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ABSTRACT

This paper describes Detroit's "Peer Teachers as Mirrors and Monitors" project, a cost effective approach to increasing student achievement in mathematics and reading in grades one through four in Title I schools. The program consists of: (1) an observation/feedback system giving teachers data from their students' engaged-in-learning rates; and (2) four training interventions to provide teachers with management techniques, instructional strategies, research findings, and observation opportunities. Classroom observation data, attendance records and California Achievement Test results were used to evaluate the first two years of program implementation. Data indicate both project schools significantly increased the percentage of time spent in interactive instruction. The project was also successful in developing classroom observation measures, modifying teacher behavior, and implementing new instructional strategies. While the project had a positive impact, it is difficult to attribute student achievement gains entirely to this project. Observation materials, descriptive statistics, and data analysis results are appended. (BS)

MEASURING AND INCREASING TIME-ON-TASK:

A COST EFFECTIVE APPROACH

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MEASURING AND INCREASING TIME-ON-TASK: A COST EFFECTIVE APPROACH

Precis

This paper will describe Detroit's cost effective approach to the measurement and improvement of time-on-task for early elementary school students. The instrumentation will be described and results from the first two years of project implementation will be presented. Copies of the classroom observation instruments developed by the project will be included.

MEASURING AND INCREASING TIME-ON-TASK: A COST EFFECTIVE APPROACH

Background

Early in this decade, educational research focused attention of practitioners and researchers on the use of time in classrooms as a significant variable in the equation which describes student achievement. This concern continues to grow with the focus on the use of time evidenced in the multitude of national and local reports on the state of education in America. This concern resulted in part from a body of research which established the relationship between engagement rates and achievement (e.g., Frederick, Walberg and Rasher, 1979; Stallings, 1976 and 1980; Good and Beckerman, 1978; Davidson and Holly, 1970; Anderson and Scott, 1978; Frederick, 1977; Rosenshine, 1976; Frederick and Walberg, 1980).

In 1981, the National Institute of Education issued a request for proposals (RFP) for research contracts which would investigate cost effective models for increasing student time-on-task in grades 1 - 4 at Title I eligible schools. The monies for these research contracts were allocated from Follow Through funds which had been set aside to fund research in promising practices for raising student achievement at these grade levels. The time-on-task focus resulted from the Follow Through evaluation and several meetings and solicited papers which reflected this concept.

Four school districts were selected as sites for these research contracts. The Detroit project was entitled, "Peer Teachers as Mirrors and Monitors." The original proposal outlined the general format for the project which included a periodic feedback system in which teachers are provided data gathered by their peers which document their students' engaged-in-learning rates and their classroom management procadures (Mirrors and Monitors), plus

four types of teacher training: Knowledge of Theory and Practice, Modeling/Demonstration/Sharing, Practice in Simulated Conditions, and Coaching/Recycling. Each of these training methods is more expensive than the one which precedes it; however, it was assumed that fewer teachers would need to participate in each successive type of training since many would have benefited from the earlier ones.

The contract was for four years--one planning year and three years of implementation. The planning year was used to work with the teachers at the project schools to flesh out the original proposal into a final project plan. The planning involved many meetings with participating teachers and outside consultants which resulted in the early development of the training materials and preliminary work on the data collection instruments. Teachers worked in committees to develop strategies to reduce interruptions, increase student on-task behavior, make use of teacher aides (who could not work with project students as part of the NIE imposed stipulations) and other project related tasks.

Project Overview

The purpose of the "Peer Teachers as Mirrors and Monitors" project is to increase mathematics and reading achievement in grades one through four by increasing the amount of time students are engaged in learning tasks in which they experience a low error rate and which are directly related to the outcome measure (i.e., increase Academic Learning Time-ALT). The strategy for accomplishing this purpose includes a periodic system of feedback through which teachers are given data by their peers which document their students' engaged-in-learning rates and their use of classroom time. This observation/feedback component is called Mirrors and Monitors. It takes place at the beginning of

the year (when outside coders collect data) and following each of the four interventions which are designed to provide teachers with management techniques, instructional strategies, research findings, and opportunities to observe others, either live or via video tape. The final observation sequence each year is also conducted by outside coders. This procedure is followed because the data from the first and last observations each year are used for evaluation purposes as well as for feedback to participants.

The first training intervention is called Knowledge of Theory and Practice. It provides participants with a library of printed and video tape materials related to the project goals. Participants use their data from the initial observation to determine which areas they wish to strengthen via the use of these materials. They are provided released time by a substitute in order to read articles or view video tapes.

Following a period of Mirrors and Monitors where participants form teams to observe each other and record data, the second intervention, Modeling/Demonstration/Sharing takes place. This intervention allowed participants to use the services of one of the district's demonstration teachers or to observe teachers in their own building in order to improve their skills.

This was followed by Mirrors and Monitors before the third intervention, Practice in Simulated Conditions, began. This intervention was designed to allow participants to try out strategies they had observed with small groups of their peers before attempting to use them in their classroom.

Following another period of Mirrors and Monitors, the final intervention, Coaching/Recycling, was implemented. This intervention involved one-to-one coaching of participants in strategies they wished to acquire but had not acquired from the other interventions. The coaching was done by either project staff or district demonstration teachers.

The final phase of the project each year was Mirrors and Monitors conducted by the outside coders.

The original project plan called for the interventions to begin during the second year of funding (year one of project implementation). Many problems were encountered during that year. These included, but were not limited to, a month-long teachers' strike at the beginning of the school year, and resistance on the part of the teachers to embrace the project. As a result, only the Mirrors and Monitors component of the project, along with an increased level of awareness of the project goals, was implemented during the first year.

The second year of implementation saw fewer problems. The year began on time and the initial data collection took place. The interventions were implemented more or less as planned. There was still some resistance on the part of some of the teachers. The final implementation year (currently under way) consists of only the Mirrors and Monitors component, with an additional modification which allows teachers to have their lessons video taped and to code themselves using the observation forms. This final year is intended as a maintenance year for the project.

Observation Instrument Development

The Mirrors and Monitors data required the design and development of instruments which would provide valid and reliable data on student on-task/off-task behaviors and on teachers' use of time and behaviors in the classroom which could be linked to student behaviors. Since teachers would be collecting data in peers' classrooms, the instruments and instructions had to be simple enough so that all participants would feel comfortable using them. The

instruments also had to be unobtrusive so that the normal classroom routine would not be interrupted. The interpretation of the data had to be simple and immediate since the observation data are shared between peers following each observation. Once the instruments were developed, training procedures had to be developed and perfected so that all project participants, and the outside coders, would be trained to produce valid and reliable data using the instruments.

After reviewing the literature (Borish and Shulte, 1981; Floden and Porter, 1981; Stallings, 1980), it was determined that observations made every two minutes throughout a class period would give a valid "snapshot" of behavior. This time frame was used for collecting data at the student level and at the classroom level. This provides a sample of behaviors which is averaged across time and gives a good approximation of the proportion of time students are on-task and the allocation and use of classroom time by teachers for different categories of behavior.

Student level data are collected using a seating chart format (see Figure 1). Prior to the observation, a seating chart is prepared which gives the name and location of students in the classroom within a box large enough to accommodate 5 rows of 5 marks indicating the students status as follows: a plus sign (+) for on-task, a zero (0) for 'don't know,' and a minus sign (-) for off-task. In addition to the seating chart, name tags are prepared for students to be coded in order to facilitate identifying students when they move about the room or are regrouped during the class period.

On-task behavior is defined as "students participating in the intended lesson which is related to either reading or mathematics." Examples of on-task behavior included: participating in guided lessons, responding orally,

engaged in a written assignment, engaged in a discussion that is related to the lesson, and taking a test or quiz. Off-task behavior is defined as "behavior not related to the lessons or a lack of involvement on the part of students." Examples of off-task behaviors included: engaged in a social interaction, uninvolved in the lesson, exhibiting disruptive behavior, waiting for help, being disciplined, sharpening pencils, daydreaming, and roving about the room. Observers are instructed to code students either on- or off-task if at all possible. The zero (0) code is used only when the observer is unable to observe the students for some reason.

Coding student behavior involves rapid decisions on the part of the observer. A sweep of the classroom is made at the beginning of each two-minute observation period. Each sweep follows the same path in order to assure that students are observed in approximately the same segment of the two-minute interval. As the observer glances at the student, a decision is made about the student's on-task/off-task status and the appropriate mark is made on the observation form. No attempt is made to make a cumulative assessment concerning the student's behavior throughout the interval. Since 25 observations are made during each observation, errors resulting from this sampling procedure are minimal.

Classroom level/teacher behavior data are collected simultaneously with student level data in order to provide feedback to teachers on their behavior and on the classroom activities taking place during the observation period. One of the important goals of the project is to increase teachers' use of instructionally appropriate behaviors while decreasing those behaviors which cause students to move off-task or appear not to promote academic learning time.

The data collection forms developed for this purpose went through several revisions. After the first year of implementation, the form was revised again. The changes in the form between year one and year two did not significantly affect the summary data since both forms reported data in the same four categories: non-interactive instruction, interactive instruction, off-task, and organization. The revisions resulted in combining and renaming some of the sub-categories and in how data were recorded on the form. The latest revision of the form is included herein (see Figure 2). The numbers of students engaged in each of the categories of activities are recorded on the form. The activity in which the teacher is involved is marked with a circle. Non-interactive instruction includes silent reading and seatwork. Interactive instruction includes oral reading, instructional explanation, giving directions, discuss/review assignments, and practice/drill. Off-task involves students in off-task activities. Organization includes management, distribute/collect materials and transitions. Specific definitions were developed for each of these behaviors (see Figure 2) based upon input from the project teachers.

Target percents for each of the four areas addressed on the form (from Stallings, 1980) are included as a guide to project teachers in interpreting the results. Data from the observation are easily converted to percents using the directions on the form. These results can then be compared to the targets.

Each observation period consists of 25 two-minute intervals during which each student is observed and coded (on the student form) and then the classroom level form is completed, recording the numbers of students in each category in the appropriate location. Then the teacher's activity is

indicated with a circle. Both the student and classroom forms are marked during each two-minute interval. During the 50 minute class period, 25 observations are made for every student in the room and 25 sets of numbers are recorded on the classroom observation form.

Information about the effect of various types of activities in the classroom can be determined by comparing the two observation forms. Student's on-task/off-task data can give the teacher information about what activities students in the classroom were involved in and what activities may have caused them to stray off-task. Grouping patterns and the number of students with whom the teacher was working during each interval are also available. These data provide information for possible areas in which the teachers may wish to alter their behaviors.

All observation forms developed by the project were field tested and validated over a one-year period prior to classroom use. The validation procedure involved criticism and revision of the forms by project teachers and administrators, project staff, and outside consultants. Field tests were conducted in non-project schools in Detroit. All elementary grades were involved in the field test as were some high school classes. The results of the field tests indicated that the data collected were representative of the classroom situation observed. Field test observations were made by pairs of observers. The results were very consistent between the pairs of observers.

Training observers to use the forms requires two steps. First, observers must memorize the definitions of the behaviors to be observed and become familiar with the location of each of the behaviors on the classroom observation form and memorize the definitions of on-task and off-task behaviors for students. Second, they must be provided guided and independent practice in

using the observation forms to code behaviors of students and teachers in a closely supervised situation and in classrooms.

The first phase of the training is best accomplished through presentation of the concepts and a detailed walk-through of the definitions of each of the behaviors with ample examples presented to the entire group of observers. Discussion among the observers which results in consensus among them as to the meaning of the terms is also helpful.

The guided practice phase of the training should begin with the use of video tapes of actual classroom situations which may be stopped and restarted at any point in order to present the group with situations that they may encounter during the observation. This procedure should be followed by role playing where half the group codes while the other half acts out a classroom scene. The groups then reverse roles as observers and presenters. The trainer should discuss the results of each of these trial codings.

Following this initial training, independent practice should be provided by placing trainees in pairs in actual classrooms and debriefing them following the coding period. Discussions between pairs concerning discrepancies in their observations are an important part of the learning process. At least three practice sessions should be provided. Most observers can learn to collect data in about two days of training.

Other Data Collection Procedures

In addition to observation data, achievement data in reading and mathematics and attendance data were collected for the purpose of project evaluation.

Attendance data was collected from local school records for both students and teachers.

Achievement data were collected using the California Achievement Test. This instrument was used because it was administered on a city-wide basis by the district and additional testing of project students on another instrument would have been excessive. Achievement data are collected in the spring of each school year.

Evaluation Results

Evaluation results summarizing the first two years of program implementation are presented here. Three major areas of results will be described: classroom/teacher behaviors, student behaviors, and achievement data.

Classroom/teacher behavior data were collected during observations conducted by outside observers using the instruments described above. Each teacher was scheduled for two reading and two mathematics class observations in the fall and spring of each year. The mean percent of time across the four observations was recorded for each teacher as a pre and post measure of their use of classroom time.

Table 1A about here

Table 1A gives the numbers of teachers at each grade level and each school for whom observation data were available during year one of the project.

Table 1B about here

Table 1B gives the same data for year two of the project.

Table 2 presents the mean percents of time the teachers at each of the schools used in each of the four categories measured during the observation. Data for both years are included.

Table 2 about here

Examination of these data indicate that over the first two years of the project both project schools significantly increased the percent of time spent in interactive instruction. Both project schools maintained the increase in this category. The control school regressed eight percent at the Fall '83 data collection time in this category and then reached a new high at the end of year two. In all cases, teachers were well within the target percents at all data points. The organization category was reduced and remained low.

Table 3 about here

Teacher attendance data are presented in Table 3. The results are mixed. School One improved, School Two and the Control School worsened. In absolute terms, the two project schools were about equal in year two and had better attendance than the comparison school.

Student behavior data were collected using the seating chart form described above. These data were collected simultaneously with the classroom level data. Table 4A presents the numbers of students at each school by grade

Table 4A about here

for year one. Table 4B presents the same data for year two.

Table 4B about here

The data in Table 5 represent the mean percents of on-task behavior for students at each school by grade level for the two years of project implementation. The results are somewhat unexpected. At the school level, all three

Table 5 about here

schools followed a similar pattern: high levels of on-task behavior in the fall of year one which was maintained into the spring, followed by a sizeable

increase in the fall of year two which fell back to the initial level observed in the fall of year one.

Table 6 about here

Student attendance is presented in Table 6. These data indicate that student attendance declined slightly at each site. In absolute terms, the Control School had the highest absence rate at the end of year two, followed in descending order by School Two and School One. This trend was parallel to results of comparisons made between year one data and the year prior to project implementation.

Achievement data were gathered using the California Achievement Test (CAT/C) as described above. All analyses included only students with data for year one and year two.

Tables 7 and 8 present mean scale scores by grade level for the pre- and posttest data in reading at the three sites. All three showed gains in

Tables 7 and 8
about here

reading achievement from year one to year two. Analysis of covariance was employed to compare the three schools' scores in reading on the posttest controlling for pretest differences (see Table 9). Adjusted means on the

Table 9 about here

posttest for each school appear in Table 10.

Table 10 about here

The overall ANCOVA produced a significant F value of 50.168. The covariate (reading pretest scores) accounted for a significant proportion of

this difference (F = 408.787). There was a significant interaction between the two main effects (F = 13.55[illegible]), grade level and school. Both main effects were significant. The grade level effect (F = 11.830) was anticipated due to the nature of the scale scores. The school effect (F = 7.347) showed that School One scored significantly higher than School Two which, in turn, scored higher than the Control School. In year one, school differences were not significant.

Table 11 about here

Additional ANCOVA analyses conducted controlling for pretest and the proportion of time students were on-task in the spring of year two indicated that the differences observed in the analyses above were maintained, as was the relative ranking of the schools when these variables were controlled (see Tables 11 and 12).

Table 12 about here

Tables 13 and 14 present mean scale scores by grade level for the pre- and posttest data in mathematics at the three sites. All three showed gains

Tables 13 and 14
about here

in mathematics achievement from year one to year two. Analysis of covariance was employed to compare the three schools' scores on the posttest controlling for pretest differences (see Table 14). Adjusted means on the posttest for each school appear in Table 15.

Table 15 about here

The overall ANCOVA produced a significant F value of 159.912. The covariate (mathematics pretest scores) accounted for a significant proportion

of this difference (F = 1352.230,. There was a significant interaction between the two main effects (F = 43.808), grade level and school. Both main effects were significant. The grade level effect (F = 17.631) was anticipated due to the nature of the scale scores. The school effect (F = 22.446) showed that School One scored significantly higher than School Two which, in turn, scored higher than the Control School (see Table 16). This result parallels the year two reading results and reinforces a somewhat weaker finding from year one data.

Table 16 about here

Additional ANCOVA analyses conducted controlling for pretest and the proportion of time students were on-task in the spring of year two indicated that the differences observed in the analyses above were maintained, as was the relative ranking of the schools when these variables were controlled (see Tables 17 and 18).

Table 17 about here

The final set of analyses involving achievement data involved correlational analyses conducted to reaffirm the relationship between achievement and on-task behavior. A significant positive correlation was found between on-task behavior (spring of year two) and reading achievement (year two posttest), r = 0.2080. There was a similar result for mathematics in year two, r = 0.3234. Using year one data, the correlations were r = 0.3466 and r = 0.2619 for reading and mathematics, respectively.

Table 18 about here

Summary

This paper has described Detroit's "Peer Teachers as Mirrors and Monitors" project, a cost-effective approach to increasing student achievement in mathematics and reading in grades one through four which uses a system of periodic feedback to teachers on their use of time and the on-task level evidenced by their students and four progressively more expensive interventions to assist teachers in making changes which will have the desired result. The evolution of the project was described and observation data collection instruments developed by the project were presented. Findings from the evaluation of the first two years of project implementation were included.

Conclusions

The project has been successful in several areas. First, the data collection procedures have been developed and refined and are useful to this project and in other applications. Second, students at the project sites appear to be on-task at high levels. Third, teachers have modified their behavior in order to conform to research based allocation of time. Fourth, new instructional strategies have been employed, including more focused instruction. It is difficult to attribute the improvement in student achievement entirely to this project since many other competing hypotheses are tenable. However, the experience of participating in this project has had an impact on school and project staff which will be felt long after the project ends in 1985.

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FIGURES AND TABLES

FIGURE 1

DETROIT PUBLIC SCHOOLS

PEER TEACHERS AS MIRRORS AND MONITORS

Student Time-On-Task Observation Form

Teacher _____ Time ____:____ to ____:____

School _____ Grade:____ Subject _____

Room ____ Date _____

Observer _____

SEATING CHART

FIGURE 2

PEER TEACHERS AS MIRRORS AND MONITORS
Observation Form

DIRECTIONS: During each 2 minute observation, record the number of students involved in each of the activities listed below. Circle the number of students involved in activity in which the teacher is directly participating.

School:_____ Teacher:_____ Grade:____ Room:_____ Subject:_____ Observer:_____ Date:_____

Start time:____:____ End time:____:____ Number of students:_____

Observation #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	Number of Circles
Activity																										
Silent Reading																										
Seat Work																										
Oral Reading																										
Instructional Explanation																										
Giving Directions																										
Discuss/review assignments																										
Practice/ Drill																										
Students Off Task																										
Management																										
Distribute/Collect materials																										
Transitions																										

SUMMARY INFORMATION	total number teacher circles in each area	percent of observations in each area*	target percents for each area
Non-Interactive Instruction	_____	_____	35% or less
Interactive Instruction	_____	_____	50% or more
Off-Task	_____	_____	5% or less
Organization	_____	_____	15% or less

*Divide the total number of teacher circles by the number of observations and multiply your answer by 100

FIGURE 3.

PEER TEACHERS AS MIRRORS AND MONITORS
Classroom Observation Form Activities

ACTIVITY	DESCRIPTION
Silent Reading	Students are reading silently to themselves as a group activity or are working on individual assignments. No writing.
Seat Work	One or more students is/are writing papers, doing computation, or involved in any other silent written work related to the lesson.
Oral Reading	One or more students is/are reading a section from a play aloud or reading a book for the class re reading group to hear. Oral reading is usually not done in unison; generally, students take turns reading sequential sections from a book. The teacher or the student(s) can also read aloud while the rest of the class follow along in their own texts.
Instructional Explanation	An adult is informing some grouping of students about a subject. Academic discussion or slow-paced question/answer session takes place regarding lecture material, assignments, or problems.
Giving Directions	An adult is explaining an activity, the procedures to be followed, the amount of work to be finished, or rewards for completing the assignment. The discussion is not focusing on the academic content, but on the information that students need to carry out the assignment (or discussing grades).
Discuss/Review Assignment	One or more students is/are receiving information or feedback on work they have completed, or are being evaluated on their work preparatory to continuing the assignment.
Practice/Drill	One or more students is/are verbally involved in reinforcing, repetitive, or rote work. This activity must be differentiated from seat work. Students writing verbal material, as in dictation, are also coded Practice/Drill.
Students Off-Task	One or more students or teacher and students are interacting about work or subjects other than class-related material, or students are not involved in any activity, are arriving or leaving, or moving about the room. (See list of off-task behaviors)
Management	Taking attendance, making/receiving announcements, regrouping, forming lines, discipline, collecting money, etc.
Distribute/Collect Materials	Teacher and/or students are involved in passing out papers, putting away materials, preparing to leave, or preparing or checking materials.
Transitions	Changing from one activity to another.

TABLE 1A

Numbers of Teachers at Each School by Grade

Grade 1982-83	Numbers Of Teachers		
	Project Schools		Control
	School One	School Two	School
K	1	0	0
1	3*	2	3
2	3	2*	2
3	3**	0	2**
4	2	1	0
Totals	12	5	7

*One of each of these teachers has a 1st/2nd grade split.

**One of each of these teachers has a 3rd/4th grade split.

TABLE 1B

Numbers of Teachers at Each School by Grade

Grade 1983-84	Numbers Of Teachers		
	Project Schools		Control
	School One	School Two	School
1	2	2	1
1/2 Split	1	0	0
2	3	2	1
2/3 Split	1	1	1
3	2	0	1
3/4 Split	1	1	0
4	1	2	2
Totals	11	8	6

TABLE 2

Means of Percents* of Classroom Time Used in Four Categories

School	Observation Date	N	Non-Interactive Instruction	Interactive Instruction	Off-Task (Student Related)	Organization
School One	Fall - '82	11	12%	75%	1%	12%
	Spring - '83	12	8	84	1	8
	Fall - '83	11	4	86	1	9
	Spring - '84	11	4	83	5	8
School Two	Fall - '82	5	11	71	3	15
	Spring - '83	5	6	84	2	8
	Fall - '83	8	3	83	2	11
	Spring - '84	8	1	85	3	10
Control School	Fall - '82	7	19	60	5	15
	Spring - '83	7	12	76	2	10
	Fall - '83	6	8	68	7	14
	Spring - '84	6	7	79	3	11

*Percents may not total 100% due to rounding error.

Target percents for each of the categories were as follows:

Non-Interactive Instruction .. 35% or less
Interactive Instruction .. 50% or more
Off-Task (Student Related) .. 5% or less
Organization .. 15% or less.

TABLE 3

Means of Numbers of Days Absent at Each School by Grade for Teachers Year One (1982-83) and Year Two (1983-84)

Grade 1983-84	Means of Numbers of Days Absent					
	School One		School Two		Control School	
	Year One	Year Two	Year One	Year Two	Year One	Year Two
1	10.0	5.8	2.0	3.0	9.0	7.0
1/2 Split			1.5	4.0		
2	8.8	5.8	1.8	8.0	8.0	10.0
2/3 Split	2.0	5.0	8.0	8.0	6.0	8.5
3			0.5	4.3	0.0	18.0
3/4 Split	12.5	16.0	5.0	10.0		
4	6.0	3.0	6.0	15.0	8.8	12.5
School Means	8.0	6.3	2.8	6.9	6.8	11.3

TABLE 4A

Numbers of Students at Each School by Grade

Grade 1982-83	Numbers Of Students		
	Project Schools		Control School
	School One	School Two	
1	85	58	57
2	69	54	79
3	87	0	30
4	90	28	49
Totals	331	140	215

TABLE 4B

Numbers of Students at Each School by Grade

Grade 1983-84	Numbers Of Students		
	Project Schools		Control School
	School One	School Two	
1	77	50	25
2	85	50	43
3	72	18	15
4	34	84	45
Totals	268	202	128

TABLE 5

Mean Percent On-Task Behavior for Students at Each School by Grade Level
Fall and Spring, Year One and Year Two

Grade	Project Year	Project Schools				Control School	
		School One		School Two			
		Fall	Spring	Fall	Spring	Fall	Spring
1	One	78%	80%	67%	74%	59%	58%
	Two	92	87	88	71	83	72
2	One	77	72	81	87	73	68
	Two	90	81	88	86	77	65
3	One	84	95	-	-	87	81
	Two	92	80	84	82	90	79
4	One	95	91	87	57	83	70
	Two	98	98	83	68	81	83
School Means	One	84	85	75	76	73	67
	Two	92	85	86	75	81	74

TABLE 6

Means of Numbers of Days Absent at Each School by Grade for Students Year One (1982-83) and Year Two (1983-84) (N=312)

Grade 1983-84	Means of Numbers of Days Absent					
	School One		School Two		Control School	
	Year One	Year Two	Year One	Year Two	Year One	Year Two
2	11.0	13.1	16.0	15.7	13.1	11.9
3	10.1	11.1	7.9	6.2	8.2	12.0
4	8.5	7.3	9.6	11.1	11.7	12.7
School Means	10.3	11.4	11.0	11.6	11.9	12.3

TABLE 7

Means of Scale Scores on the CAT/C Reading Comprehension Subtest
For Each School by Grade
Spring, 1983 (Year Two Pretest)

Grade 1983-84	Project Schools						Control School		
	School One			School Two					
	Mean	s.d.	N	Mean	s.d.	N	Mean	s.d.	N
1	386	22	2*						
2	374	31	61	316	29	21	350	31	28
3	398	34	35	390	34	17	363	56	8
4	470	38	25	421	36	16	416	33	32
School Means	401	49	123	370	56	54	382	47	68

*These two students were grade failures and are in Grade 1 for the posttest also.

TABLE 8

Means of Scale Scores on the CAT/C Reading Comprehension Subtest
For Each School by Grade
Spring, 1984 (Year Two Posttest)

Grade 1983-84	Project Schools						Control School		
	School One			School Two					
	Mean	s.d.	N	Mean	s.d.	N	Mean	s.d.	N
1	342	83	2*						
2	39.	31	61	359	32	21	380	44	28
3	418	39	35	421	33	17	400	39	8
4	539	43	25	445	59	16	427	45	32
School Means	429	68	123	404	56	54	405	49	68

*These two students were grade failures and are in Grade 1 for the pretest also.

TABLE 9

Results of ANCOVA Comparing Posttest Reading Scale Scores for Three Schools While Controlling for Pretest Reading Scale Scores
Year Two Data

Source	Sum of Squares	df	Mean Square	F	Significance
Pretest	510669.000	1	510669.000	408.787	**
Main Effects	48315.250	5	9663.047	7.735	**
School	18355.500	2	9177.750	7.347	**
Grade	44334.125	3	14778.039	11.830	**
Interaction	67728.313	4	16932.078	13.554	**
Explained	626712.563	10	62671.254	50.168	**
Residual	292319.438	234	1249.228		
Total	919032.000	244	3766.524		

**p < .01

TABLE 10

Mean Posttest Reading Scale Scores Adjusted for Pretest by School
Year Two Data

School	Adjusted Mean Scale Score
School One	425.75
School Two	414.95
Control School	402.73

TABLE 11

Results of ANCOVA Comparing Posttest Reading Scale Scores for Three Schools While Controlling for Pretest Reading Scale Scores And Proportion of Time-On-Task for Students Year Two Data

Source	Sum of Squares	df	Mean Square	F	Significance
Covariates	523767.188	2	261883.563	211.643	**
Pretest	473529.938	1	473529.938	382.686	**
On-Task	13098.176	1	13098.176	10.585	**
Main Effects	47434.250	5	9486.848	7.667	**
School	13262.867	2	6631.434	5.359	**
Grade	44313.832	3	14771.277	11.937	**
Interaction	59519.938	4	14879.984	12.025	**
Explained	630721.375	11	57338.305	46.338	**
Residual	288310.625	233	1237.385		
Total	919032.000	244	3766.524		

**p < .01

TABLE 12

Mean Posttest Reading Scale Scores Adjusted For Pretest and Proportion Time-On-Task For Students Year Two Data

School	Adjusted Mean Scale Score
School One	423.98
School Two	416.97
Control School	404.28

TABLE 13

Means of Scale Scores on the CAT/C Mathematics Subtest
For Each School by Grade
Spring, 1983 (Year Two Pretest)

Grade 1983-84	Project Schools						Control School		
	School One			School Two					
	Mean	s.d.	N	Mean	s.d.	N	Mean	s.d.	N
1	316	4	2*						
2	340	22	61	313	19	21	323	22	28
3	366	14	35	363	19	17	369	14	8
4	440	29	25	382	31	13	398	27	32
School Means	368	44	123	347	37	51	364	42	68

*These two students were grade failures and are in Grade 1 for the posttest also.

TABLE 14

Means of Scale Scores on the CAT/C Mathematics Subtest
For Each School by Grade
Spring, 1984 (Year Two Posttest)

Grade 1983-84	Project Schools						Control School		
	School One			School Two					
	Mean	s.d.	N	Mean	s.d.	N	Mean	s.d.	N
1	300	40	2*						
2	355	20	61	345	21	21	347	24	28
3	404	27	35	400	27	17	382	20	8
4	543	34	25	407	49	13	422	31	32
School Means	406	77	123	379			386	45	68

*These two students were grade failures and are in Grade 1 for the pretest also.

TABLE 15

Results of ANCOVA Comparing Posttest Mathematics Scale Scores for Three Schools While Controlling for Pretest Mathematics Scale Scores
Year Two Data

Source	Sum of Squares	df	Mean Square	F	Significance
Pretest	728065.875	1	728065.875	1352.230	**
Main Effects	38579.250	5	7715.848	14.331	**
School	24170.828	2	12085.414	22.446	**
Grade	28477.805	3	9492.602	17.631	**
Interaction	94349.125	4	23587.281	43.808	**
Explained	860994.250	10	86099.375	159.912	**
Residual	124374.750	231	538.419		
Total	985369.000	241	4088.668		

**$p < .01$

TABLE 16

Mean Posttest Mathematics Scale Scores
Adjusted for Pretest by School
Year Two Data

School	Adjusted Mean Scale Score
School One	404.62
School Two	392.64
Control School	386.43

TABLE 17

Results of ANCOVA Comparing Posttest Mathematics Scale Scores for Three Schools While Controlling for Pretest Mathematics Scale Scores And Proportion of Time-On-Task for Students
Year Two Data

Source	Sum of Squares	df	Mean Square	F	Significance
Covariates	748761.875	2	374380.938	722.075	**
Pretest	573963.625	1	373963.625	1107.014	**
On-Task	20695.996	1	20695.996	39.917	**
Main Effects	26271.938	5	5254.387	10.134	**
School	15250.590	2	7625.293	14.707	**
Grade	22215.941	3	7405.313	14.283	**
Interaction	91085.000	4	22771.250	43.919	**
Explained	866118.813	11	78738.063	151.864	**
Residual	119250.188	230	518.479		
Total	985369.000	241	4088.688		

**$p < .01$

TABLE 18

Mean Posttest Mathematics Scale Scores Adjusted
For Pretest and Proportion Time-On-Task
For Students
Year Two Data

School	Adjusted Mean Scale Score
School One	403.63
School Two	389.19
Control School	383.07