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

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ABSTRACT

The goal of this project was to create a middle school literacy program that was more responsive to the needs and abilities of early adolescents in urban middle schools. The program components included: (a) cooperative learning classroom processes; (b) a literature anthology for high interest reading material; (c) explicit instruction in reading comprehension; (e) integrated reading, writing, and language arts instruction; and (f) a writing process approach to language arts.

The study was conducted in 5 schools in a large urban school district, 2 implementing Student Team Reading and Writing (STRW) and 3 comparison schools. The results indicated that the students in STRW had significantly higher achievement in reading vocabulary, reading comprehension, and language expression. The results suggest that a multifaceted approach to restructuring can effectively improve the achievement of students in urban middle schools.

INTRODUCTION

For 40 years the philosophical goal of middle level education movement in the United States has been to make schools more responsive to the unique needs and abilities of early adolescents. The recommendations have included creating a more personalized learning environment, creating more meaningful curricula, and encouraging students to think reflectively and solve problems (e.g., Carnegie Task Force on Education of Young Adolescents, 1989; Eichhorn,

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1966; Johnston & Markle, 1986). Yet descriptive research has found that much of what is advocated is not experienced by most students in the middle grades (Epstein & Mac Iver, 1990; Irvin, Valentine, & Clark, 1994). Most middle schools are large and departmentalized, include little or no interdisciplinary teaming, and have no integration of content or curricula. Students often see six or more teachers a day and teachers teach 150 or more students a day. While these characteristics are not limited to urban middle schools, the size of urban school districts and the resulting size and impersonalization of urban middle schools exacerbate this situation in urban middle schools.

Recent research has indicated that during the middle grades there is a significant downturn in many indicators of students' learning and motivation. This is observed in a decline in students' grades, attitudes toward school, attendance rates, and attachment to school, and an increase in truancy (Anderman, Maehr, & Midgley, 1999; Carnegie Task Force on Education of Young Adolescents, 1989). Perhaps one of the more troubling areas is middle school students' declining literacy skills performance (reading and writing) as indicated in the National Assessment of Educational Progress 1998 reading report card (Donahue, Voelkl, Campbell, & Mazzeo, 1999). Poor reading performance in particular is troubling since reading and writing skills are central to learning and academic performance in other content areas.

These indicators are also of concern because they are good predictors of a student's potential for dropping out of school (Ekstrom, Goertz, Pollack, & Rock, 1987; McDill, Natriello, & Pallas, 1985). As these indicators decline, the probability that a student will not graduate from high school increases. One suggested cause for this noticeable change in these predictors is the mismatch between the middle school structures and programs and the developmental level of early adolescents (Fine, 1987; Midgley & Feldhaufer, 1987; Wehlage & Rutter, 1987). Over time the developmental mismatch may produce a decline in students' achievement and motivation resulting in lower attendance, achievement, and attachment (Anderman et al., 1999; Natriello, McDill, & Pallas, 1990).

The Nature of the Middle School Mismatch

The middle school mismatch with the psychological and intellectual development of early adolescents is both structural and curricular. At a time when students are developing more ability to handle complex tasks and abstract ideas the curricula tend to focus on concrete and low-level skills (Epstein & Mac Iver, 1992; Goodlad, 1984; Lounsbury, 2000). Through their previous years of

schooling early adolescents have developed their basic skills and knowledge to the point where they are ready for applying their knowledge to solve problems, yet they are often engaged in lower level tasks that require narrow correct answers (Doyle, 1983; Mergendoller, Marchman, Mitman, & Packer, 1988). Middle school instruction is more didactic than elementary school instruction (Epstein & Mac Iver, 1992). Teachers dominate the activity and allow students few opportunities to interact (Clark & Clark, 1993). This results in passive learning with little or no development of students' ability to work with others.

The organization of classrooms in middle school is also developmentally inappropriate for early adolescents. During early adolescence students are developing a desire to make more decisions about things that affect them and a need to have more control in their lives. Yet middle schools typically offer them few opportunities to participate in making decisions about the academic activities and content in which they engage (Midgley & Feldhaufer, 1987).

The structure of middle schools adds to the problems faced by early adolescents. Most middle schools are departmentalized creating discrete content areas with separate skills and knowledge (Clark & Clark, 1993). The seemingly arbitrary distinctions between subjects fragments students' learning and makes it less relevant to their lives at a time when adolescents are becoming interested in how knowledge and skills relate to and are important to them. Departmentalized structures also create more distance between students and their teachers as students see each teacher for less than an hour a day and interact with six to eight teachers a day. Given this structure it is not surprising that adolescents feel decreasing attachment with school during middle school.

Changing Middle School Literacy Instruction

The goal of this project was to develop a model for middle school literacy instruction that addresses some of the issues described above. The author wanted to redesign the nature of literacy instruction for middle school students in a way that used research-validated practices to address the instructional, motivational, and social needs of adolescents. Reorganization efforts were focused on reading and English classes in sixth through eighth grades. The program elements were based upon research in classroom organization, reading and writing instruction, and cooperative learning. While much of this research has validated specific individual procedures in relatively short-term studies, this study attempted to use this basic research to construct and evaluate a model of literacy instruction for at-risk middle school students. The goals for the design of the model were as follows:

Use Good Literature as the Basis for Reading Instruction

A major focus of the project was to give students meaningful and interesting experiences in literacy. First, the author wanted to eliminate the use of a middle-level basal reading series and instead use an anthology of good literature as the source for the content in reading instruction. The author felt that students would be more motivated to read if the instruction was based on interesting selections of good literature written by well-known authors, rather than the type of material typically found in basal readers. The goal was also to use an anthology that was organized in thematic units to make students' experiences in literature more organized to facilitate transfer of knowledge from one selection to another. It was also hoped that the thematic organization would help make the reading activities seem more meaningful because they related to one another.

Second, the author wanted to focus more of the literacy instruction on writing, both the students' writing and the writing of well-known authors. The goal was to have students read, understand, and interpret selections by famous authors. Students were also to engage in many writing activities aimed at expressing their own experiences, ideas, and feelings by making writing process instruction a central element in language arts. It was hoped that by increasing the relevance and participatory nature of the instructional activities the students would become more motivated and engaged in their literacy learning.

Provide Student With Meaningful Follow-Up Activities Related to What They Have 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. As a result, students often do not see them as important or meaningful (Beck, McKeown, McCaslin, & Burkes, 1979; Osborn, 1984). The goal of the instruction was to have students involved in follow-up activities that extend their understanding of the literature they have read. In this way students would improve their comprehension of what they have read and learn skills that would generalize to reading and comprehending other selections. This would also increase the perceived relevance of follow-up activities that in turn increase the likelihood that students will find them meaningful and useful.

Provide Instruction on Reading Comprehension Strategies

In the past 20 years there has been a significant amount of research in reading comprehension instruction that has identified specific comprehension

strategies that are effective in improving students' reading performance (e.g., Loranger, 1997; Palincsar & Brown, 1984; Paris, Wasik, & Turner, 1991). The goal of the program was to teach specific comprehension strategies like identifying main ideas, summarizing, and clarifying what has been read. The students would learn these strategies in lessons specifically focused on an individual strategy and then apply them in reading subsequent pieces of literature.

Focus Instruction in Language Arts on Writing

In the past 20 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, instead spending most of their language arts time on language mechanics instruction and using grammar textbooks (Bridge & Hiebert, 1985). The goal of the program was to provide teachers with a classroom process that focused their language arts instruction on writing and instructional materials that supported the writing emphasis. In this way the students' language arts instruction would become more meaningful and useful by focusing on skills that would improve their writing ability. At the same time the writing emphasis would be intrinsically motivating to students because they could see the usefulness and enjoyment of the subject by writing about things that were meaningful to them and sharing that writing with their peers.

Integration of Reading and English Classes

As described above, American middle schools typically provide instruction in a departmentalized structure. In urban schools, where reading is often taught in sixth and seventh grades, departmentalization causes students to get reading instruction from one teacher and English from another. However, there clearly is a great deal of overlap and a continuity of skills between reading and English. The goal of the project was to take advantage of this natural connection and have the same teacher teach both reading and English. This would also be a way to achieve two goals of middle-level education: approaching reading and English in an interdisciplinary fashion and reducing the student-teacher ratio. The integration of the two subjects would help students to see the connections between the content areas and increase the potential for students to transfer knowledge and skills they have learned.

Use Cooperative Learning Processes and Classroom Structure

The project intended to change the classroom structure and learning environment in classes to make it more developmentally appropriate by using cooperative learning structures and processes. Research has shown that cooperative learning can have a significant positive effect on students' achievement, attitudes and social relations particularly if it includes both group goals and individual accountability (Johnson & Johnson, 1989; Slavin, 1990). Group goals give students a reason to cooperate or share their ideas. Individual accountability makes all students responsible for learning and reduces the potential for students to rely on others in the group to do the work, the "free rider effect" (Slavin, 1990). When the two elements are combined it creates a structure that fosters positive interdependence where students rely on and help one another, which increases achievement, productivity, and attitudes toward others (Johnson & Johnson, 1989).

Cooperative learning also makes learning processes more active as students discuss tasks with one another. It provides advantages by having students model complex processes and giving feedback to one another. As students interact they internalize the strategies and processes needed to construct meaning (Stevens, 1994; Vygotsky, 1978). During cooperative dialogue students provide elaborative explanations to one another that gives them a deeper understanding of what has been taught (Palincsar & Brown, 1984; Webb, 1985).

Finally, cooperative learning builds student responsibility for their own learning and gives them a greater sense of input into or control of their education (Johnson & Johnson, 1989; Johnson, Johnson, & Holubec, 1991). Cooperative learning structures encourage all students to succeed through collaborating to achieve a goal based on effort and mastery, rather than through competition. The structure gives all students an opportunity to participate and feel successful which in turn has a positive impact on students' perceived competence and self-efficacy (Schunk, 1989).

THE STUDENT TEAM READING AND WRITING

The Student Team Reading and Writing (STRW) program is an integrated approach to reading and language arts for early adolescents. The reading part of the program consisted of three principal elements: literature-related activities, direct instruction in reading comprehension strategies, and selection-

related writing. In all of these activities students work in heterogeneous learning teams. All activities followed a regular cycle that involved teacher presentation, team practice, independent practice, peer pre-assessment, and individual accountability.

Teams

Cooperative learning teams were used as a vehicle to get students to engage in academic interactions that would further their understanding of what had been taught (see National Reading Panel, 2000) and to take advantage of the strong peer orientation of early adolescents. This created a change in the instructional activity in the classroom by giving students more responsibility for their work. It also provided a more social and engaging academic environment, rather than the more common didactic instruction in middle schools (see Epstein & Mac Iver, 1992).

The students were assigned to teams of heterogeneous ability. Within the teams students were assigned a partner with whom they worked when they completed their activities. Students' scores on the individual accountability activities (e.g., quizzes) contributed to form a team score. Teams were recognized for their success in attaining prespecified levels of performance on the accountability measures based upon the average score of the team members. Research on cooperative learning has found that this sort of recognition based on 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).

Literature-Related Activities

The students used an American literature anthology as the source of the reading selections. The anthology provided high quality literature written by well-known authors like O. Henry, Langston Hughes, Pearl Buck, and Isaac Asimov. These writings tended to not only be of higher quality than those typically found in a basal reading series at this level, but they were also more high-interest readings for early adolescents.

The selections were introduced and discussed in teacher-led instruction. Teachers set the purpose for reading, introduced new vocabulary, reviewed old vocabulary words, discussed the selection after students have read it, and so forth. After the students read the literature selection they completed a series of follow-up activities that were specifically related to what they have read. The activities included:

Partner Reading

Students read the selection silently then read it orally with their partner. During oral reading the students took turns reading, alternating after each paragraph. The listener followed along and corrected any errors the reader may make. This type of repeated reading gave the students a great deal of practice reading orally and has been found to contribute significantly to students' reading fluency on the target passage and transfers to increased reading fluency on future reading tasks (National Reading Panel, 2000; Samuels, 1979). Increasing reading fluency is an important skill as it not only helps in word recognition, but also seems to help improve reading comprehension (Faulkner & Levy, 1999; Thurlow & van den Broek, 1997).

Comprehension of the Selection

The students were given written activities that focused on comprehension of the structure and content of the literature selection. The goal of these activities was to move beyond factual understanding to deeper comprehension of the passages. This was an attempt to get students to apply their skills to solve problems and make inferences about what they had read, activities more relevant for the abilities of early adolescents (see Epstein & Mac Iver, 1992).

Halfway through the selection the students stopped reading to do half of their comprehension activities. They discussed and wrote answers to questions asking 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 the interpretation of figurative language or literary techniques used. After completing the first half of the story and comprehension activities, the students read the second half of the story and completed the comprehension activities related to it.

Research in reading comprehension has found that understanding story structures is important for students comprehension (Baumann & Bergeron, 1993; Fitzgerald & Spiegel, 1983; National Reading Panel, 2000), and that discussing predictions and summaries of stories can increase students' comprehension (Palincsar & Brown, 1984; Pearson & Fielding, 1991). The comprehension activities related to the literature selections used both in an attempt to give students practice and feedback on generalizable skills in comprehension.

Word Mastery Activities

Much research has shown that development of vocabulary skills in students is an important part of improving their reading skills. Vocabulary instruction

prior to reading can improve comprehension of current reading material (Brett, Rothlein, & Hurley, 1996; Tomeson & Aarnoutse, 1998), increases reading achievement (Brett et al., 1996; Eldredge, 1990), and improves students' abilities to see causal connections in what they have read (Medo & Ryder, 1993). As students move into middle school there is more emphasis on reading to learn (Stevens, Slavin, & Farnish, 1991). Since vocabulary knowledge is a fundamental building block of those comprehension and learning processes, vocabulary instruction must be a fundamental part of literacy instruction.

Students were given a list of new or difficult words that were related to the selection. The word mastery activities focused on the students' ability to decode and understand the meaning of the new words. Decoding practice involved rapid review of the words with a partner, so each student developed 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; National Reading Panel, 2000; Rosenshine & Stevens, 1986). The students learned the meaning of the new words through practice focused on writing "meaningful sentences" with the vocabulary. A meaningful sentence was one that tells what the word means in the context of the sentence (i.e., "The octopus wrapped his eight long legs around the undersea diver," not "I saw an octopus").

Summarizing the Main Points of the Selection

In previous research, summarizing what has been read in one's own words has been found to be a very effective way to enhance the reader's comprehension and retention of what has been read (Doctorow, Wittrock, & Marks, 1978; Paris et al., 1991; Weinstein, 1982). Training students to summarize as they read has been found to be an effective way to remediate poor readers' comprehension problems (Jenkins, Heliotis, Stein, & Haynes, 1987) and to improve student learning from expository text (Rinehart, Stahl, & Erickson, 1986). Thus, summarization is a useful skill to learn for improving comprehension and for students' future use in reading to learn content presented in text.

After reading and discussing the selection, students summarized the main points of the story to their partner. Students' summaries were prompted by their partner who had specific questions about important elements or episodes in the selection which were provided in the instructional materials. The

partner then checked the summary in terms of the adequacy of its completeness and detail.

Selection-Related Writing

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

For each selection the students were given an open-ended writing assignment where they were asked to write in response to a topic related 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 selection, or they might be asked to compare and contrast characters from the selection or from two different literature selections. Students used a modified writing process in writing their response to the prompt, in which they discussed their ideas with their partner, drafted a version of the response, revised their writing based upon their partner's feedback, edited their writing, and created a final copy.

Instruction on Reading Comprehension Strategies

Students received direct instruction on reading comprehension strategies and study strategies on a regular basis. The comprehension strategy instruction applied of a large body of research that has shown that students' reading comprehension can be significantly improved through instruction and practice in specific reading comprehension strategies (e.g., Palincsar & Brown, 1984; Paris, Lipson, & Wixson, 1983; Stevens, 1988). Previous research has shown the efficacy of instruction on strategies for identifying main ideas, drawing conclusions, and interpreting figurative language (National Reading Panel, 2000; Pearson & Fielding, 1991). Students were taught when and how to use the strategy and they were taught comprehension monitoring strategies so they could check their appropriate use of the strategies. Instruction on comprehension monitoring strategies has been shown to increase students' effective use of strategies and further improves their comprehension of what they have read (Silven, 1992).

Students were also taught study strategies to help them locate, organize, and retain important information that was presented in text. Teaching students strategies for reading and remembering information from text can increase

their ability to learn the content greatly because students become actively engaged in understanding and organizing the information they are reading (Anderson & Armbruster, 1984; Baker & Brown, 1984).

Writing Instruction

The writing part of the program combined a writing process approach with language arts instruction. The goal of the writing process approach was to make writing the focus of language arts instruction and to have grammar, language expression, and language mechanics instruction relate to students' writing. In this way 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. Also, because learning these skills was contextualized, it is more likely that the skills will be retained. Students were encouraged to actively use the new skills in their writing further increasing their processing of the information and improving their understanding of the skills.

Briefly the components of the writing instruction were as follows:

The Writing Process

The students were taught to use a writing process approach when they write. The process involved planning, drafting, revising, editing, and making a final draft. One important characteristic of this approach was that it was 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 writing and rewriting a composition. Classroom research has shown that using process writing can lead to greatly improved students' writing performance (Raphael, Englert, & Kirschner, 1986; Stevens, Madden, Slavin, & Farnish, 1987).

Initially the teacher provided instruction on how to complete each step of the process. The steps were modeled and the students actively engaged in each step. The students were 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

The student determined what the topic of the writing would be, often within constraints specified by the teacher (e.g., "Write a short story in the style of

O. Henry"). Peers discussed their topics and their plans on how to develop the topic in their writing. Students gave their partners feedback about what they liked and points they wanted clarified or expanded.

Drafting

After the student had a plan, he/she wrote a first draft of the composition. The goal of the first draft was to get the ideas on paper. Students were taught to focus on their expression of ideas and present them in a logical, cohesive sequence. Also, students specifically were taught to ignore spelling and mechanics at this step in the process, as those concerns were addressed separately.

Revision

Once the student completed the first draft of the composition, he/she read the writing to a peer to get feedback on the clarity and organization of the ideas in the draft. Again students were taught to give one another meaningful feedback in terms of what they liked and what they wanted to know more about. The feedback gave the writer valuable information about how his/her audience responded to and understood what was written. The student could use the feedback to revise the writing and make it better or more easily understood.

Editing

After the writer revised the content, he/she gave the composition to a peer for editing. During editing the student focused on giving feedback on the mechanics and spelling. Students were given an editing checklist to help them focus on specific skills as they edited another student's work. Often the students focused on specific mechanics skills that they had recently mastered during their language arts lessons (described below). The writer used the feedback to correct errors and improve the quality of his/her composition. The teacher also read the paper before the final draft to correct all of the errors, as in the role of a copy editor, so the student's final draft could be in the finished form.

Final Draft

The final draft was complete when the author finished writing the composition in its final form including all of the above corrections. The final step was for the author to share the composition with his/her audience, the class.

Writing Concept Lessons

Once students learned to use all of the steps in the writing process, the teacher provided instruction and models on styles and techniques of writing. The lessons included topics like improving descriptions, organizing ideas, and getting your audience's attention. There were also lessons on specific styles of writing like explanatory writing, persuasive writing, and writing personal and business letters. The STRW program provided a set of writing concept lessons, but teachers were also encouraged to develop their own lessons based upon students' needs and interests. Often teachers used authors that the class was reading in the literature anthology as models for specific types of writing. An advantage of this instructional strategy was that it further strengthened the connections between reading and writing.

Integrated Language Arts Lessons

Teachers periodically taught lessons on language mechanics and language usage lessons from a set of materials provided by the STRW program. Teachers were told to select language arts lessons that were appropriate for the students' needs as identified in the teacher's evaluations of the students' writing. The goal of the lessons was to give students skills that would help improve their writing. Each lesson included specific writing-related activities to increase the likelihood that students would transfer what they learned to their own writing. Students were also taught how to edit for the types of errors that were relevant to the newly acquired skill. In subsequent writing process activities the new language mechanics skills were added to the editing checklist so students would apply what they learned in writing and in editing their own work and the writing of their classmates.

Research Goal

The components described above all have been documented at improving students' performance in relatively short-term experimental, laboratory-type studies. These studies also were not limited to middle school age students, rather the subjects in the studies ranged from early elementary age (6 years old) through high school age (18 years old). The purpose of this study is not to test the efficacy of these elements. Instead this study attempts to build an instructional model based upon this research that can be used in high poverty middle schools. The research also evaluates the impact of the model on students' achievement in reading and language arts when this model is used in relatively long-term (1-year) implementation. It is hoped that this research

will add to our knowledge of the capacity to put basic research in reading and writing together into an instructional package that is applicable to classroom instruction, and to systematically study the efficacy of the model as it is used for an academic year. This research will also offer knowledge about research-based literacy instruction for students in high poverty middle schools.

METHOD

Subjects and Design

The subjects were 3,916 students in five middle schools in a large urban school district in the eastern United States. These middle schools were comprised of sixth through eighth grade (age 11–14). The school population was predominantly minority students (approximately 80%) and many of the students were classified as low-income because they receive free or reduced lunch (approximately 67%). The two experimental schools were matched with three comparison schools on their initial achievement in reading and language arts on the California Achievement Test (described below) that had been administered by the school district. There was also an attempt to match the schools on ethnicity and socioeconomic background of the students (see Table 1).

The teachers ranged from 2 to 23 years of teaching experience (see Table 2). The mean number of years experience in each school was over 10 years, suggesting that the majority of the teachers were very experienced, although each school had at least one teacher with less than 5 years experience.

Table 1. School Demographics.

	N	Percent minority	Percent disadvantaged
Experimental schools (combined)	1798	80.2	69.1
School 1	893	98.0	73.1
School 2	905	62.6	65.2
Comparison schools (combined)	2118	82.1	70.8
School 3	592	58.4	61.9
School 4	413	76.3	71.4
School 5	1113	97.1	75.4

Table 2. Teacher's Years of Experience.

		Years of experience teaching	
	N	Average	Range
Experimental schools (combined)	20	13.1	2–20
School 1	10	12.9	2–19
School 2	10	13.2	4–20
Comparison schools (combined)	29	12.4	2–23
School 3	8	12.5	3–20
School 4	7	13.6	2–23
School 5	14	11.8	2–17

Treatments

Experimental

The teachers in the experimental schools were trained in STRW during their summer vacation for five, half-day (3 hr) sessions during 1 week. The training consisted of an explanation of the processes and the rationale behind them. For example, the trainer would describe some of the problems teachers typically see in student's reading. Then the trainer briefly described some of what we know about from reading research and how that related to effective instruction. This led to a description of the goals of the reading component of STRW, to develop reading fluency and reading comprehension. The trainers led the teachers step-by-step through the daily lessons for a story in the anthology.

During the training teachers participated in a simulation of major components of each program. The trainer acted as the teacher in the simulation, modeling appropriate teacher behaviors. The teachers acted in the role of students, so they could get an understanding of what students were to do in STRW. The trainer also gave the teachers a number of strategies for effectively monitoring students' behavior when they used STRW.

During the training, the teachers were given a detailed manual that described each of the components in much the same way they were described by the trainer. The manual was intended to be a resource the teachers could read as a review of the training, and refer to as they began teaching. Before the beginning of the school year the teachers were given all of the books and materials they needed to implement STRW.

During the first 3 months of implementation the project staff observed and gave feedback to the teachers as they implemented the program. The goal of the observations was to coach the teachers to become proficient in the instructional model and to improve the quality of their implementation of the program. 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 in order to resolve any problems they were having and to use their feedback to improve the program. As the teachers became more proficient with STRW, the coaching and meetings decreased to the point where the project staff were simply monitoring the teachers' implementation on a periodic basis.

Implementation

After 4 months (1 semester) of implementation and coaching, the author felt that teachers were implementing STRW fairly effectively. The project staff then observed teachers to measure their implementation of the program to ascertain a measure of program fidelity across the classrooms. The observers had a form with each of the major elements and descriptions of effective use of them. For example, under Partner Reading the form had items "Teacher has students read aloud with partners," "The partners alternate turns when reading," and "Partners correct each other's error."

Each teacher was observed on 3 randomly selected days which were always different days of the week. The observations were unannounced, and teachers were not aware of the purpose of the observation. Since project staff had been in their classrooms frequently during the project, their presence for the implementation checks was not an unusual occurrence. Prior to collecting implementation data, the author and his/her assistant discussed each of the items on the observation form. Then we observed two different teachers for 30 min each. To determine our inter-rater reliability we calculated the percent of agreement across the two common observations. The level of agreement was above 90% on both observations and averaged 93%.

On any given day only a portion of the elements of STRW (described above) were relevant for that particular point in the cycle of instruction. Therefore, the teacher's implementation was the percentage of expected behaviors (of the teacher and students) observed during that point in the instruction. We then averaged across the 3 observation days to get an average level of implementation. All teachers in the study averaged at or above 83% implementation, with an average rate of implementation across the teachers of

91%. There were no significant differences in level of implementation of the program due to the level of experience of the teacher. Thus the author considered this to be a high-fidelity implementation.

Comparison

The teachers in the comparison schools used traditional instructional methods. Students went to different teachers for reading and English. The reading teachers used a basal reading series and related adjunct materials (e.g., workbooks). The English teachers used an English literature anthology for their literature component and a grammar textbook for the language arts component. The comparison teachers did not use cooperative learning processes in their instructional activities on a daily basis.

Measures

California Achievement Test

The California Achievement Test (CTB/McGraw-Hill, 1986) is a standardized achievement test that uses multiple choice questions to assess student performance in reading vocabulary, reading comprehension, language expression, and language mechanics (as well as math, social studies and science). The California Achievement Test is a nationally normed standardized test that is commonly used in school districts to monitor student's academic progress.

In this study we used only the reading and language sections. Reading vocabulary questions were of two main types, selecting the synonym and selecting the appropriate word to complete the sentence. Reading comprehension questions had students read a multiple paragraph passage and then answer questions about the passage. The questions were factual and summarization questions about the passage. Language expression questions asked students to read a passage and identify appropriate phases or words to fit particular parts of the passage. This could be thought of as a language usage test. The language grammar section of the test had students read sentences and passages and identify error (or "no errors") that occurred in the passage. This was essentially an editing type of task.

Pretests

We used the existing school district achievement test data from the California Achievement Test, Form E 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 and as a covariate to increase the power in the analyses of the outcome data.

Posttests
We administered the California Achievement Test, Form F as the posttest in May near the end of the study. This form is designed to be a parallel form to Form E that was used as the pretest.

RESULTS

Analyses
The author used a MANCOVA that nested class within treatment to measure the class-level effects of the treatment. Initially grade-by-treatment analyses were performed to determine if the treatment had differential effects across the three grade levels. There were no significant grade-by-treatment interactions so the raw scores for each grade level were converted to z-scores and the data were collapsed across grade levels to simplify the analyses and the discussion of the results.

Achievement Pretests
As noted previously, we attempted to match the experimental and comparison schools on initial achievement on the California Achievement Test. The pretest analyses at the individual level 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 comparison students had significantly higher initial achievement than did the experimental students (Table 3).

Achievement Posttests
The results from the class-level MANCOVAs indicated 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 3. For the three significant main effects the effect sizes ranged from $+.25$ to $+.38$, indicating that the experimental classes scored a quarter to a third of a standard deviation higher

Table 3. Student Achievement: Means,[1] Analyses, and Effect Sizes.

Collapsed across grades	STR/STW	Comparison	*F*	Effect size[2]
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		

Note. [1] Means are presented in *z*-scores. Posttest means are adjusted *z*-scores where the pretest was used as an adjustment.
[2] Effect size is the difference in the adjusted means divided by the unadjusted comparison group standard deviation.

on achievement than did the comparison classes. (The effect size equals the difference in the group means divided by the comparison group standard deviation.)

DISCUSSION AND CONCLUSIONS

These results support the hypothesis that restructuring high poverty urban middle schools reading and language arts instruction by using research-based instructional procedures, good literature as the basis for instruction, cooperative learning processes, and integrating reading and writing instruction, can result in significantly higher student achievement. The components, particularly the use of cooperative learning and the writing process, cause students to get more actively engaged in and take more responsibility for their own learning. By discussing what they have read, writing responses to the content of their reading, and critiquing what one another have written, the students actively process what they have read and learned, thus making it much more likely that they will retain and recall it. These processes make the students generate more connections between what they have read and what they already know, hence increasing the potential for retention (Wittrock, 1986).

Cooperative learning classroom processes offer another benefit by taking advantage of students' strong peer orientation. In early adolescence the peer group exerts a great deal of influence on the attitudes and behavior of the student. Cooperative learning processes involve the peer group in the instructional and motivational activity of the classroom, creating a situation where the peer group becomes a positive and potentially motivating influence on the student's attitude toward school and his/her behavior in school. As has been suggested in the literature on middle schools, involving peers in learning activities can have potential learning and motivational benefits for students (Anderman et al., 1999; Lounsbury, 2000).

STRW is a multifaceted program, and clearly more than cooperative learning is responsible for the results found in this study. The curriculum materials were designed to have an impact on students' achievement and motivation. Literature-based texts were selected to challenge students to read difficult selections and to motivate students to read by including well-written and interesting selections. The follow-up materials actively engaged students in activities that previous research has found improve comprehension through discussing, analyzing, and making inferences about what they have read. The teachers also provided instruction on specific comprehension strategies that were also an application of basic research findings. The writing activities integrated students' learning in reading and writing, and used a writing process approach to actively engage them in developing their written expression. Clearly the results of this study exemplify the combined impact of these features of the STRW program.

This study cannot disentangle, nor does it attempt to isolate the effect of any of these individual components. Instead the study attempts to provide an example of programmatic research that integrates research-based components. The study indicates that reading and language arts instruction that takes into consideration all of these facets can have a significant and important impact on at-risk, urban middle schools students' achievement. The STRW program produced positive effects of 1/4 to 1/3 of a standard deviation difference (effect sizes of +.25 to +.38) in reading comprehension, reading vocabulary and writing expression as measured on a standardized achievement test. While these are not large effect sizes in the classic sense, they are substantial differences given that they were found in a standardized achievement test, a test that is designed to be stable.

The study also offers an example of how theory and basic research can be effectively combined to create a useful instructional application for schools. Scholars suggested that middle-school instruction theoretically should look

different than what we observed in schools to fit better with the developmental growth and changes we see during early adolescence (e.g., Lounsbury, 2000; Midgley & Feldhaufer, 1987). With this as the stimulus, the author looked to the rich research literature in reading and writing to build an instructional model for the critical area of literacy instruction. The research engineered research-based components into a model of classroom process and curriculum that teachers effectively implemented for a school year. The positive effects of this model suggest that such theory and research-based instruction can effectively improve learning of at-risk middle school students.

Limitations

One limitation of this study is that the two experimental schools volunteered to participate. While not every teacher was eager to restructure their classroom or change their curriculum, the fact that the school as a whole was interested in restructuring and innovation increases the likelihood that the results may be due to the faculty, their motivation. This raises the question of results due to a potential Hawthorne effect, rather than to the instructional program. The issue can only be resolved by additional studies in other schools randomly selected, rather than self-selected. Similarly, longer term studies where the instructional innovation is less novel and more institutionalized would reduce the potential Hawthorne effect. Additionally, longer term studies and studies in new situations would provide valuable information about the sustainability and transportability of the program and the effects reported here.

Another limitation of the study is that the experimental treatment is made of many different components including changes in school and classroom structures, classroom processes, instructional curricula and tasks, and reward structures. It is impossible to disentangle the relative effects of these many components in this study. As a result it is impossible to determine which components contributed to the positive effects on student outcomes and to identify which components are necessary and sufficient to change students' achievement.

Future research is needed to understand the effects of the program in this study and its potential for use in other schools and with other populations. These results do suggest that the STRW program can be effective in increasing students' achievement in urban middle schools. The combination of instructional and organizational features in this program has potential for restructuring middle schools, much as has been suggested in theory, and in turn make them more appropriate for the abilities and needs of early adolescents.

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