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ABSTRACT

Two studies evaluated the use of the Student Team Reading (STR) and Student Team Writing (STW) program in urban middle schools. The first study investigated the use of STR in 20 experimental sixth-grade classes in three schools matched with 39 classes in three control schools. The second study investigated the use of STR and STW in sixth, seventh, and eighth grades in two urban middle schools in Maryland matched with three control schools. In the first study, experimental students achieved significantly higher on a standardized measure of reading comprehension. The reading comprehension achievement of academically handicapped students, analyzed separately, was highly significant in favor of the experimental group. In the second study, the STR and STW students had significantly higher achievement on measures of reading vocabulary, reading comprehension, and language expression. (Two tables of data are included in the first study, and one table of data is included in the second study; 25 references are attached to the first study, and 22 references are attached to the second study.) (Author/RS)

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Robert J. Stevens and Scott Durkin

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The Center

The mission of the Center for Research on Effective Schooling for Disadvantaged Students (CDS) is to significantly improve the education of disadvantaged students at each level of schooling through new knowledge and practices produced by thorough scientific study and evaluation. The Center conducts its research in four program areas: The Early and Elementary Education Program, The Middle Grades and High Schools Program, the Language Minority Program, and the School, Family, and Community Connections Program.

The Early and Elementary Education Program

This program is working to develop, evaluate, and disseminate instructional programs capable of bringing disadvantaged students to high levels of achievement, particularly in the fundamental areas of reading, writing, and mathematics. The goal is to expand the range of effective alternatives which schools may use under Chapter 1 and other compensatory education funding and to study issues of direct relevance to federal, state, and local policy on education of disadvantaged students.

The Middle Grades and High Schools Program

This program is conducting research syntheses, survey analyses, and field studies in middle and high schools. The three types of projects move from basic research to useful practice. Syntheses compile and analyze existing knowledge about effective education of disadvantaged students. Survey analyses identify and describe current programs, practices, and trends in middle and high schools, and allow studies of their effects. Field studies are conducted in collaboration with school staffs to develop and evaluate effective programs and practices.

The Language Minority Program

This program represents a collaborative effort. The University of California at Santa Barbara is focusing on the education of Mexican-American students in California and Texas; studies of dropout among children of recent immigrants have been conducted in San Diego and Miami by Johns Hopkins, and evaluations of learning strategies in schools serving Navajo Indians have been conducted by the University of Northern Arizona. The goal of the program is to identify, develop, and evaluate effective programs for disadvantaged Hispanic, American Indian, Southeast Asian, and other language minority children.

The School, Family, and Community Connections Program

This program is focusing on the key connections between schools and families and between schools and communities to build better educational programs for disadvantaged children and youth. Initial work is seeking to provide a research base concerning the most effective ways for schools to interact with and assist parents of disadvantaged students and interact with the community to produce effective community involvement.

Abstract

This report presents evaluations of the use of the Student Team Reading (STR) and Student Team Writing (STW) program in urban middle schools. Part I presents a study of the use of Student Team Reading in 20 experimental sixth-grade classes in three schools matched with 39 classes in three control schools. Part II presents a study of the use of Student Team Reading and Student Team Writing in sixth-, seventh-, and eighth grades in two urban middle schools matched with three control schools. In the first study, experimental students achieved significantly higher on a standardized measure of reading comprehension. The reading comprehension achievement of academically handicapped students, analyzed separately, was highly significant in favor of the experimental group. In the second study, the Student Team Reading and Student Team Writing students had significantly higher achievement on measures of reading vocabulary, reading comprehension, and language expression.

Acknowledgments

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Part I

Student Team Reading: A Cooperative Learning Approach to Middle School Reading Instruction

Introduction

For nearly thirty years the philosophical goal of middle level education has been to make schools more responsive to the unique needs and abilities of early adolescents. Recommendations for how schools can achieve this goal have included creating a more personalized learning environment, creating more meaningful curricula, and encouraging students to think reflectively and solve problems (cf. Carnegie Council on Adolescent Development, 1989; Eichhorn, 1966; Johnston,1984).

Descriptive research, however, has found that much of what is advocated is not experienced by most students in the middle grades (Epstein & Mac Iver, 1990). Most middle schools are large and departmentalized and include little or no interdisciplinary teaming and no integration of content or curricula. Students often have six or more teachers, and teachers teach 150 or more students per day. Many middle grades continue to be a time when students exhibit low attendance and poor attitudes toward school, and they often lack mastery of literacy and numeracy skills. Although advocates of particular characteristics of middle level education have identified what the goals are, there clearly is a need to implement strategies to attain the goals and to evaluate what works in middle level education (Strahan, 1991).

In the area of reading instruction in the middle grades, little has been done to adjust the curriculum and instructional processes to meet the needs and tap the abilities of middle school students. Typical reading instruction in middle school is simply more of the same type of instruction that students received in elementary schools (Knott, 1986). Often the curriculum is based upon instruction in isolated skills and has little or no relationship to what students read in other subject areas. Students continue to be passive learners in traditional settings.

This research addressed the issues of middle grade reading instruction by developing and evaluating a reading instruction program specifically designed for early adolescents. The strategy was to apply the research on reading and cooperative learning to address the philosophical issues raised by middle grade advocates and to meet the needs of middle grade students.

Reading Research

Research on reading instruction in the middle grades parallels and expands upon the wealth of research in elementary reading instruction. Middle school students benefit from being taught the structure of text as an aid to comprehension, which can be accomplished by teaching the concepts of characters, setting, plot, theme, symbolism, and figurative language in the context of reading good literature (Alvermann, Moore & Conley, 1987). This type of instruction helps contextualize students' knowledge, thus increasing its meaningfulness and its retention.

Reading research has found that instruction in segmented skills does little to improve students' ability to comprehend what they've read (Anderson, Hiebert, Scott, & Wilkinson, 1985). However, explicit instruction on comprehension strategies consistently has been shown to be effective in changing students' reading behavior and their ability to comprehend (cf. Palinscar & Brown, 1984; Paris, Cross, & Lipson, 1984; Stevens, 1988). Explicit instruction on strategies explains to students how they can comprehend text and monitor their own comprehension. Students learn general processes that help them derive meaning from text and integrate that meaning with what they already know. Given instruction on strategies students develop more competence and independence as learners and often are able to generalize their strategies to reading new content (Paris, et al., 1984).

Reading research has also emphasized the need to make strong connections between reading and writing. Students in secondary schools spend little time writing in academic subjects in school and usually write only brief paragraphs (Applebee, 1981). Yet writing activities not only improve students' abilities to express themselves, they also act as a natural extension of reading and increase students' comprehension of what they've read (Anderson, et al., 1985).

Cooperative Learning

A substantial body of research at a variety of grade levels documents that cooperative learning increases student achievement, creates more positive attitudes toward school, and improves peer relations (Slavin, 1983; 1990). When students work together on heterogeneous-ability learning teams and are given clear incentives for cooperation, they exhibit cooperative on-task behaviors. In cooperative learning teams, students explain and elaborate academic tasks to one another, which is an effective way to improve students' understanding (Wittrock, 1986).

Cooperative Learning processes have been shown to be highly effective in elementary reading instruction. The Cooperative Integrated Reading and Composition (CIRC) program has produced significantly higher student achievement in reading comprehension and reading vocabulary in second through sixth grades (Stevens, Madden, Slavin and Farnish, 1987; Stevens and Slavin, 1991). The research on CIRC indicates that a multi-faceted program that revises reading curricula and uses cooperative learning produces higher student achievement than traditional curricula and instruction. Subsequent component analysis research provides strong evidence that students in cooperative learning classrooms achieve substantially higher when compared to students working independently with the same content (Stevens, Slavin and Farnish, 1991). Thus research strongly supports the effectiveness of cooperative learning in reading instruction.

Some research supports the effectiveness of cooperative learning processes with students in middle grades, but none of this research looks at middle grade reading instruction (Slavin, 1990). Cooperative learning processes fit well with middle grade education, in part because of students' increased peer orientation in early adolescence (Johnston, 1984; Wiles & Bondi, 1986). Using cooperative learning in middle grades takes advantage of the powerful impact that groups can have on students' learning and motivation. Middle grade students also prefer to be actively involved in their learning, rather than being passive learners (Wiles & Bondi,1986). Cooperative learning enlists the students as instructional resources in the classroom, getting them actively involved in learning. For these instructional and motivational reasons, cooperative learning seems appropriate for middle grade students.

The Student Team Reading Program

The Student Team Reading (STR) program is a cooperative learning approach to reading instruction for middle grades students. The STR program has two major curriculum components: literature-based activities and explicit instruction in comprehension strategies. The cycle of instruction uses teacher-directed instruction and cooperative learning in heterogeneous teams. The teams are given rewards and recognition based upon the performance and improvement of each of the team members.

Literature-based Activities

To provide interesting and meaningful reading material to the students, STR uses an English literature anthology rather than a reading basal. The anthology contains a selection of genres (e.g., short stories,

science fiction, legends) and provides biographical sketches of major authors (e.g., O. Henry, Langston Hughes, Pearl Buck). The teacher prepares the students to read the selection by introducing the author and the genre, discussing relevant background information, and introducing the new vocabulary words. Then students engage in a series of cooperative learning activities which the teacher monitors. The teacher leads the students through a discussion of the daily activities as the students complete them. The activities include:

a. Partner reading. The students read the story silently first, then orally with a partner. During oral reading, each student reads aloud while the partner follows the text and helps the reader with his/her errors. The oral reading practice is designed to build fluency and automaticity of decoding (Samuels, 1985), and the repeated reading builds both automaticity and comprehension (Anderson, et al., 1985).

b. Treasure hunts. Students are given questions about the selection which focus on comprehension of the content and understanding and appreciation of the author's purpose and writing style. The questions focus on the theme of the selection, analysis of the character's actions and motives, and comprehension of the literary techniques and figurative language used.

c. Word Mastery. The students practice saying the new vocabulary aloud with their partners until they are able to say them accurately and smoothly. This helps students master the new words so they will not interfere with their comprehension of the selection (LaBerge & Samuels, 1974; Perfetti, 1985). After reading the selection, students write "meaningful sentences" for selected words from the vocabulary list. The goal is to show they understand the meaning of the word in the context of the sentence (e.g., "I was furious with my brother when he threw my shoes into the lake" not "I was furious with my brother"). The students also use a metacognitive checking strategy to evaluate the meaningfulness of their sentences. They take the word out the sentence and see if they can substitute any other word in its place. If the sentence allows random substitutions for the vocabulary word, then it is not "meaningful" for the vocabulary word.

d. Story-retelling. After reading the selection and discussing it in their teams and with the whole class, students summarize the main parts to their partners. Summarizing and paraphrasing content in one's own words has been found to improve students' comprehension of what has been read (Weinstein, 1982; Wittrock, 1986).

e. Story-related writing. After reading the selection the students are given a topic or choice of topics that require them to respond in a brief composition to what they have just read. The students may be asked to compare characters from two selections, relate their feelings about the selection, or analyze and interpret the author's message or purpose. This activity allows students to elaborate on what they have read and relate it to their prior knowledge or experiences, thus increasing their depth of comprehension (Anderson, et al., 1985; Wittrock, 1986).

f. Quizzes. At the end of the activity cycle for each selection the students are given brief quizzes about the selection and are asked to write meaningful sentences for selected vocabulary words. The students complete the quizzes independently, and they are scored by the teacher. The quiz scores are used to determine team scores and team recognition.

Explicit Instruction in Comprehension Strategies

Students receive explicit instruction in comprehension strategies such as identifying main ideas and themes, drawing conclusions, making predictions, and understanding figurative language. The instruction provides students with comprehension-fostering strategies and metacognitive checking strategies such as those developed in basic and applied research in reading comprehension (e.g., Brown & Palincsar, 1982; Palincsar & Brown, 1984; Paris, Cross & Lipson, 1984; Stevens, 1988).

After teacher-directed instruction in the strategies, students engage in cooperative learning activities to master the strategies. Teachers then review and apply the strategies when relevant to later literature selections.

Team Rewards and Recognition

Students are assigned to heterogeneous-ability learning teams in which they collaborate to complete the activities described above. Cooperative activities are reinforced through group goals and recognition based upon the points that team members receive for their individual performances on the quizzes. The points are contributed to form a team score. Teams that average 80% and above are recognized for their achievement and receive certificates appropriate for their level of achievement. Previous research has found that cooperative learning teams that are recognized for the performance of each of the team members have higher on-task behavior and gain significantly more on achievement (Slavin, 1983; 1990).

Mainstreaming Academically Handicapped Students

One of the goals of the STR program is to provide an effective instructional process in reading for mainstreamed students with mild academic handicaps in regular education classes. Previous research has strongly supported the benefits for mainstreamed students of cooperative learning programs in elementary school reading instruction (Slavin, Stevens, and Madden, 1988; Stevens and Slavin, 1991).

In this study, we investigate the impact of discontinuing pull-out remedial programs in middle school and, instead, mainstreaming mildly handicapped students along with their teacher into regular education classes. The mainstreamed students were assigned to cooperative learning teams within the regular class, further integrating them both socially and academically. The class was team-taught by the regular education and special education teachers.

Method

The goal of this study is to evaluate the effectiveness of a cooperative learning approach to middle grade reading instruction as compared to traditional instruction in reading. Effectiveness is measured by student outcomes on standardized achievement tests.

Subjects and Design

The subjects were 1223 sixth-grade students in six middle schools in an urban school district in Maryland. Twenty experimental classes in three schools were matched on California Achievement Test Total Reading pretest scores with 34 classes in three control schools. The student populations in the schools ranged from 27 to 99 percent minority (median of 74.5%), and from 38 to 77 percent disadvantaged students (median of 57.5%). The treatment was implemented for the entire 1989-90 academic year.

Treatments

Control. The control teachers continued using their traditional methods and curriculum materials. In reading, they usually used a basal series and emphasized instruction in isolated skills. At times, students read silently; at other times they read orally in turns (one student reads while the rest of the class follows along). Students spent most of their seatwork time working independently to complete worksheet activities and "skills." Typically, students did little or no extended writing that was related to their reading activities. The control group instruction typified what has been described as traditional reading instruction in middle grades (Alvermann, et al., 1987; Anderson, et al., 1985).

Experimental. The experimental teachers were trained in the STR program in three

half-day training sessions. The training included how to do the classroom processes and what the rationale was behind them. Program elements were simulated for the teachers, with the trainer acting as the "teacher" and the teachers acting as "students." The teachers also received a detailed manual of the STR program and curriculum materials and textbooks, as described above.

During the initial six weeks of the implementation, the project staff observed the experimental teachers three or four times a week to monitor their implementation. The staff coached the teachers by providing them feedback on their implementation and answering their questions about the STR program. We emphasized the implication of the cooperative learning processes and the teacher-led explicit instruction as critical elements. Periodically we held after-school meetings to provide further feedback and to discuss implementation questions with the teachers. As teachers became more proficient with STR, the observations occurred less frequently and at more random intervals.

Teacher variations in the presentation of instruction (e.g., new vocabulary, story discussion, writing activities) were accepted and encouraged, provided that the adaptations met the goals of the STR materials and processes outlined in the teacher's manual. We asked, however, that the teachers use the cooperative learning processes described for each of the components. These standards were made clear during training, and subsequent observations indicated that although teachers did vary some of their instructional procedures, the prescribed cooperative interactions between students were evident in each of the components.

Measures

Achievement tests. The California Achievement Test (CAT) Form C was used as a pre- and posttest. The school district administered these tests every spring. The students' fifth-grade test scores were used to match the sixth-grade classes on initial ability. The fifth-grade scores were also used as the pretest data in all analyses. The sixth-grade scores were the posttests.

Results

All achievement analyses used standardized test scores. The data were analyzed by using individual-level ANCOVAs with CAT reading vocabulary and reading comprehension pretest scores used as the covariate to increase the power of the analyses. The ANOVA of the pretest data indicated that no significant differences existed between the control and experimental groups on their entering reading vocabulary or reading comprehension scores.

The ANCOVA of the posttest data indicated a significant difference favoring the experimental group on the standardized measure of reading comprehension, $F(1,1217)=4.1$, $p<.05$. There was no significant difference on the reading vocabulary test scores. The raw score means, standard deviations, and effect sizes are presented in Table 1.

Interaction effects. As part of the analyses, we examined the potential interaction of student race with the treatment to determine if the experimental treatment had differential effects on students of different races. The ANCOVA found no significant race-by-treatment interaction. Similarly, gender had no impact on the effects of the treatment, as there was no gender-by-treatment interaction.

Academically Handicapped Students

The data for students who received remedial reading or special education services was analyzed separately to determine the impact on mainstreamed students of reading instruction using the STR program. In both the experimental and control groups these students were identified as learning disabled.

Table 1

Reading Achievement: Means, Standard Deviations, and Analyses

	STR	Control		
Pretest	Mean[1] (SD)	Mean[1] (SD)	F	Effect Size
Reading Vocabulary	20.3 (6.4)	20.4 (6.6)	<1	
Reading Comprehension	24.3 (7.6)	24.5 (8.8)	<1	
Posttest				
Reading Vocabulary	18.1 (5.4)	18.3 (5.6)	1.95	-.02
Reading Comprehension	24.1 (7.3)	23.2 (8.1)	4.10*	.11
N	455	768		

[1] The means are raw score means on the California Achievement Test. The pretest scores are from the spring of fifth grade on level 15. The posttest scores are from the spring of sixth grade on level 16.

* $p < .05$

Table 2

Reading Achievement: Special Education Students

	STR	Control		
Pretests	Mean[1] (SD)	Mean[1] (SD)	F	Effect Size
Reading Vocabulary	18.8 (5.1)	18.4 (5.0)	<1	
Reading Comprehension	19.9 (7.1)	18.5 (7.3)	<1	
Posttests				
Reading Vocabulary	16.2 (4.1)	14.8 (3.9)	2.1	+.36
Reading Comprehension	21.0 (6.0)	16.7 (5.4)	9.18*	+.80
N	30	30		

[1] The means are raw score means on the California Achievement Test. The pretest scores are from the spring of fifth grade on level 15. The posttest scores are from the spring of sixth grade on level 16.

* $p < .01$

The academically handicapped students in the control group typically received their instruction in either a self-contained classroom or through pull-out instruction from the resource teacher. In the experimental group the academically handicapped students were mainstreamed in regular classes as described previously.

Achievement Pretests. There were no significant differences between the two treatment groups in this subsample on either reading vocabulary or reading comprehension achievement.

Achievement Posttests. The individual-level ANCOVA indicated a highly significant difference on reading comprehension achievement favoring academically handicapped students in the experimental group [$F(1,57)=9.18$, $p<.01$]. The mainstreamed students in the experimental group also scored higher on reading vocabulary achievement, but these differences were nonsignificant [$F(1,57)=2.11$, $p=.15$]. The means, standard deviations, and effect sizes are presented in Table 2. The effect size for the significant reading comprehension differences is +.80, meaning that academically handicapped students in the experimental group scored .8 standard deviations higher than their peers in the control group. (The effect size equals the difference between the treatment means divided by the control group standard deviation.)

Discussion

The results of this study support the effectiveness of the Student Team Reading program's cooperative learning approach to middle grade reading instruction for disadvantaged students. The STR program changes both the instructional processes and the curriculum to better meet the needs and capitalize on the abilities of middle grade students. The cooperative learning classroom processes in STR create a more personalized environment in which students work together on and share their ideas about the academic tasks. Students become actively engaged in their learning, rather than being passive learners as in traditional middle school instruction. The cooperative learning teams also take advantage of the strong peer orientation of early adolescents as a motivational component.

The STR curriculum changes make students' reading instruction more meaningful by having them read a literature anthology rather than stories found in a basal series. The students analyze the plot, literary devices, and the writer's style and technique to further their comprehension and understanding of good literature. The STR curriculum also integrates reading and writing by engaging students in meaningful writing activities in each unit. The positive impact of this multi-faceted program on students' reading comprehension achievement supports the effectiveness of the strategies for middle school reading.

The achievement data for academically handicapped students in STR strongly supports the mainstreaming of middle grade handicapped students using cooperative learning. The reading comprehension achievement of the learning-disabled students in STR was more than three quarters of a standard deviation higher than that of similar students in traditional instruction. When the achievement raw scores were converted to grade equivalent scores, academically handicapped students scored 0.8 grade equivalents higher on reading comprehension, with an average grade equivalent of 5.6 compared to 4.8 for the traditionally instructed students. Although handicapped students were still below grade level, STR clearly had a strong impact on them.

Future Directions

This study provides evidence that successful changes can be made in teaching students in the middle grades, but much more needs to

be done. In a further study we will extend the research to complete the integration of reading, writing, and literature which this project initiated. One goal is to reduce the departmentalization which is so common to this content by having the same teacher teach reading and English for a two-period block of time. Students will learn to read and comprehend good literature, as described above, then apply their learning about specific authors and their craft as models in their creative writing instruction. The goal is to achieve a natural instructional flow from reading to writing as parts of the same process (see Anderson, et al., 1985).

Beyond the obvious instructional benefits, the decreased departmentalization should also have an impact on students' attitudes toward and attachment to school by making their education more integrated and meaningful.

Finally, there is much research needed on what works in middle grade education. Advocates of middle schools propose a litany of organizational, curricular, instructional, and assessment structures and processes that purportedly will make middle level education responsive to the developmental needs of adolescents, and especially to the needs of educationally and economically disadvantaged students. We need to evaluate these structures and processes to find out what actually works to improve students' achievement, attitudes, and attendance in school during early adolescence.

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Part II

Student Team Reading and Student Team Writing : An Evaluation of a Middle School Reading and Writing Program

Introduction

The Student Team Reading (STR) and Student Team Writing (STW) programs were developed to address specific instructional and developmental needs of middle school students. The programs are based upon research in classroom organization, reading and writing instruction, and cooperative learning. The goals are as follows:

1. Use good literature as the basis for reading instruction. The Student Team Reading program specifically eliminates the use of a middle level basal reading series, instead using a literature anthology in reading instruction. Students should be more motivated to read if reading instruction is based upon interesting selections of good literature written by well-known authors, rather than the type of material typically found in basal readers.

2. Provide students with meaningful followup activities related to what they've read. One of the most significant problems of basal reading series is that the follow-up activities have little or no relationship to what the students have read (Beck, McKeown, McCaslin, & Burkes, 1979; Osborn, 1984). In Student Team Reading, students are given follow-up activities which directly relate to the literature selection they've read.

The goal is to get students to actively think about and analyze what they read. In this way, students improve their comprehension of what they read and learn skills that will generalize to reading and comprehending other selections.

3. Provide instruction on reading comprehension strategies. In the past fifteen years, research in reading comprehension instruction has identified specific comprehension strategies that are effective in improving students' reading performance. The Student Team Reading program provides instructional materials to teach specific comprehension strategies like identifying main ideas, summarizing, and clarifying what has been read.

4. Provide instruction on studying strategies During early adolescence studying strategies are important skills because students are making the transition from learning to read to reading to learn (Anderson & Armbruster, 1984; Anderson, Heibert, Scott, & Wilkinson, 1985). Middle school students are beginning to read and learn factual information presented in text, yet students receive little or no instruction in how to effectively identify, organize, and retain important information from text. In fact, prior to this point, most of their reading instruction experiences have revolved around reading fiction.

One of the goals of the Student Team Reading program is to teach students effective strategies for reading factual information and to give them practice using those strategies with nonfiction materials.

5. Focus instruction in language arts on writing. In the past ten years the development of a writing process approach to writing and language arts instruction has changed the way we think about language arts instruction. However, most language arts teachers still spend little time on writing activities; most of their time is still devoted to language arts time on language mechanics instruction and using grammar textbooks (Bridge & Heibert, 1985).

The goal of Student Team Writing is to provide teachers with a classroom process that focuses their language arts instruction on writing and on instructional

materials that support the writing emphasis. Focusing on skills that will improve their writing ability should make students' language arts instruction more meaningful and useful. At the same time, the writing emphasis should be intrinsically motivating to students as they write about things that are meaningful to them and share that writing with their peers.

6. *Integration of reading and English classes.* Most middle schools departmentalize students' instruction, so one teacher teaches them reading and one teaches them English. However, there is much overlap between reading and English and a continuity of skills between them.

The goal of this project is to take advantage of this natural connection and have the same teacher teach both reading and English. Students need to see the connections between these content areas, rather than arbitrarily segmenting them. Seeing the connections increases the potential for students to transfer knowledge learning in reading to English, and vice versa.

Having a combined rading-English class should also help achieve two goals of middle level education: approaching courses in an interdisciplinary fashion and reducing the student-teacher ratio.

Achieving a lower student-teacher ratio is important because students often have a low attachment to school at this age, and as a result become disinterested in education and more likely to drop out. This is in part because they have no personal relationships with teachers. Students go from elementary school where they have one teacher for the majority of the day to a departmentalized middle school where they have six or more different teachers each day. Similarly, teachers see anywhere from 150 to 200 students a day. It is difficult for students and teachers to make any type of interpersonal attachments in this situation.

By de-departmentalizing reading and English, the students spend more time with one teacher and teachers see fewer students, closer to 100 per day. With lower student-teacher ratios, the teachers may get to know students better, increasing their ability to monitor students' performance and potentially reducing students' feelings of isolation and alienation in school.

The Student Team Reading Program

The Student Team Reading program (STR) consists of three main elements: Story-related activities, direct instruction in reading comprehension and study strategies, and story-related writing. In all of these activities, students work in heterogeneous learning teams. All activities follow a regular cycle that involves teacher presentation, team practice, independent practice, peer pre-assessment, additional practice, and individual accountability.

Teams

The students are assigned to teams of heterogeneous ability, and within the teams are assigned a partner with whom they work to complete their activities. Students' scores on individual accountability activities--for example, on quizzes--contribute to form a team score. Teams are recognized for their success in attaining pre-specified levels of performance on the accountability measures based upon the average score of the team members. Research on cooperative learning has found that recognition based upon the individual performance of all of the team members develops interdependence on the part of team members and typically is related to positive effects on students' academic performance (Slavin, 1983; 1990).

Story-related Activities

Students use an English literature anthology for the source of the reading selections. The stories are introduced and discussed in teacher-led instruction. Teachers set the purpose for reading, introduce new vocabulary, review old vocabulary, discuss the story after students have read it, and so forth.

After the students read the story they complete a series of follow-up activities that are specifically related to what they've read. The activities include:

Partner reading. Students read the story silently then read it orally with their partner. During oral reading the students take turns reading, alternating after each paragraph. The listener follows along and corrects any errors the reader may make. This type of repeated reading gives the students practice in reading orally and has been found to contribute significantly to students' reading fluency and comprehension (Samuels, 1979).

Story structure. The students are given written activities, called Treasure Hunts, that focus them on comprehending the structure and content of the story. Halfway through the selection, the students stop reading to do their Treasure Hunts. They discuss and write answers to questions that ask them to describe the characters, setting, and problem in the story and predict how the problem in the story might be resolved. They might also discuss questions related to the author's purpose or style, and examine the figurative language or literary techniques used.

Research in reading comprehension has found that understanding story structures is important for students' comprehension (Fitzgerald & Spiegel, 1983; Short & Ryan, 1982; Stein & Glenn, 1979), and that discussing predictions and summaries of stories can increase students' comprehension (Palincsar & Brown, 1984).

Word mastery activities. Students are given a list of new or difficult words that are related to the story. The word-mastery activities focus on students' ability to decode and understand the meaning of the new words. Decoding practice involves rapid review of the words with a partner, to help the student develop automatic decoding of the new words. Automaticity of vocabulary is important to prevent comprehension problems that typically occur when students have not mastered vocabulary that is relevant to the content they are reading (Perfetti, 1985; Rosenshine & Stevens, 1986).

The students also learn the meaning of the new words through practice that focuses on writing "meaningful sentences" with the vocabulary. A "meaningful" sentence tells what the word means in the context of the sentence (e.g., "The octopus wrapped his eight long legs around the undersea diver," not "I saw an octopus").

Story retell. After reading and discussing the story, the students summarize the main points of the story to their partner. These summaries are prompted by the partner, who has specific questions about important elements or episodes in the story. The partner then checks the summary for completeness and adequacy of detail. Research has found that summarizing what has been read in one's own words enhances the reader's comprehension and retention of what has been read (Doctorow, Wittrock, & Marks, 1978; Weinstein, 1982).

Story-related Writing

For each reading selection, the students are given an open-ended assignment to write a few paragraphs in response to the selection. For example, the students might be asked to use their predictions from the Treasure Hunt to write a new end to the story, or they might be asked to compare and contrast characters from the story or from different stories.

Students use a modified writing process approach--they discuss their ideas with their partner, draft a version of the response, revise their writing based upon their partner's feedback, edit their writing, and create a final copy.

Part of the purpose of the writing activity is to further students' comprehension and understanding of the reading selection by writing an extended response to the story or a part of the story (Wittrock, 1986). This activity also helps to increase the connection between reading and writing as students transfer the skills and strategies that they learn in writing to constructing good responses for the reading activities.

Instruction on Reading Comprehension and Study Strategies

Students receive direct instruction on reading comprehension strategies and study strategies on a regular basis. The comprehension strategies apply research that has shown that students' reading comprehension can be significantly improved through instruction and practice in specific reading comprehension strategies, such as strategies for identifying main ideas, drawing conclusions, and interpreting figurative language (cf. Palincsar & Brown, 1984; Paris, Lipson, & Wixson, 1983; Stevens, 1988). Students are taught when and how to use the strategy and they are taught comprehension monitoring strategies so they can check their appropriate use of the strategies.

Students are also taught study strategies to help them locate, organize, and retain important information that is presented in text. Teaching students strategies for reading and remembering information from text can increase their ability to learn the content because they become actively engaged in understanding and organizing the information they're reading (Anderson & Armbruster, 1984; Baker & Brown, 1984).

The Student Team Writing Program

The Student Team Writing (STW) program combines a writing process approach to language arts instruction with structured cooperative learning classroom processes. The goal of the writing process approach is to make writing the focus of language arts instruction and to have grammar, language expression, and language mechanics instruction relate to students' writing. Thus grammar, expression, and mechanics become more meaningful to the student because the skills can be understood in the context of the concrete activity of writing. Because learning these skills is contextualized, it is more likely that the skills will be retained. Also, students are encouraged to actively use the skills in their writing, thus increasing their processing of the information and improving their understanding of the skills that have been taught.

The Writing Process

The writing process approach involves planning, drafting, revising, editing, and making a final draft. This approach is an iterative process of writing, as opposed to the "one-shot" writing that is typical of writing instruction (Bridge & Hiebert, 1985; Graves, 1978). A process approach to writing is more realistic because good writing is typically the result of rewriting numerous times. Classroom research has shown that using the writing process can improve students' writing performance (Raphael, Englert, & Kirschner, 1986; Stevens, Madden, Slavin, & Farnish, 1987).

Initially the teacher provides instruction on how to complete each step of the process. The steps are modeled and the students actively engage in each step.

The students are also taught how to work with their peers in each of the steps as a way of integrating cooperative learning processes with the writing process.

Planning. Each student determines what the topic of the writing will be, often within constraints specified by the teacher (for example, "Write a short story in the style of O. Henry"). Peers discuss their topics and their plans on how to develop the topic in their writing. Students often discuss what they like about each other's plans and points they want to know more about.

Drafting. After each student has a plan, he or she writes a first draft of the composition. The goal of the first draft is to get the ideas on paper. Students are taught to focus on expressioning their ideas and presenting them in a logical, cohesive sequence. Also, students ignore spelling and mechanics at this step in the process, as those concerns are addressed separately.

Revision. Once the student completes the first draft of the composition, he or she reads the writing to a peer to get feedback on the clarity and organization of the ideas in the draft. Students are taught to give one another meaningful feedback in terms of what they like and what they want to know more about. This feedback gives the writer valuable information about how an audience understands and responds to what was written. The feedback is used to revise the writing and make it better or more easily understood.

Editing. After the writer revises the content, he or she gives the composition to a peer for editing. During editing, the student focuses on the mechanics and spelling, using an editing checklist. The writer uses the feedback to correct errors and improve the quality of the composition. The teacher also reads the paper before the final draft to correct all errors, as in the role of a copy editor, so the student's final draft can be in the finished form.

Final draft. The final draft is complete when the author finishes writing the composition in a final form that includes all of the above corrections, and is ready to share it with his or her audience, the class.

Writing Concept Lessons

After students learn to use all the steps in the writing process, the teacher provides instruction and models on styles and techniques of writing. These lessons include improving descriptions, organizing ideas, and getting the audience's attention. Lessons also cover styles of writing, such as explanatory writing, persuasive writing, and personal and business letters.

The STW program provides a set of writing concept lessons, but teachers are also encouraged to develop their own lessons based upon their students' needs and interests. Often, teachers use stories by authors in the literature anthology as models for specific types of writing, an instructional strategy that strengthens the connections between reading and writing.

Integrated Language Arts Lessons

On a regular basis, the teachers provide instruction in language mechanics and language usage, from a set of lessons provided by the STW program. Teachers select language arts lessons that meet the needs of the students, as evidenced by frequent errors that the teacher observes in their writing. The goal of the lessons is to give students skills that will help improve their writing, so each lesson has specific writing-related activities.

Students are also taught how to edit for the types of errors that are relevant to the newly acquired skill. In subsequent writing process activities, the new language mechanics skills are added to the editing checklist, so students can apply what they learned to their own writing and to editing another student's work.

Method

Subjects and Design

The subjects were 3986 sixth-, seventh-, and eighth-grade students in five middle schools in the Baltimore City Pubic School system. Two experimental schools were matched with three control schools on their initial achievement in reading and language arts on the California Achievement Test, Form C. We also attempted to match the schools on ethnicity and socioeconomic background of the students.

Treatments

Experimental. The teachers in the experimental schools were trained in Student Team Reading (STR) and Student Team Writing (STW) during the summer. The training consisted of an explanation of the processes and the rationale behind them and a simulation of major components of each program. Teachers were also given a detailed manual that described each of the components. Before the beginning of the school year the teachers were given all the books and materials they needed to implement STR and STW.

During the first three months of implementation, the project staff observed the teachers while they used the programs and advised them about how to improve the quality of their implementation. The goal of the observations was to coach the teachers to become proficient in these new instructional models. The project staff also met with the teachers during and after school, often attending meetings of the reading and language arts department. At these meetings, teachers' questions and problems were discussed and resolved. As the teachers became more proficient with STR and STW, the coaching and meetings decreased. The project staff monitored the teachers' improvement on a periodic basis.

Control. The teachers in the control schools used traditional instructional methods. Students went to separate teachers for reading and English. The reading teachers used a basal reading series and related adjunct materials. The English teachers used an English literature anthology for their literature component, and a grammar textbook for the language arts component. For the most part the control teachers did not use cooperative learning processes.

Measures

Achievement pretests. We used the existing school district achievement test data from the California Achievement Test, Form C as the pretest data. The pretests were given the spring before the beginning of the study. The pretests were used to match the schools on initial achievement.

Achievement posttests. We administered the California Achievement Test as the posttest in the spring of the year of the study.

Results

Analyses. We used a MANCOVA that nested class within treatment to measure the class-level effects of the treatment, with the appropriate pretests (either Total Reading or Total Language) used as the covariate to increase the power of the analyses.

Initial grade-by-treatment analyses were performed to determine if the treatment had differential effects across the three grade levels. None of the grade-by-treatment interactions were significant, so the raw scores were converted to z scores and the data were collapsed across grade

levels to simplify the discussion of the results.

Achievement pretests. We attempted to match the experimental and control schools on initial achievement on the California Achievement Test. The pretest analyses indicated that there were significant differences on the pretests of Total Reading ($F=11.2$, $p<.01$) and Total Language ($F=54.2$, $p<.01$). In both cases the control students had significantly higher initial achievement than did the experimental students (see Table 1).

Table 1

Students' Achievement:
Means[1], Analyses, and Effect Sizes

Collapsed Across Grades	STR/STW	Control	F	Effect Size
Pretest: Reading	-.05 (.99)	.05 (1.01)	11.2 **	
Lang Arts	-.11 (.99)	.11 (1.00)	54.2 **	
Posttest: Read. Voc.	.17 (.71)	-.16 (.72)	4.31*	+.33
Read. Comp.	.12 (.66)	-.13 (.73)	3.95*	+.25
Lang. Mech.	.00 (.73)	.00 (.75)	< 1.0	.00
Lang. Expr.	.19 (.72)	-.19 (.73)	5.74*	+.38
N	1798	2188		
N of Classes	72	88		

[1] Means are z-score means, posttest means are adjusted z-score means using the pretest scores as the adjustment.

* $p<.05$

** $p<.01$

Achievement posttests. The results from the MANOVAs (see Table 1) indicate that the experimental classes had significantly higher achievement on measures of reading vocabulary ($F=4.31$, $p<.05$), reading comprehension ($F=3.95$, $p<.05$), and language expression ($F=5.74$, $p<.05$). There were no significant differences on the measure of language mechanics ($F<1.0$).

The means, standard deviations, and effect sizes are presented in Table 1. The effect sizes ranged from +.25 to +.38 for the three significant main effects, indicating that the experimental classes scored a quarter to a third of a standard deviation higher on achievement than did the control classes. (The effect size equals the difference in the group means divided by the control group standard deviation.)

Discussion

These results support the hypothesis that restructuring urban middle schools reading and language arts instruction by using state-of-the-art instructional procedures, using good literature as the basis for instruction, integrating reading and writing instruction, and using cooperative learning processes can result in significantly higher student achievement. These components, particularly the use of cooperative learning and the writing process approach to language arts instruction, cause students to get more actively engaged in their own learning. When discussing what they've read, writing responses to the content of their reading, and critiquing what another has written the students are actively processing what they've read and learned, thus making it much more likely that the they will retain and recall it.

Cooperative learning also takes advantage of students' strong peer orientation. In early adolescence the peer group exerts a great deal of influence on the attitudes and behaviors of students. Cooperative learning processes involve the peer group in the instructional and motivational activity of the classroom, often creating a situation where the peer group becomes a positive influence on the student's attitude toward school and his/her behavior in school.

Student Team Reading and Student Team Writing are multifaceted programs, and clearly more than cooperative learning is responsible for the results found in this study. The curriculum materials are designed to affect students' achievement and motivation. The literature-based texts challenge students to read difficult passages and motivate students to read by including well written and interesting selections. The follow-up materials actively engage students in discussing, analyzing, and making inferences about what they have read, which previous research has found to improve comprehension.

The teachers also apply basic research findings by providing instruction on specific comprehension strategies and learning strategies. The writing activities integrate students' learning in reading and writing, and the writing process approach actively engages them in developing their written expression. The integration of language mechanics activities in the writing instruction previously has been found to be an effective way to enhance students' understanding and retention of those skills. Clearly the results of this study exemplify the combined impact of these features of the Student Team Reading and Student Team Writing programs.

Most significantly, the combination of instructional and organizational features of Student Team Reading and Student Team Writing restructured the reading

and English programs of two urban middle schools in a way that has potential for all urban middle level education. The effectiveness of these programs in producing higher student achievement suggests that this type of restructuring is not only possible but necessary.

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