to the interaction of the type of instruction with student ability since it was usually the students with lower ability who received extra instruction.

Kidder et al. (1975) also found complex curvilinear relationships between instructional time and student achievement. For some variables, a minimum amount of instructional time was needed before positive effects were observed, while the effect of other variables seemed to diminish after a maximum amount of instructional time. Kiesling (1976) found similar results. Much of this complexity is due to the distribution of instructional resources to students of varying ability. If more instructional resources are distributed to a particular

ability group, they will have a different effect than if they were distributed equally across all ability groups.

Thus, an examination of the distribution of instructional resources based on data from the Kidder et al. (1975) study was undertaken. It was hypothesized that there would be a difference in the distribution of resources to students of varying ability and that students of lower ability would be receiving more instructional time, especially when such instruction was provided by personnel other than the teacher. McDonald (1976) found that in grade 5 the use of a variety of teaching materials was a negative predictor of achievement. He suggested that student and teacher interactions with materials were more important than the diversity of materials and that too great a diversity of materials might interfere with the instructional activity required to achieve the more complex reading skills of the fifth grade. However, if students of lower ability are still learning some of the less complex reading skills, a variety of materials might be necessary to maintain interest. Therefore, another hypothesis explored in the following analyses is that relatively more instructional materials will be allocated to low ability students than to students of average or high ability regardless of age or grade level.

Method

Subjects. The study sample consisted of 3,004 fourth, fifth, and sixth graders from four school districts in New York State. These districts were selected because of the way resources were used in their reading programs. For example,

District D had invested relatively less in supplemental resources for reading instruction, while the other three districts had rather extensive compensatory reading programs established with ESEA, Title I, funds in addition to their regular reading programs. There were no schools in District D included in the sample receiving funds under Title I for reading programs.

The districts were also selected because of the variation in student socio-economic background. As can be seen from Table 1, students in District D on the average had lower percentages of students from low income families and higher percentages of white students in their classrooms, while students in District C had higher percentages of students from low income families and lower percentages of white students in their classrooms.

Insert Table 1 about here

Procedure. In February and June of 1974, all students received the California Achievement Test (CAT). All data on instructional time and materials were gathered in the three months between test administrations during taped interviews with principals, teachers, specialists, and selected teacher aides. These interviews were designed to determine minutes per week of reading instruction in four instructional modes: whole-group instruction, small-group instruction, individual help, and individualized instruction. The interviewers recorded the amount of instructional time allocated for each student by mode and teacher and

by mode and specialist, paid-aide, or unpaid-aide. Collection of the time information from both teachers and reading specialists permitted cross-checks on the data for each student. Information received from a teacher on a student could be compared with the same information received from the specialist. This interview approach does not guarantee that each student actually received a certain amount of instruction; but it does provide a reasonable estimate of instructional time.

In addition to instructional time estimates, the interviewers obtained a record of all materials and equipment used as resources in teaching reading. An Index of Materials Resource Utilization (IMRU) was developed to quantify simultaneously the type of instructional resources used by a teacher and the extent of utilization. The interview schedule grouped instructional resources into four categories: (a) basal series, workbooks, and skill-builder supplements, (b) additional software, (c) hardware (equipment), and (d) teacher-created materials. The IMRU was based on the number of materials used in each category and the extent of their use. Materials identified by the teacher as major resources were given a value twice that given supplemental materials like "additional workbooks." Each student in a particular reading class received the IMRU calculated for his teacher.

Data on student characteristics (age, sex, and socioeconomic status) were taken directly from school records. Teacher characteristics were obtained from the Basic Educational Data System of the New York State Education Department.

The reading program variables for each district were grouped into four main categories: (a) Instructional Time, including the amount of reading instruction each student received in minutes per week, (b) Instructional Materials as measured by the Index of Materials Resource Utilization (IMRU), (c) Reading Classroom Characteristics, including the size and socioeconomic composition of each student's reading class as well as the teacher's age and the number of minutes per week the teacher spent preparing for reading instruction, and (d) Student Characteristics consisting of student age in half years and pretest and posttest Achievement Development Scale Score (ADSS) on the reading comprehension section of the California Achievement Test. The ADSS provides an interval scale with normal distribution and independence of form, level, grade, and restandardization.

The means and standard deviations of the reading program variables were analyzed across age levels to determine the distribution of resources by student age. As the analyses continued, it became evident that an analysis of the distribution of resources by ability group within grade level was needed. Since there was a large amount of multi-grade grouping in Districts B and C, analyses by grade level could only be completed for Districts A and D.

Results

The results of the analyses by age group are presented in Tables 2 through 5. Included in these tables are the means and standard deviations of reading program variables within each age group for each district. Several conclusions

can be reached concerning the way each district distributed its resources to its students.

Insert Tables 2 through 5 about here.

The distribution of time for reading instruction varied across districts more than it varied within districts. District C had from 2 to 4 hours more total reading instruction per week than District D Furthermore, District D had no paid aide instruction and very little specialist instructional time compared to the other districts. This reflects the fact that District D was receiving no ESEA, Title I, funds. District D also had less variation in its distribution of total reading instructional time as indicated by the lower standard deviations compared to the other districts. The range of means for age groups in District D was about 40 minutes, while the age group means in the other districts ranged from 78 minutes in District A to 134 minutes per week in District C. Also District A and District C seemed to allocate more time for reading instruction to older students.

Not only were there similarities and differences in the way districts allocated total reading instruction, but trends were also evident in the allocation of total reading instructional time to the various modes of instruction. For example, small group instruction accounted for the greatest proportion of total instructional time in each district, with the exception of the 13-14 year age group in District C. Furthermore, most of the small group instruction in each district was given by the teacher. In Districts A, B, and C as the age of the students

increased, the amaunt of whole group instruction increased.

Similar trends were also evident with individualized instruction, reading specialist, and paid aide instruction. In Districts A and B, as student age increased, the minutes per week of individualized instruction increased. Likewise, the amount of specialist instruction in Districts A and B tended to increase with student age. District C was the only district with more paid aide instructian than specialist instruction. Special note shauld be taken of the amount of individualized instruction, specialist, and paid aide instructional time being allocated to the 13- and 14-year-olds. In most cases, this age group received at least twice as much individualized instruction, specialist, and paid aide instruction in Districts A and B than any of the other four age groups within each district. Similarly, in District C, more paid aide instructional time was provided for the 13- and 14-year-olds than the other age groups, as was individual help in District B.

Trends in the distribution of instructianal materials as measured by the IMRU were not as clear as those for instructional time. However, in general, older students seemed to receive fewer materials than younger students. Furthermore, District D had a lawer mean IMRU in each age group than any of the other districts.

The amount of time per week a teacher used in preparing for reading instruction varied across districts and age groups. Teachers in District C spent the most time each week preparing for reading instruction, while District D

teachers spent the least time. It should be noted that these two districts also had the most and least total reading instructional time per week, respectively.

An examination of the California Achievement Test of Reading Comprehension scores indicates that the scores increased with age in each district except for the 13- and 14-year olds. Students in this oldest age group on the average scored lower on the CAT Reading Comprehension pretest than the 11-year olds in each district. The 13- and 14-year old students in District B even scored below the 8- and 9-year old students. This, plus the fact that in Districts A and B more reading specialist instructional time was allocated to the 13- and 14-year old students would seem to indicate that there is a difference in the way resources are allocated to students of varying ability. For this reason, an analysis by grade level was necessary to determine whether this same phenomenon occurred at each grade level.

The students in grades 4, 5, and 6 in Districts A and D were divided into three ability groups with the group cut-off points being one-half standard deviation above and below the mean for a given grade in a district. These analyses are displayed in Tables 6 through 11.

Insert Tables 6 through 11 about here.

From these tables, it is clear that low-ability students received more reading instruction than the average or high-ability students. With the exception of grade 5 in District D, every low-ability group received on the average from 10 minutes to

more than two hours more total reading instruction per week than the other two ability groups at the same grade level. Furthermore, the low-ability students received more reading instruction by specialists and paid aides than the high-ability groups. If the amount of individual help and individualized instruction given by the teacher is compared with the total minutes per week individual help and individualized instruction a low-ability student received, the conclusion can be made that the largest portion of individual help and individualized instruction for low-ability students came from specialists and paid aides. On the other hand, middle and high-ability students received more whole group instruction than low-ability students in four out of six cases. As mentioned, the low-ability students in grade 5 of District D was the only low-ability group that did not receive more total reading instruction than the middle and high-ability students in the same grade level and district. This was because the increase in the amount of whole group instruction for the middle and high-ability students was greater than the increase in the amount of small group instruction for the low-ability group. Therefore, the reason most low-ability students received more total reading instruction was that they received more instruction in an individual mode than the other groups, and a reasonable portion of such instruction came from personnel other than the teacher.

Another way to analyze the allocation of resources is to look at the distribution across grade levels. One would expect that due to the nature of the reading skills being taught and the increase in the amount of subject matter in other

curriculum areas, the amount of time spent in reading instruction would decrease as the grade level increased, unless, of course, compensatory help was needed to bring the competency of students in the higher grades to a minimum standard. This seemed to be the case in District A. The amount of reading instruction increased with grade level. In addition, the amount of instructional time in the low-ability group increased at a greater rate than that of the middle and high-ability groups. The opposite was true for District D. With the exception of the middle and high-ability groups in grade 5, the amount of reading instructional time decreased as grade level increased.

This finding is consistent with a comparison of the CAT pretest scores. In grade 4, the mean CAT Reading Comprehension pretest score of the low-ability group in District A was 2 points higher than the same group in District D. Naturally, this mean increased as the grade level increased. However, in grade 6, the mean pretest score of the low group in District A is 19 points lower than that of District D. With the exception of the high-ability group in grade 4, the mean pretest scores of the middle and high-ability groups in District A remained within 6 points of the mean for the same groups in District D. Thus, there was obviously a need, based on the pretest scores, for the compensatory reading program, including the increase in instructional time for the low-ability students in grade 6 of District A.

This need was also directly related to the socioeconomic composition of the reading classroom. In the low- and middle-ability groups of District A, as

grade level increased, the percentage of students from families of low socio-economic status (SES) increased and the percentage of white students in the classroom decreased. Also, as the ability lev.. increased within a grade in District A, the percentage of white students in the classroom increased and the percentage of students from families of lower SES decreased. The racial and socioeconomic composition of classrooms in District D was relatively more stable.

The distribution of instructional resources in District A, as measured by the IMRU, was not consistent with the distribution of instructional time. The teachers in District A generally used more materials than teachers in District D. These materials were distributed fairly evenly across the three grades, with the fourth grade favored slightly. However, in all three grades, more materials were being used for the middle-ability students than for students in either of the other two ability groups. In District D, the amount of materials decreased as grade level increased, with students in the high-ability group receiving more materials in two of the three grades.

Discussion

The results of the present analysis clearly support the hypothesis that resources were distributed differently to students of varying ability. Furthermore, students of low ability received more instructional time, especially when such instruction was provided by a reading specialist or paid aide. These conclusions help clarify some previous findings and also seem to contradict a common assumption.

Kidder et al. (1975) found that some extra classroom instruction, like specialist instruction, produced negative effects in regressions using student reading achievement as the dependent variable. We have already seen that most of the specialist time was going to students of low ability. However, these low-ability students were still scoring low on the achievement test regardless of increases in specialist instruction. It took less teacher time to raise the test score of the middle and high-ability students than it did specialist time to raise the test score of the low-ability students. Thus, it seems that the specialist is not having a strong effect on achievement of low-ability students. However, we do not know what would have happened to the achievement of these low-ability students had they not received specialist instruction.

This example and the data presented seem to contradict a common assumption made by researchers studying the effects of educational inputs on student achievement, namely, that resources are allocated to students without regard to student characteristics such as SES, grade level, or ability level (Luecke and McGinn, 1975). It is also commonly assumed that these resources will have similar effects on all students within the schools. The schools do not differ in the way they allocate resources to students based on ability, grade level, and SES.

This analysis did not support the hypothesis that more instructional materials, as measured by the IMRU, were allocated to students of low ability. However, this was due to a characteristic of the IMRU and not the allocation of actual materials. The IMRU was derived from data received during the teacher interview, and a value was assigned to each teacher. Each student then received the value

of the IMRU assigned to his teacher. Hence, the IMRU is not a measure of the amount of materials a student used, but an index of the amount of materials a teacher used in the classroom whether it was used with one group or all groups. In order to study the actual allocation of instructional materials to students, such an index would have to be based on the student and not the teacher.

It has been shown that time is a sensitive measure of the amount of instruction a student receives. It provides an accurate description of the allocation of instruction. The measurement of time provides the local district with a tool to monitor changes in the allocation of instructional resources. Furthermore, since the cost of a teacher, paid aide, or specialist is known, it would be possible to determine the actual cost per minute or hour of reading instruction and compare it with student achievement. This was suggested by Kidder et al. (1975). The measure of time could also be used to determine the cost and allocation of materials and other educational resources.

Future research should examine methods to determine the optimum use of existing resources. This might be accomplished through the use of educational production functions or linear programming. However it is accomplished, the method will have to account for the fact that all students do not receive the same quantity of educational materials, nor do they receive the same configuration of instruction by the teacher, specialist, or paid aide.

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Footnote

Financial suppart for portions of this research came from the Carnegie Corporation of New York and the National Commission on Productivity and Work Quality. The study was initiated by Robert P. O'Reilly, then Chief of the Bureau of School and Cultural Research, New York State Education Department. Herbert Kiesling, Professor of Economics at Indiana University, was instrumental in the development and implementation of the empirical investigations.

Table 1

Characteristics of School Districts

Variables	District			
	A	B	C	D
Type	Urban	Urban	Urban	Suburban
% White Students per Class	83	63	42	89
% Working Poor/Unskilled Worker	36	37	59	25
Number of Students	947	523	967	567
Number of Teachers	56	25	60	36
Number of Schools	7	3	5	2

Table 2

Means and Standard Deviations of Reading Program Variables Within Age Groups in District A

Reading Program Variables	Age Groups				
	8-9 (N=96)	10 (N=257)	11 (N=313)	12 (N=214)	13-14 (N=45)
Instructional Time (Minutes per Week)					
Teacher Small Group	172.5 (82.7)	158.6 (106.2)	144.2 (114.0)	146.5 (107.3)	121.7 (86.6)
Teacher Individual Help	2.5 (5.1)	2.6 (7.1)	2.5 (7.9)	2.2 (5.9)	4.4 (12.9)
Teacher Individualized Instruction	1.6 (11.9)	3.7 (23.4)	8.6 (34.5)	17.7 (53.8)	35.3 (79.2)
Total Whole Group	32.7 (52.8)	56.9 (100.4)	84.3 (121.9)	94.6 (140.2)	77.0 (115.0)
Total Small Group	179.3 (87.5)	171.3 (111.2)	153.1 (117.3)	158.8 (111.7)	153.8 (97.9)
Total Individual Help	5.3 (20.0)	7.7 (28.4)	6.8 (24.3)	6.3 (37.3)	4.4 (12.9)
Total Individualized Instruction	15.3 (41.8)	22.1 (51.6)	23.2 (51.7)	38.4 (86.6)	75.3 (132.3)
Total Teacher	209.2 (72.3)	221.8 (108.1)	239.5 (120.0)	261.0 (142.1)	238.4 (141.7)
Total Specialist	12.9 (42.8)	20.6 (48.6)	18.2 (43.0)	21.8 (56.8)	44.8 (63.3)
Total Paid Aide	10.2 (43.3)	15.6 (53.1)	9.1 (32.1)	11.8 (39.3)	27.3 (56.1)
Total Unpaid Aide	0.3 (3.1)	0	0.5 (6.0)	3.4 (20.7)	0
Total Reading Instruction	232.6 (77.0)	254.1 (114.4)	267.3 (127.2)	293.4 (158.2)	310.5 (155.6)
Instructional Materials					
IMRU	11.7 (4.1)	12.0 (4.5)	11.1 (4.0)	10.7 (4.0)	11.5 (4.2)
Reading Classroom Characteristics					
Number of Students in Class	25.9 (5.6)	24.4 (4.3)	24.6 (4.6)	24.5 (4.6)	24.3 (4.3)
% White	90.6 (13.8)	87.1 (14.6)	83.5 (17.0)	77.3 (21.3)	66.4 (20.7)
% Working Poor/Unskilled Worker	27.4 (26.5)	34.6 (30.6)	36.9 (33.1)	41.6 (35.2)	57.9 (28.0)
Teacher's Age in Years	36.5 (10.9)	40.4 (13.0)	40.7 (12.1)	38.7 (11.6)	37.5 (11.3)
Teacher Preparation Time (Minutes per Week)	178.3 (135.6)	179.3 (140.0)	168.4 (144.7)	165.8 (137.4)	227.4 (155.1)
Student Characteristics					
CAT Comprehension Pretest	418.9 (52.8)	441.5 (61.5)	469.6 (73.8)	473.5 (72.1)	433.0 (57.8)
CAT Comprehension Post-test	431.7 (58.4)	453.2 (58.4)	476.2 (76.4)	474.7 (75.4)	436.7 (64.1)

Note: Standard deviations appear in parentheses.

Table 3

Means and Standard Deviations of Reading Program Variables Within Age Groups in District B

Reading Program Variables	Age Group				
	8-9 (N=91)	10 (N=163)	11 (N=172)	12 (N=83)	13-14 (N=12)
Instructional Time (Minutes per Week)					
Teacher Small Group	277.9 (128.8)	314.6 (148.4)	209.2 (203.6)	123.3 (160.4)	100.0 (147.7)
Teacher Individual Help	1.7 (5.0)	4.7 (11.1)	4.8 (7.7)	3.1 (4.5)	5.0 (9.8)
Teacher Individualized Instruction	4.4 (29.5)	17.8 (61.8)	47.1 (106.2)	49.4 (110.8)	50.0 (116.8)
Total Whole Group	26.2 (43.3)	24.6 (45.2)	30.5 (45.2)	51.5 (50.5)	50.8 (54.0)
Total Small Group	281.5 (131.4)	324.4 (152.7)	210.9 (203.6)	125.1 (159.9)	100.0 (147.7)
Total Individual Help	6.1 (18.7)	12.3 (30.2)	10.2 (22.6)	6.0 (13.5)	46.7 (143.1)
Total Individualized Instruction	22.4 (51.1)	39.3 (79.0)	69.9 (117.4)	83.3 (135.8)	115.0 (143.5)
Total Teacher	310.1 (147.0)	361.7 (147.0)	291.7 (159.1)	227.3 (133.2)	205.8 (153.8)
Total Specialist	19.7 (45.7)	30.4 (76.7)	24.5 (69.5)	35.7 (101.2)	65.0 (118.5)
Total Paid Aide	5.4 (18.4)	7.8 (28.6)	4.5 (19.1)	0.7 (4.6)	41.7 (144.3)
Total Unpaid Aide	1.0 (7.0)	0.7 (7.4)	0.9 ([illegible])	2.2 (12.2)	0
Total Reading Instruction	336.2 (153.0)	400.6 (157.1)	321.6 (16[illegible].0)	265.8 (139.3)	312.5 (133.4)
Instructional Materials					
IMRU	11.5 (3.0)	12.3 (3.0)	10.6 (3.4)	8.6 (2.5)	8.3 (1.7)
Reading Class Characteristics					
Number of Students in Class	26.7 (3.8)	24.9 (4.2)	24.8 (4.4)	24.6 (4.7)	25.3 (1.7)
% White	60.5 (32.9)	63.6 (34.7)	68.3 (31.6)	62.9 (31.5)	44.7 (20.1)
% Working Poor/Unskilled Worker	38.9 (34.4)	36.8 (31.3)	36.8 (28.5)	38.6 (31.1)	65.3 (18.9)
Teacher's Age in Years	34.0 (6.5)	33.4 (7.9)	40.1 (11.1)	42.0 (9.5)	36.5 (5.6)
Teacher Preparation Time (Minutes per Week)	288.7 (80.0)	262.0 (116.3)	211.3 (129.7)	205.5 (138.9)	170.0 (147.2)
Student Characteristics					
CAT Comprehension Pretest	398.2 (71.4)	430.2 (71.6)	452.8 (79.5)	458.9 (78.5)	381.6 (86.1)
CAT Comprehension Post-test	422.0 (68.0)	437.0 (78.3)	460.4 (73.5)	462.6 (82.7)	405.6 (78.1)

Note: Standard deviations appear in parentheses.

Table 4

Means and Standard Deviations of Reading Program Variables Within Age Groups in District C

Reading Program Variables	Age Group				
	8-9 (N=152)	10 (N=282)	11 (N=271)	12 (N=186)	13-14 (N=48)
Instructional Time (Minutes per Week)					
Teacher Small Group	186.8 (133.3)	202.8 (168.6)	216.6 (175.8)	254.2 (164.6)	250.4 (145.6)
Teacher Individual Help	3.5 (10.2)	5.3 (32.0)	3.1 (22.3)	1.5 (5.4)	1.3 (3.6)
Teacher Individualized Instruction	57.6 (165.2)	33.7 (115.9)	17.2 (72.4)	5.4 (37.1)	8.3 (40.4)
Total Whole Group	64.6 (110.0)	96.2 (138.2)	172.3 (155.6)	110.7 (125.0)	121.9 (114.0)
Total Small Group	200.1 (147.5)	219.6 (185.0)	238.5 (190.2)	270.1 (177.4)	311.8 (229.4)
Total Individual Help	27.8 (57.2)	23.0 (58.1)	14.7 (51.1)	13.5 (37.9)	20.0 (77.2)
Total Individualized Instruction	76.6 (167.9)	49.0 (133.9)	35.8 (96.6)	26.2 (91.7)	16.1 (50.0)
Total Teacher	312.6 (252.4)	338.0 (150.7)	364.3 (135.4)	371.8 (145.2)	381.9 (124.7)
Total Specialist	14.7 (43.8)	14.7 (60.6)	22.8 (72.5)	18.8 (83.2)	18.2 (77.8)
Total Paid Aide	35.8 (105.0)	32.4 (104.1)	26.8 (92.0)	28.4 (85.9)	65.1 (141.6)
Total Unpaid Aide	6.0 (27.8)	2.8 (17.9)	2.4 (17.1)	1.5 (11.4)	4.8 (22.3)
Total Reading Instruction	369.0 (171.3)	380.7 (165.4)	412.7 (153.2)	420.4 (155.2)	469.8 (230.9)
Instructional Materials					
IMRC	11.7 (4.9)	12.3 (4.5)	11.9 (4.2)	11.7 (3.9)	10.8 (3.5)
Reading Classroom Characteristics					
Number of Students in Class	23.4 (5.2)	23.0 (4.9)	22.5 (4.6)	23.0 (3.7)	20.7 (4.4)
% White	37.4 (29.1)	42.1 (31.0)	43.0 (29.2)	45.0 (28.0)	36.9 (29.6)
% Working Poor/Unskilled Worker	61.5 (34.3)	61.3 (35.2)	56.2 (34.8)	52.8 (33.9)	60.1 (33.9)
Teacher's Age in Years	31.1 (9.9)	32.3 (10.9)	31.5 (9.3)	30.4 (7.0)	28.4 (5.6)
Teacher Preparation Time (Minutes per Week)	287.3 (254.5)	292.0 (212.1)	281.8 (190.9)	308.3 (187.4)	314.1 (207.9)
Student Characteristics					
CAT Comprehension Pretest	377.7 (65.0)	388.5 (66.9)	407.0 (79.1)	417.5 (74.7)	392.5 (64.4)
CAT Comprehension Post-test	398.6 (76.7)	411.0 (75.3)	432.4 (86.5)	446.9 (72.9)	405.7 (65.5)

Note: Standard deviations appear in parentheses.

Table 5

Means and Standard Deviations of Reading Program Variables Within Age Groups in District D

Reading Program Variables	Age Group				
	8-9 (N=60)	10 (N=188)	11 (N=215)	12 (N=5)	13-14 (N=8)
Instructional Time (Minutes per Week)					
Teacher Small Group	144.0 (66.7)	160.9 (99.1)	160.2 (90.8)	177.1 (71.3)	180.6 (55.4)
Teacher Individual Help	0.7 (1.3)	1.0 (3.3)	0.7 (3.7)	0.1 (0.3)	0.3 (0.5)
Teacher Individualized Instruction	-	-	-	-	-
Total Whole Group	63.9 (98.5)	92.1 (88.0)	68.1 (81.9)	35.9 (51.0)	50.0 (65.5)
Total Small Group	151.5 (71.5)	162.5 (99.6)	160.2 (90.8)	180.2 (73.3)	180.6 (55.4)
Total Individual Help	1.0 (2.1)	1.6 (7.3)	2.4 (9.2)	1.7 (6.7)	0.3 (0.5)
Total Individualized Instruction	-	0.6 (8.8)	-	-	-
Total Teacher	208.6 (61.7)	254.0 (60.7)	229.1 (81.1)	213.0 (88.8)	230.9 (90.6)
Total Specialist	3.8 (11.2)	1.9 (12.5)	1.3 (7.8)	3.8 (22.0)	-
Total Paid Aide	-	-	-	-	-
Total Unpaid Aide	4.0 (21.7)	1.0 (9.8)	0.4 (3.5)	0.9 (5.3)	-
Total Reading Instruction	216.5 (60.4)	256.9 (58.5)	230.7 (81.4)	217.8 (89.6)	230.9 (90.6)
Instructional Materials					
IMRU	11.4 (4.0)	10.4 (3.2)	8.2 (2.4)	7.5 (2.1)	6.9 (2.2)
Reading Classroom Characteristics					
Number of Students in Class	31.0 (3.7)	30.6 (4.6)	31.3 (4.6)	31.1 (3.1)	29.5 (1.7)
% White	83.9 (10.0)	87.1 (8.9)	91.3 (7.3)	91.1 (8.0)	89.7 (10.0)
% Working Poor/Unskilled Worker	32.1 (15.7)	25.0 (14.0)	24.1 (16.8)	28.6 (20.0)	18.9 (18.9)
Teacher's Age in Years	40.7 (12.5)	42.3 (10.4)	44.9 (8.7)	44.8 (7.3)	45.1 (7.8)
Teacher Preparation Time (Minutes per Week)	160.6 (71.9)	155.3 (72.7)	144.7 (97.4)	187.6 (125.0)	120.6 (138.6)
Student Characteristics					
CAT Comprehension Pretest	427.4 (61.2)	439.5 (63.1)	479.5 (70.1)	493.6 (68.8)	430.8 (23.4)
CAT Comprehension Post-test	448.3 (58.4)	465.4 (55.9)	496.2 (74.5)	512.1 (67.9)	445.5 (33.3)

Note: Standard deviations appear in parentheses.

Table 6

Means and Standard Deviations of Reading Program Variables Within Ability Groups of Grade 4 in District A

Reading Program Variables	Ability Group		
	Low (N=39)	Middle (N=189)	High (N=55)
Instructional Time (Minutes per Week)			
Teacher Small Group	168.9 (81.2)	182.8 (93.9)	195.5 (112.9)
Teacher Individual Help	3.7 (7.6)	2.8 (6.9)	0.5 (0.8)
Teacher Individualized Instruction	—	—	—
Total Whole Group	11.2 (19.6)	23.9 (42.5)	41.3 (59.5)
Total Small Group	186.7 (92.8)	200.8 (103.2)	196.7 (115.6)
Total Individual Help	20.1 (48.3)	9.7 (30.5)	0.5 (0.8)
Total Individualized Instruction	42.9 (60.4)	17.3 (42.0)	2.0 (14.8)
Total Teacher	183.8 (77.7)	209.5 (86.7)	237.3 (97.4)
Total Specialist	31.9 (48.0)	24.0 (54.5)	3.3 (18.0)
Total Paid Aide	45.3 (82.7)	17.9 (55.1)	—
Total Unpaid Aide	—	0.2 (2.2)	—
Total Reading Instruction	261.0 (112.9)	251.6 (109.4)	240.5 (99.5)
Instructional Materials			
IMRU	10.5 (3.9)	12.2 (4.7)	11.6 (3.9)
Reading Class Characteristics			
Number of Students in Class	23.2 (4.6)	25.4 (5.1)	27.4 (4.2)
% White	85.8 (14.6)	89.2 (13.3)	92.3 (9.9)
% Working Poor/Unskilled Worker	39.2 (30.2)	27.8 (28.0)	23.1 (20.8)
Teacher's Age in Years	38.9 (12.4)	37.7 (12.2)	43.7 (11.7)
Teacher Preparation Time	196.2 (137.5)	196.3 (153.0)	231.7 (187.0)
Student Characteristics			
CAT Comprehension Pre-test	331.3 (21.3)	413.9 (30.7)	494.2 (19.7)
CAT Comprehension Post-test	374.8 (46.1)	420.0 (50.6)	490.3 (39.6)
Student Age in Half-Years	20.5 (1.6)	20.2 (1.2)	20.1 (1.7)

Note: Standard deviations are in parentheses.

Table 7

Means and Standard Deviations of Reading Program Variables Within Ability Groups of Grade 5 in District A

Reading Program Variables	Ability Groups		
	Low (N=48)	Middle (N=219)	High (N=62)
Instructional Time (Minutes per Week)			
Teacher Small Group	150.4 (129.1)	133.5 (108.9)	97.7 (107.3)
Teacher Individual Help	2.8 (7.1)	3.3 (9.4)	0.7 (2.8)
Teacher Individualized Instruction	—	1.5 (7.5)	6.5 (14.8)
Total Whole Group	94.1 (207.4)	111.1 (161.4)	115.8 (90.4)
Total Small Group	164.4 (124.5)	141.3 (111.4)	98.7 (106.6)
Total Individual Help	8.4 (22.3)	4.6 (15.4)	0.7 (2.8)
Total Individualized Instruction	66.3 (103.9)	18.5 (40.9)	7.4 (16.3)
Total Teacher	247.3 (212.4)	249.5 (146.8)	220.7 (64.3)
Total Specialist	65.1 (103.5)	18.5 (40.1)	1.9 (10.7)
Total Paid Aide	17.6 (43.8)	7.3 (30.8)	—
Total Unpaid Aide	3.1 (15.1)	.3 (5.1)	—
Total Reading Instruction	312.3 (178.0)	266.5 (136.9)	222.7 (65.3)
Instructional Materials			
IMRU	10.0 (3.5)	11.2 (3.9)	10.9 (3.2)
Reading Class Characteristics			
Number of Students in Class	21.7 (1.1)	23.0 (3.0)	25.5 (4.2)
% White	69.6 (18.8)	82.5 (17.3)	90.0 (11.2)
% Working Poor/Unskilled Worker	60.3 (31.1)	46.4 (32.2)	28.2 (31.0)
Teacher's Age in Years	39.1 (12.3)	41.55(13.0)	46.1 (12.2)
Teacher Preparation Time	164.2 (117.1)	143.7 (97.7)	123.5 (87.7)
Student Characteristics			
CAT Comprehension Pre-test	348.2 (25.2)	454.1 (39.9)	554.3 (31.7)
CAT Comprehension Post-test	391.7 (49.6)	460.5 (54.6)	553.0 (48.8)
Student Age in Half Years	22.8 (1.3)	22.0 (1.2)	22.0 (1.0)
Student Age in Half Years	22.8 (1.3)	22.0 (1.2)	22.0 (1.0)

Note: Standard deviations are in parentheses.

Table 8

Means and Standard Deviations of Reading Program Variables Within Ability Groups of Grade 6 in District A

Reading Program Variables	Ability Group		
	Low (N=39)	Middle (N=222)	High (N=44)
Instructional Time (Minutes per Week)			
Teacher Small Group	145.5 (134.8)	159.4 (100.2)	163.5 (116.4)
Teacher Individual Help	7.9 (18.2)	2.0 (5.6)	1.6 (3.8)
Teacher Individualized Instruction	62.8 (98.0)	20.0 (55.3)	1.7 (11.3)
Total Whole Group	96.7 (142.1)	73.5 (98.4)	80.5 (79.6)
Total Small Group	189.7 (134.6)	169.7 (106.9)	163.5 (116.4)
Total Individual Help	20.7 (65.0)	6.2 (31.7)	1.6 (3.8)
Total Individualized Instruction	117.3 (149.0)	34.6 (77.1)	1.7 (11.3)
Total Teacher	312.9 (172.5)	255.6 (112.8)	247.3 (90.8)
Total Specialist	55.4 (66.3)	15.8 (43.5)	—
Total Paid Aide	46.2 (71.3)	11.4 (36.8)	—
Total Unpaid Aide	10.0 (35.3)	1.2 (12.9)	—
Total Reading Instruction	424.4 (199.7)	284.0 (130.0)	247.3 (90.8)
Instructional Materials			
IMRU	10.9 (3.1)	11.8 (4.2)	10.9 (4.6)
Reading Class Characteristics			
Number of Students in Class	24.7 (4.3)	24.7 (4.8)	26.5 (4.8)
% White	56.6 (16.0)	77.3 (20.3)	92.8 (11.2)
% Working Poor/Unskilled Worker	63.7 (25.5)	41.2 (33.4)	10.7 (21.7)
Teacher's Age in Years	36.5 (10.3)	37.1 (11.4)	41.3 (11.2)
Teacher Preparation Time	271.7 (172.0)	201.4 (134.3)	155.5 (60.4)
Student Characteristics			
CAT Comprehension Pre-test	371.5 (32.8)	487.7 (37.9)	594.8 (28.9)
CAT Comprehension Post-test	401.3 (57.5)	488.4 (55.2)	586.8 (50.5)
Student Age in Half Years	25.0 (1.8)	24.0 (1.2)	23.4 (0.6)

Note: Standard deviations are in parentheses.

Table 9

Means and Standard Deviations of Reading Program Variables Within Ability Groups of Grade 4 in District D

Reading Program Variables	Ability Group		
	Low (N=19)	Middle (N=85)	High (N=26)
Instructional Time (Minutes per Week)			
Teacher Small Group	191.1 (74.3)	135.5 (73.4)	128.1 (68.2)
Teacher Individual Help	0.6 (1.3)	0.5 (1.1)	0.8 (2.2)
Teacher Individualized Instruction	—	—	—
Total Whole Group	35.8 (69.8)	89.9 (106.8)	96.9 (102.9)
Total Small Group	211.6 (72.4)	139.1 (75.9)	130.4 (69.9)
Total Individual Help	6.9 (20.4)	0.6 (1.5)	0.8 (2.2)
Total Individualized Instruction	—	—	—
Total Teacher	227.5 (74.8)	226.0 (61.3)	225.8 (55.6)
Total Specialist	11.1 (22.1)	2.2 (10.2)	2.3 (11.8)
Total Paid Aide	—	—	—
Total Unpaid Aide	15.8 (39.2)	1.4 (13.0)	—
Total Reading Instruction	254.3 (68.7)	229.6 (60.3)	228.2 (55.7)
Instructional Materials			
IMRU	10.6 (3.3)	11.7 (3.9)	13.3 (3.6)
Reading Class Characteristics			
Number of Students in Class	30.3 (3.0)	31.7 (3.9)	31.3 (3.7)
% White	85.7 (4.3)	85.4 (10.5)	82.5 (13.3)
% Working Poor/Unskilled Worker	42.4 (19.8)	29.9 (14.2)	29.7 (12.3)
Teacher's Age	42.5 (10.9)	40.1 (12.0)	36.5 (10.7)
Teacher Preparation Time	115.0 (57.7)	181.8 (75.4)	202.5 (86.3)
Student Characteristics			
CAT Comprehension Pre-test	329.3 (19.1)	417.6 (33.6)	511.5 (25.7)
CAT Comprehension Post-test	404.8 (44.1)	444.1 (50.2)	513.5 (44.1)
Student Age in Half Years	19.3 (1.0)	19.5 (0.7)	19.5 (0.7)

Note: Standard deviations are in parentheses.

Table 10

Means and Standard Deviations of Reading Program Variables Within Ability Groups of Grade 5 in District D

Reading Program Variables	Ability Group		
	Low (N=36)	Middle (N=149)	High (N=36)
Instructional Time (Minutes per Week)			
Teacher Small Group	171.8 (83.4)	161.8 (108.9)	149.4 (133.5)
Teacher Individual Help	4.1 (9.4)	1.0 (2.6)	0.4 (1.9)
Teacher Individualized Instruction	—	—	—
Total Whole Group	62.2 (43.6)	95.5 (84.6)	123.1 (108.5)
Total Small Group	171.8 (83.4)	161.8 (108.9)	149.4 (133.5)
Total Individual Help	4.1 (9.4)	1.0 (2.6)	0.4 (1.9)
Total Individualized Instruction	3.3 (20.0)	—	—
Total Teacher	238.1 (84.6)	258.3 (59.2)	272.9 (54.6)
Total Specialist	3.3 (20.0)	—	—
Total Paid Aide	—	—	—
Total Unpaid Aide	—	—	—
Total Reading Instruction	241.5 (78.4)	258.3 (59.2)	272.9 (54.6)
Instructional Materials			
IMRU	9.1 (2.4)	9.4 (2.2)	8.5 (3.0)
Reading Class Characteristics			
Number of Students in Class	28.1 (2.4)	31.0 (5.1)	30.6 (7.2)
% White	85.7 (5.4)	88.4 (7.2)	94.3 (7.3)
% Working Poor/Unskilled Worker	24.4 (10.1)	20.4 (12.0)	14.5 (12.2)
Teacher's Age	44.0 (8.0)	43.7 (9.1)	46.4 (13.8)
Teacher Preparation Time	140.8 (52.8)	133.6 (57.7)	95.3 (53.6)
Student Characteristics			
CAT Comprehension Pre-test	358.0 (28.2)	456.7 (34.0)	555.3 (36.6)
CAT Comprehension Post-test	413.1 (41.2)	471.6 (44.1)	553.6 (51.8)
Student Age in Half Years	21.6 (0.9)	21.4 (0.6)	21.5 (0.6)

Note: Standard deviations are in parentheses.

Table 11

Means and Standard Deviations of Reading Program Variables Within Ability Groups of Grade 6 in District D

Reading Program Variables	Ability Group		
	Low (N=38)	Middle (N=145)	High (N=33)
Instructional Time (Minutes per Week)			
Teacher Small Group	181.1 (75.6)	170.1 (58.9)	184.7 (89.4)
Teacher Individual Help	0.1 (0.3)	0.1 (0.3)	0.1 (0.2)
Teacher Individualized Instruction	—	—	—
Total Whole Group	41.6 (54.5)	39.2 (53.2)	21.8 (42.8)
Total Small Group	188.9 (78.8)	170.1 (58.9)	184.7 (89.4)
Total Individual Help	3.2 (9.3)	2.0 (9.5)	3.7 (9.9)
Total Individualized Instruction	—	—	—
Total Teacher	222.7 (94.2)	209.5 (84.8)	206.6 (95.9)
Total Specialist	11.1 (34.5)	1.4 (8.9)	-
Total Paid Aide	—	—	—
Total Unpaid Aide	—	0.4 (3.5)	3.6 (9.9)
Total Reading Instruction	233.8 (95.7)	211.4 (85.4)	210.2 (96.2)
Instructional Materials			
IMRU	7.4 (2.0)	7.2 (2.0)	8.6 (2.1)
Reading Class Characteristics			
Number of Students in Class	30.2 (2.2)	31.1 (3.0)	33.1 (4.3)
% White	89.8 (7.6)	92.0 (7.4)	92.6 (9.4)
% Working Poor/Unskilled Worker	30.3 (19.9)	26.1 (18.8)	37.1 (19.6)
Teacher's Age	43.4 (7.8)	45.7 (6.6)	44.0 (8.1)
Teacher Preparation Time	197.9 (135.1)	162.9 (118.9)	201.8 (121.9)
Student Characteristics			
CAT Comprehension Pre-test	390.6 (28.5)	493.5 (33.2)	598.6 (26.6)
CAT Comprehension Post-test	431.6 (46.4)	505.6 (52.7)	611.6 (54.8)
Student Age in Half Years	23.7 (1.1)	23.4 (0.8)	23.4 (0.6)

Note: Standard deviations are in parentheses.