AN INVESTIGATION OF THE IMPLEMENTATION AND STUDENT OUTCOMES OF INSTRUCTION FOR SELF-REGULATION THROUGH MEDIATED COLLABORATIVE PROBLEM SOLVING

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ABSTRACT

AN INVESTIGATION OF THE IMPLEMENTATION
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This exploratory study focused on the implementation and student outcomes of Mediated Collaborative Problem Solving (MCPS), a model of strategy instruction informed by social constructivist principles. MCPS was designed to provide special education and remedial reading students opportunities to work collaboratively with each other, the teacher, and more capable peers to identify, define and evaluate strategies they could use to monitor and regulate their reading. The student participants were two groups of six third and fourth graders, the majority of whom were experiencing reading difficulties in school. Instruction was conducted by the researcher for 35 days.

The student participants, after instruction, showed increased declarative and conditional knowledge about strategies. They evidenced changes, although of a more modest nature, in their procedural knowledge about the three targeted strategies: summarizing, questioning, and predicting. Following instruction, the special education and Chapter One students' proficiency in using these three strategies was more similar to that of the regular education students

than it was prior to instruction. Overall, there were minimal changes in the students' comprehension performance over the course of instruction; however, the performance of four students (two special education and two regular education students) did show a positive trend. The students' conceptions of reading, both prior to and following instruction, involved focus on both decoding and comprehension.

The implementation issues addressed in this study focused on assessment as well as the provision of scaffolded instruction within this model. Assessment was possible in a wide variety of areas including the students' declarative, conditional and procedural knowledge about strategies; their conceptions of reading; and their understanding of text. Scaffolding decisions were found to be affected by the following factors: the nature of scaffolding; the tasks utilized in the model; the lack of a metascript; and the implementation of instruction which places the teacher in the role of a novice. Other issues raised were the limits of heterogeneous grouping, the influence of difficulty with risk-taking, and the importance of establishing a classroom culture conducive to collaborative problem solving. Factors which would increase the manageability of scaffolding were identified and discussed.

DEDICATION

This dissertation is dedicated to my parents,

Lois and Willis Winn, with love.

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INTRODUCTION

The current emphasis in literacy instruction, as in other content curriculum areas, is on students developing the ability to use higher order thinking skills independently. Bereiter and Scardamalia (1987) refer to the pursuit of high literacy as learning that is beyond that of adapting to the goals of the prevailing culture. Students come to interact with and use text to define and solve problems on their own, directing and controlling their learning. Similarly, McGinley and Tierney (1989) discuss "critical literacy" or students' ability to use reading and writing to go beyond the demands associated with minimum competency. This focus on high or critical literacy is a relatively recent one (Resnick & Resnick, 1977) and one that needs to be addressed in our models of curriculum and instruction.

Essential to the development of high literacy or critical literacy is the ability to engage in intentional, self-regulated reading. Students need to be aware of the variables that influence comprehending and learning from text and to take control of their learning (Palincsar & Brown, 1989). Once capable of self-regulation, they become able to interact with texts on their own, no longer needing to rely on teacher direction (Bereiter & Scardamalia, 1987). Instruction which focuses on self-regulation is a means of fostering student achievement of the goals of high or critical literacy.

Within the reading domain, strategy instruction has represented one approach to teaching for self-regulation. The purpose of strategy instruction is to provide students ways of organizing and transforming information in a range of reading situations (Stone, 1989b). Currently, there are several models of strategy instruction which focus on teaching students to monitor their reading progress and to take corrective action when difficulties arise.

While few would contest the goals of strategy instruction, the methods for achieving them are not without critics. Historically, the methods have been heavily influenced by a reductionist perspective on teaching and learning (Gavelek & Palincsar, 1988; Poplin, 1988a; Stone, 1989a, 1989b). Currently, attention has turned to the application of social constructivist views on teaching and learning to strategy instruction with calls for incorporation of Vygotsky's (1978) emphasis on the social interactions by which learning occurs (Belmont, 1989; Gavelek & Palincsar, 1988; Stone, 1989a, 1989b).

But what does strategy instruction informed by a social constructivist perspective look like? How can a teacher conduct this kind of instruction with heterogenous groups of students? What place does this instruction have in facilitating all students' attaining the goals of high levels of literacy? Specifically, what is its place in helping special education and remedial reading students attain these goals?

Questions also arise about the roles of teachers and students. Social constructivists view teachers as mediators of students'

acquisition of knowledge rather than knowledge providers. Students are seen as collaborators in constructing knowledge rather than as knowledge recipients (Anderson, 1989). From the teacher's perspective, there is confusion concerning what the role of knowledge mediator entails. How are we to reconcile our task of eliciting knowledge from students with sharing our understandings with them? Specific to strategy instruction, and to this study, can students become more able to be self-directed readers through instruction which focuses on mediated collaborative learning of the strategies?

Mediated collaborative problem solving (MCPS), a social constructivist model of strategy instruction, is the focus of this study. The model has been developed to provide special education and remedial reading students the opportunity to work collaboratively with the teacher, each other, and with more capable peers to develop awareness of, and ability to control, their interactions with text. The study focuses on the implementation and outcomes of this model.

CHAPTER ONE: REVIEW OF THE LITERATURE

The Goal of Strategy Instruction: Self-Regulation in Reading

Self-regulation in reading refers to awareness of variables that are important to reading and the ability to control one's own reading behaviors. Students who are self-regulated readers approach tasks with a repertoire of strategies which they are able to use purposefully. They identify the need for planful activity and are able to apply strategies in a personally adapted manner suited to their learning style and to the demands of the task (Palincsar & Brown, 1989; Paris & Oka, 1986).

Both knowledge and beliefs are important to self-regulation. Students need to understand reader, task, and strategy variables involved in reading (Meyers & Paris, 1978). They need to know how to recognize and solve comprehension problems as they arise. In addition, they need to be motivated to take action, believing in their ability to do so. In other words, self-regulation involves both "skill and will" (Paris & Oka, 1986).

What enables self-regulation in reading activity? There are three main types of knowledge involved in self-regulation: 1) knowledge of strategies; 2) metacognitive knowledge; and 3) real world knowledge (Palincsar & Brown, 1989; Pressley, Borkowski, Schneider, 1987). These three continually interact with each other and with the reader's beliefs about herself and her self-regulatory ability.

Strategy knowledge refers to knowledge of particular strategies. Not all the strategies that have been recommended have been shown to be necessarily beneficial to comprehension. Nor have their merits in comparison to each other been defined (Palincsar & Brown, 1989). Only a core have received empirical support, these being summarization, mental imagery, the use of story grammar, question-generating, question answering, and prior knowledge activation for making inferences (Pressely, Johnson, Symons, McGoldrick, & Kurita, 1989). Instruction in these strategies has been successful in increasing students' reading performance (Baumann, 1984; Pearson, Hansen, & Gordon, 1979; Raphael & Pearson, 1985.)

Self-regulated readers have metacognitive knowledge about the strategies they use. They understand what the strategies are (declarative knowledge) and how to use them (procedural knowledge). Flexible use of strategies also involves students' conditional knowledge about strategies (Paris, Lipson, & Wixon, 1983) or knowing why particular strategies are effective and when to use them. To know this, students have to be aware of the characteristics of their own learning (e.g., "I have a lot of difficulty identifying and remembering the important parts of my social studies chapters"; "I understand the material better when I know a lot about the topic") as well as the characteristics of the task (e.g., reading for the gist, studying for a multiple choice test). In addition, they have to be able to identify goals for their reading and to determine whether or not these goals are being met.

Metacognitive knowledge also involves students being able to select strategies and use them in appropriate situations to control their reading. This is done through activities such as checking, planning, monitoring, testing, revising, evaluating (Brown, 1978). Using these activities, the student recognizes situations calling for particular strategies, deploys them as indicated, and evaluates their effectiveness in relation to particular goals.

Besides being able to use strategy and metacognitve knowledge flexibly, students who are self-regulated readers also use their real world knowledge. There are three ways in which the knowledge base can be used (Pressley, Borkowski, & Schneider, 1987). First, it can diminish the need to use strategies. Pressely et al. report several memory studies in which students memorized categorized items without conscious effort and employment of strategies. Their knowledge of the relationships among the items was automatically activated and used. Second, students' knowledge base can activate use of strategies. Pressely et al., again relying on memory research, suggest that students may reflect on categorization of related items which they could carry out rather automatically and, from this, extract the principle of relating items in preparing to recall them. The third way in which students' real world knowledge is used in self-regulation is through enabling the use of particular strategies. Hasselhorn and Korkel (cited in Pressley et al., 1987) taught sixth graders to use strategies to monitor their reading and then gave them a passage about soccer and asked them to identify text errors. Students with high

knowledge about soccer were better able to detect the errors than those with low knowledge. The high knowledge students who had strategy instruction performed at a higher level than the trained low knowledge students. The authors concluded that strategy training benefitted the low knowledge students more than those with high knowledge. However, the low knowledge students did not reach performance levels of the high knowledge students, indicating that the higher knowledge level also facilitated strategy use.

Students' motivation to be strategic depends on their beliefs regarding self-regulation. Motivation can be seen as a function of: 1) expectations for success as a result of using the strategies; 2) the value placed on success in the reading task (Anderson, 1989), 3) beliefs about the learner's ability and the task itself. If the student does not value success in the task, she has little motivation to attend to whether or not it is being performed successfully. Similarly, if she feels success is due to luck and failure to a generalized low aptitude (Dweck, 1975), she will not see the value of strategies or reasons to use them.

To summarize, self-regulated learners have declarative, procedural, and conditional knowledge about a range of strategies. They use the strategies flexibly to monitor their reading comprehension and learning, identifying situations in which they are having difficulty meeting task demands. Once they identify these situations, they take corrective action. Self-regulated learners are motivated to

use strategies and believe in their value. In addition, they have the background knowledge with which to construct meaning from the text.

Students with reading difficulties have been found to be lacking much of the knowledge, beliefs, and behaviors that characterize self-regulated learners. (August, Flavell, & Clift, 1984; Baker, 1982; Baker & Brown, 1984; Butkowsky & Willows, 1980; Garner, 1980, 1987; Garner, Wagoner, & Smith, 1983; Meyers & Paris, 1978). Learning disabled students have been viewed as students who do not possess certain strategies, who do not select appropriate ones, and/or who do not self-monitor (Swanson, 1989). In the following section, selected research studies focusing on the relation of reading level and the knowledge and beliefs involved in self-regulation will be discussed.

Characteristics of the Learner: Good and Poor Reader Differences

Most of the research documenting student differences in self-regulation has involved comparisons between older and younger students or of good and poor readers who are the same age. Developmental as well as good/poor reader differences have been seen through both self-report data as well as measures of on-line processing.

Younger and poor readers evidence differing conceptions of reading than do more competent readers. Downing (1969) noted the difficulty five year olds he interviewed had in defining the purposes of reading.

None of his respondents even suggested that "What is in books" is information.

Meyers and Paris (1978) interviewed second and sixth graders about their knowledge of person, task, and strategy variables involved in reading. The second graders more often expressed a view of reading as decoding rather than meaning-constructing. These students were also much less aware that reading requires specialized skills or of the influence of motivation. Their awareness of task variables was more limited than that of the sixth graders. For example, although they knew that interest, familiarity, and length affected reading performance, they were not as aware of features such as paragraph organization. The second graders also did not evidence the level of knowledge about the need for different strategies when pursuing different goals. In addition, they did not report as large a repertoire of strategies as the sixth graders did.

Metacognitive knowledge has been found to be related to reading comprehension performance. Paris and Jacobs (1984) found modest but significant correlations between awareness of reading (planning, evaluation, and regulation) as assessed by an interview and performance on a standardized reading test, cloze tasks, and error detection tasks in third and fifth graders. Students with higher metacognitive awareness also had higher scores on the comprehension measures.

Good and poor readers have been found to differ in sensitivity to a variety of text factors. Bransford, Stein, Shelton, & Owings (1980) found that students in the top third of a fifth grade class used

arbitrariness of material to judge the difficulty of texts while students in the bottom third of the class did not do so. Brown and Smiley (1977) compared the ability of students in third, fifth, seventh grade, and college to rate the importance of structural units of stories and found a developmental trend with the older students being the most sensitive to differences in importance.

Both age and ability differences have been found in comprehension monitoring. This has been studied primarily through tasks involving detection of inconsistencies in text and detection of missing information. Garner (1980) asked good and poor junior high students to help edit two passages by stopping after reading each segment and indicating whether it had been difficult to understand, easy to understand, or "ok." Four segments of each passage contained inconsistencies due to alterations of critical words (e.g., "letters" for "numbers"). Good readers distinguished between consistent and inconsistent paragraphs to a significantly greater extent than did poor readers. In addition, when queried about their reasons for rating the inconsistent paragraphs "ok" or "difficult to understand," good readers tended to focus on the inconsistencies. Poor readers tended give responses such as "I didn't like that part as well," or "The words were longer."

August, Flavell, and Clift (1984) examined good and poor reader differences in detection of inconsistencies due to missing information. Their subjects were fifth graders who were reading at or above grade level or were reading at least one year below grade level as defined by

scores on a standardized achievement test. The students read stories presented page by page on a computer and were assessed on: 1) the time it took to read the pages following missing information in the inconsistent stories compared to the time it took to read equivalent sections of the consistent stories; 2) the difference in the number of lookbacks in the two kinds of stories; 3) verbal reports about detection of missing information; and 4) recall of the stories.

There were significant differences between the two groups of students in the amount of time spent reading inconsistent stories with the good readers taking more time. Only nine of the thirty-two subjects looked back at all but, of those nine, six were skilled readers. Of the students who showed at least minimal detection by slowing down or lookbacks, or making inferences, good readers reported missing information, placed it correctly, and were able to repair the story at significantly greater rates than the poor readers. The two groups of readers did not differ in their ability to recall the stories, indicating that recall could not be accounting for differences in verbal reports of problem detection.

Strategy knowledge has been found to be correlated with reading ability. Garner, Wagoner, and Smith (1983) used a tutoring task to identify differences in knowledge of strategies. Sixth grade good and poor comprehenders helped fourth grade students answer questions after reading an expository text. The specific focus of the study was whether the good and poor comprehenders would differ in use of text lookbacks, differentiated use of text for answering reader-based vs. text-based

questions, and sampling of text to resolve comprehension difficulties. Significant differences were found between the groups in all three of these areas. Good readers advised their tutees to look back in the text more than poor readers did. In addtion, they encouraged appropriate use of looking back (e.g., when the answer can be found in the text), and directed attention to appropriate sections of the text. "Good comprehenders spontaneously demonstrated awareness of why, when, and where lookbacks to text should be used, and poor comprehenders did not" (p. 445).

Differences in good and poor readers' use of strategies has also been examined. Two strategies that have been focused on in the research are text lookbacks and summaries. The differences in guidance about lookbacks given to the fourth graders by the good and poor reader tutors in the Garner et al. (1983) study most likely indicates differences in strategy use among the two groups. These differences were also evident in an on-line study conducted by Garner and Reis (1981).

Nineteen poor comprehenders in grades four through ten and nineteen good comprehenders in grades six through eight were given a story in three parts. They were directed to read each part and then answer comprehension questions, looking back at any part of the story to do so. Lookback questions involved information in a section prior to the one just read. Data was collected on actual lookbacks as well as indications of monitoring (e.g., quizzical responses, shrugging, verbalized hesitations). Overall, the poor comprehenders did not

demonstrate monitoring and generally did not use lookbacks. The good comprehenders in sixth and seventh grades showed evidence of monitoring but not of using lookbacks while the good comprehenders in eighth grade monitored and used lookbacks.

Brown, Day, and Jones (1983) investigated text summarization with students in grades five, seven, eleven, and college. The students were given folktales to read and were asked to recall them. They were asked to pretend they were newspaper reporters and write a short summary for one story. Following this, they were asked to cut their summaries to 40 and then 20 words. With all three summaries, the older students performance was superior to that of the younger ones.

Along with deficits in metacognitive knowledge and skills, poor readers have been found to differ in their beliefs about their competence in reading, their attributions for success and failure, and their task persistence. Butkowsky and Willows (1980) examined the relationship between reading ability and cognitions and behaviors related to academic self-concept. Their subjects were fifth graders, one-third of whom were good readers, one-third average readers, and one-third poor readers as defined by the discrepancy between potential and performance.

There were two tasks, the reading task involving anagrams and the unspecified task involving puzzles with line drawings. For each of the tasks, there were solvable and unsolvable versions. Half of the subjects in each group received the solvable versions and half the unsolvable versions. Students were asked to predict how well they

thought they would do, identity causal attributions for their performance, and then, after completing the first task, predict how well they thought they would do on the next one.

Students with relatively poor reading ability were found to have less initial expectancy for success than better readers. In addition, they tended to give up more quickly when they had difficulty, to attribute failure to more internal and stable causes (e.g., ability) and success to more external causes (e.g., nature of task), and to be less expectant of success after a failure experience.

Butkowky and Willows point out that their low readers exhibited the same behaviors and attributions described by others (e.g., Dweck, 1975) as learned helplessness. Learned helpless children are not likely to use strategies to aid in their reading as they believe that ability, rather than effort, determines performance outcomes (Borkwoski, Carr, & Rellinger, 1990).

In combination, the studies reviewed in this section point to poor readers as not possessing the knowledge and beliefs to optimally control their reading. The students lack understanding of the person, strategy, and task variables involved in regulating reading performance. They do not tend to use strategies effectively to control their reading. In addition, they too often are not motivated be strategic due to a focus on lack of ability. Overall, although metacognitive deficits cannot be identified as the cause of all reading problems (Swanson, 1989; Wong, 1985), there is strong evidence that

many poor readers, in comparison to more able ones, are not as aware of and/or able to control their reading behavior.

Given the lack of knowledge and beliefs critical to self-regulation in many poor readers, we need to consider the instruction that these students are currently receiving. Are poor readers being exposed to instruction that focuses on development of the ability to self-regulate? Does their instruction foster a concept of reading as problem solving and of readers as having the strategies and ability to monitor and control their interactions with text? In the next section, selected studies addressing these questions will be discussed.

Nature of Instruction Provided to Poor Readers

Research into the nature of instruction provided for poor readers (Allington, 1980; Allington, 1983: Allington & McGill-Franzen, 1989; Collins, 1981; Haynes & Jenkins, 1986; Leinhart, Zigmond, Cooley, 1981; Swanson, 1984) has pointed to a lack of attention to the development of knowledge, beliefs, and behaviors associated with self-regulation. Studies have shown that poor readers, in both regular and special education or remedial settings, are not receiving as much exposure to connected text as are good readers. There is less of a focus on and instruction in comprehension and more of one on decoding and isolated skills. A disproportionate amount of time is spent in individual seatwork. In general, strategy instruction is not in the forefront.

Most of the studies of instruction in regular education classes have involved comparisons of instruction provided to good and poor readers. Allington (1983), in reviewing many of the studies, pointed to differences in amount of engaged time students spend reading, time spent in oral vs. silent reading, lesson emphases, and patterns of teacher interruptions.

Allington (1980) found differences in teacher interruption behaviors when working with high and low reading groups. Twenty first and second grade teachers were observed teaching the two groups of students designated their best and worst readers. Students' oral reading errors as well as the teachers' responses to them were recorded. The teachers interrupted poor readers when they made errors significantly more often than they interrupted good readers. Even if the errors were semantically appropriate, the poor readers were interrupted more. The teacher's remarks were more likely to be directed at graphophonemic cues for the poor readers while they emphasized semantic and syntactic cues for the good readers. These interruption behaviors can be seen as evidence of a focus on decoding with the poor readers and one more on meaning with the good readers.

Collins (1982) analyzed the discourse style and interactional patterns in first and third grade reading groups. In the first grade study, he found that decoding was emphasized in the low group while comprehension was focused in the higher group. When the low group students made errors, the teacher gave them graphophonemic and vocabulary cues while she responded to the high group students' errors

with syntactic and semantic cues and modeled ways in which the sentence or passage should sound.

Collins observed that the discussions in the third grade classes studied were less collaborative in the low reading groups than in the high groups. Teachers incorporated fewer of the lower students' responses into subsequent questions, thus reducing the chance for dialogue to ensue. There was also less discussion of vocabulary and more disruptive overlapping of questions and answers (resulting in answers not always being acknowledged) in the low group. Both in the first and third grade study, students in the low groups were receiving instruction that was not conducive to the development of a concept of reading as problem solving. Nor did this instruction teach or encourage students to become actively involved in the reading process.

Studies of reading programs in special education settings have indicated that little actual reading instruction is even occurring. Rather, a large majority of students' time is spent in independent seatwork. This has been seen in self-contained as well as resource room settings. Leinhart, Zigmond, and Cooley (1981) examined reading instruction in primary, self-contained learning disabilities classrooms. Although there was much variation, on the average, students were involved in reading activities for only 10% of their days. Reading instruction was minimal, averaging 16 minutes per day.

In a replication of the Leinhart et al. study, Haynes and Jenkins (1986) examined reading instruction provided to fourth through sixth grade mildly handicapped students in resource rooms. Students were

involved in reading activities of any type only 44% of the time they were scheduled for resource room instruction. Proximity data indicated that the majority of instruction was through independent seatwork. Similar to Haynes and Jenkins' finding, Ysseldyke, Thurlow, O'Sullivan, and Christenson (1989) found that students in special education settings worked on worksheets 14.7%-25.8% of the time while they were only involved in teacher-focused tasks 4.0%-10.0% of the time.

Allington and McGill-Franzen (1989) compared the opportunity to read and write offered to special education and Chapter One elementary and middle school students. They observed 32 identified handicapped students and 32 students receiving Chapter One services for an entire school day, using a student observation instrument and taking fieldnotes. Activities coded as reading and language arts were the largest lesson category but the nonacademic activities consumed almost equal time. Special education students received fewer minutes of reading instruction daily than the Chapter One students because they missed more reading time in the regular classroom. The special education classes had the smallest proportion of active teaching and the largest proportion of seatwork activities. Seatwork activities provided the students in all of the settings were undifferentiated, not designed for individual needs.

Studies of remedial reading programs have yielded similar findings to the special education studies. Allington, Stuetzel, Shake, and Lamarche (1986) found that, although two thirds of the time in the

remedial reading classes they observed was spent in reading activities, most of these activities were focused at the sentence level or lower. As in the special education studies, there was a heavy use of independent workbook or worksheet activities with focus on isolated skills. The teachers were seen to serve more as monitors than as instructors with the instruction that was seen emphasizing getting the correct answer rather than how to do so.

Even when teachers rate strategy training as important, they are not always providing it. Swanson (1984) observed regular and special education teachers two hours a day for seven days and found that the mean percentage of time spent in strategy instruction was less than 10%. All teachers studied had mean ratings of less than 3% of time spent in metacognitive (person, task, strategy, and self-evaluation variables a formal topic of discussion) and generalization (Socratic instruction; concepts varied across task, person, and setting; feedback in terms of further inquiry) activities. Yet these teachers rated strategy instruction as being very important.

Based on the research reviewed in this section, we can conclude that, overall, the instruction given to poor readers, both in regular and special education settings, does not focus on students' ability to understand and control the factors involved in comprehending and learning from text. We need to develop means of promoting in poor readers the knowledge and behaviors which will facilitate self-regulation. Strategy instruction has been proposed as an instructional approach to meet this need.

Strategy instructional approaches have been developed and examined in laboratory and classroom research. Results have generally been positive, although not equivocal (Stone, 1989a). If we are to advocate their more widespread use in classrooms, especially for students with reading difficulties, we need to examine the approaches closely in an attempt to identify ways in which they do foster self-regulation. In the following section, six current prominent approaches to strategy instruction will be discussed.

Approaches to Strategy Instruction

The approaches to strategy instruction to be considered in this section are: 1) Direct Instruction; 2) Cognitive Behavior Modification; 3) the Strategies Intervention Model, 4) Direct Explanation; 5) Informed Strategies for Learning,; 6) and Reciprocal Teaching. This section is not based on an exhaustive review of these approaches but rather on selected articles about each. Discussion will focus on an overview of each approach as well as exemplary studies and their outcomes.

Direct Instruction

The term "Direct Instruction" was introduced as a result of the process-product research on effective teaching practices (Rosenshine, 1979). This research pointed to the importance of teacher behaviors and the relationship of these to student achievement. Direct Instruction of reading strategies is characterized by systematic,

explicit teaching of strategies to students (Gersten, Woodward, & Darch, 1986). Strategies are presented in a sequential fashion, generally based on a task analysis in which the process is broken down and presented in simple to complex steps. For example, Baumann (1984) used the following hierarchy of main idea skills in designing strategy lessons: main ideas and details in paragraphs-explicit; main ideas and details in paragraphs-implicit; main ideas and details in passages-explicit; main ideas and details in passages-implicit; main idea outlines of passages-explicit; main idea outlines of passages-implicit.

The teacher, typically using scripts for lesson presentation and systematic correction procedures, defines each step of the strategy and models its use. At this point, she also provides conditional knowledge, telling the students about how the strategy will help them. The students are explicitly taught the steps, often through rules and the use of heuristics (Baumann, 1988). Students practice these steps with the teacher providing and gradually fading prompts. Each step of the strategy is practiced until the students reach mastery criteria before the next step is introduced. Evaluation of performance is based on whether or not the students are following the stated procedures. It is carried out by the teacher who immediately corrects errors through reference to the rules or heuristics used to present the procedures.

As defined by Baumann (1988), a typical Direct Instruction strategy lesson includes:

1. An introductory statement. The students are told what they will be learning and how it will improve their reading (declarative and conditional knowledge).
2. Direct, explicit instruction in the strategy.
3. Heuristics or visual displays. These help the students remember the strategy. An example used in teaching summarizing is a picture of an umbrella with the main idea written on it and supporting details written underneath (Baumann, 1984).
4. Constructive responses during instruction. Students are involved beyond the level of recognition of correct responses. For example, they are asked to write summaries rather than select the correct ones from given choices.
5. Gradual transfer of responsibility for strategy use. Initially, the teacher has full responsibility for strategy use carried out through explanation and modeling. Then the students participate in guided practice during which time they are led by the teacher to use the strategy, often by reference to the heuristics. Finally, the students practice using the strategy on their own.
6. Conditional knowledge. Students are given further information by the teacher about conditions for and evaluations of strategy use.

A hallmark of Direct Instruction, and, to some (e.g., Baumann, 1988) the most important characteristic, is the active and directive role played by the teacher.

> ... the teacher, in a face-to-face, reasonably formal manner, tells, shows, models, demonstrates, teaches the skill to be learned. The key word here is teacher, for it is the teacher who is in command of the learning situation and leads the lesson, as opposed to having instruction "direct" by a worksheet, kit, learning center, or workbook. (Baumann, 1988, p. 714)

Throughout instruction, the teacher maintains control of the pace, sequence, and content of the lessons (Kierstead, 1985). It is the teacher who: 1) defines the strategies; 2) provides declarative, procedural, and conditional knowledge about them; and 3) evaluates students' competence in using the strategies.

The effect of Direct Instruction has been studied with regular and special education students learning a variety of comprehension strategies such as identifying the main idea, using study skills to remember information, understanding anaphoric relationships, and reading critically. In much of the work to date, the model has been compared to more traditional instruction such as that associated with a commercial language arts curriculum.

Baumann (1984) compared Direct Instruction of main idea comprehension (Strategy group) with main idea instruction as presented in a basal reading series (Basal group) and vocabulary instruction (Control group) with sixth graders. Using a posttest-only design, he found the Strategy group to be superior to the Basal and Control group in recognizing explicit and implicit main ideas at the paragraph and passage level, and in composing outlines of passage and paragraph main ideas. The treatment groups did not differ, however, in their free recalls of passages, something that was not directly taught. Although there was a main effect for ability, there were no interactions between ability and treatment.

A Direct Instruction approach to teaching study skills to fifth graders was compared to instruction involving independent seatwork and

teacher feedback using the same materials with teacher feedback and to a no instruction condition in a study by Adams, Carnine, and Gersten (1982). Students in the Direct Instruction condition were seen individually for four days and taught, through the use of scripted lessons, to use the following steps to study passages: 1) preview the paragraph by reading headings and subheadings; 2) recite the subheading; 3) ask themselves questions about what might be important to learn; 4) read to find the important details; 5) reread the subheading and recite the important detains, and 6) rehearse by reading each subheading and reciting the important detail. Passage recall and responses to a short answer test were assessed both the day following instruction and two weeks later. The students in the Direct Instruction group outperformed those in the other two groups on the short answer tests but there were no differences among the groups on passage recall. While the students were studying for the posttests, the researchers noted the study method they seemed to be using. Interestingly, while 93% of the students in the Direct Instruction group used some form of study strategy (compared to 47% of the workbook group and 33% of the non-instructed group), they did not necessarily use the strategies focused on in the training. This was cited as evidence that the students modified and adapted the strategies taught (Gersten & Carnine, 1986).

The effect of Direct Instruction on third grade students learning to understand anaphoric relationships was studied by Baumann (1986). In this study, the contrast group was instructed with lessons on word

referents from a basal reader program. There was also a no-instruction control group. Both the Direct Instruction and the contrast group's performance was significantly higher than that of the control group on identifying antecedents from short texts, identifying antecedents from basal passages, and answering wh-questions involving use of anaphoric relationships. In addition, the two groups' performance was superior on a test of identifying antecedents which was administered four weeks after the end of instruction. The Direct Instruction group outperformed the basal group on all of the measures.

Patching, Kameenui, Carnine, Gersten, and Colvin (1983) utilized a Direct Instruction model to teach critical reading skills (detecting instances of faulty generalization, false causality, and invalid testimonial) to fifth graders. Instruction was conducted on an individual basis over a 3-day period. Posttest performance was compared to that of students using a workbook and corrective feedback approach as well as to that of students receiving no instruction. Students receiving Direct Instruction scored higher than the other two groups on a test in which they had to determine if they could be sure whether statements following passages were true or not. There were no significant differences among the groups on two other measures, one requiring students to detect invalid arguments and reasoning and one in which they had to identify which of three given rules could be applied to identify invalid arguments.

The above study was modified and replicated with fourth through sixth grade learning disabled students (Darch & Kameenui, 1987).

Instruction was lengthened to twelve days and conducted in small groups. Also, the contrast condition was instruction on the same critical reading skills through workbook exercises and loosely structured discussions. The dependent measures were the same as those in the Patching et al. (1982) study. Students in the Direct Instruction group scored significantly higher than those in the contrast group on all three dependent measures.

Direct Instruction involves systematic presentation of strategies in a hierarchically sequenced manner. The studies reviewed have demonstrated that the use of Direct Instruction has been successful in increasing targeted reading comprehension skills. Both normally achieving and below average readers have been able to master the skills which were systematically presented by the instructor. In general, the increases have been seen in the targeted skills. Increases in areas not directly taught (e.g., recall) have not always been found. In part, this is a function of the measures selected for study and the typically short duration of the interventions. However, it may also indicate students' difficulty in using the skills in novel situations. Students in the Patching et al. study showed evidence of personalizing the study skills (Gersten & Carnine, 1986). Students in the other studies may not have become as flexible in their use of the skills learned.

Cognitive Behavior Modification

Cognitive Behavior Modification, like Direct Instruction, has become a rather widely encompassing term, used by some (e.g., Ryan,

Weed, & Short, 1986) to include all self-instruction programs. The more traditional Cognitive Behavior Modification approach is one in which students come to regulate their performance by means of internalizing a prescribed set of monitoring statements before, during, and after performing a task. Use of Cognitive Behavior Modification has not been limited to the reading domain. It is also used to decrease disruptive behavior, aggression, cheating, and to increase attention, essay writing, handwriting, and math skills.

The development of Cognitive Behavior Modification was influenced by several theoretical perspectives on learning (Meichenbaum, 1985; Meichenbaum & Asarnow, 1979). First was social learning theory which pointed to the importance of students' cognitions in facilitating self-control. Researchers' attention moved from overt behaviors to ways in which students were mediating them. A second influence was work in verbal mediation which pointed to the importance of training for production and use of mediators as well as comprehension of the task.

A third influence was the focus of the Soviet psychologists such as Vygotsky (1978) and Luria (1976) on the ways in which verbal control of thinking and behavior shifts from the adult to the child. All higher psychological functions are seen as beginning on the interpersonal level and then being transformed to the intrapersonal level. Luria proposed that this shift occurs in three phases. First, the adult's speech controls the child's behavior. Second, the child is directed by his own overt speech such as occurs when children talk to

themselves when they play. Finally, this speech, and thus the control, becomes internalized. Although Cognitive Behavior Modification does not attend to the mechanism by which this internalization occurs (Stone, 1989a), the instruction is designed to parallel the process. Self-monitoring statements are first modeled by the adult and then gradually internalized by the child as she plans for, carries, out, and evaluates a task.

The final influence on the development of Cognitive Behavior Modification was dissatisfaction with results of behavior modification. The changes that were produced in students' behavior were not durable. In addition, students were not generalizing what they had learned.

The procedural steps of Cognitive Behavior Modification, as identified by Meichenbaum (1985) are: 1) an adult model performs the task while thinking aloud; 2) the child performs the same task with external guidance from the adult; 3) the child performs the task, instructing himself aloud while doing so; 4) the child performs the task while whispering instructions to her/himself; and 5) the child performs the task while directing her/his performance through private, inner speech. Through these steps, based on task analyses, the child learns a sequence of self-instructional statements guiding her learning. This instruction, modeled by the adult and performed later by the child, focuses on problem-definition, attention focusing, self-reinforcement, and self-evaluative or self-coping skills (Meichenbaum, 1985). Following is a passage to be modeled to students:

> Well, I've learned three big things to keep in mind before I read a story and while I read it. One is to ask myself what the main idea of the story is. What is the story about? A second is to

> learn important details of the story as I go along. The order of main events or their sequence is an especially important detail. A third is to know how the characters feel and why. So, get the main idea. Watch sequences. And learn how the characters feel and why. While I'm reading I should pause now and then. I should think of what I'm doing. And I should listen to myself. Am I saying the right things? Remember, don't worry about mistakes. Just try again. Keep cool, calm, and relaxed. Be proud of yourself when you succeed. Have a blast! (Meichenbaum & Asarnow, 1979).

Cognitive Behavior Modification has been studied in relation to studying, scanning, and error detection. Dansereau, Collins, McDonald, Holley, Garland, Diekhoff, and Evans (1979) taught undergraduate students in a one semester course to guide their studying through the use of an executive strategy and underlying substrategies. The executive strategy was learned with the use of the heuristic MURDER:

M: Set the mood to study

U: Read for understanding

R: Recall the material without looking at the text

D: Correcting material, amplifying, and storing material to digest it

E: Expand knowledge by self-inquiry

R: Review mistakes

The substrategies were: 1) Paraphrasing/Imagery; 2) Networking in which the students were taught to use one of four organizing principles to draw diagrams showing relations among the material; and 3) Analysis of Key Ideas in which the students were given worksheets to use in defining, elaborating, and interrelating material.

Each student was instructed in MURDER and one of the substrategies. In addition, they were instructed in a retrieval strategy utilizing a second MURDER heuristic and in support strategies of goal-setting, concentration management through self-talk, and monitoring. Instruction occurred through lectures, practice, and small group or pair discussions. The self-talk was modeled and the students guided to evaluate their internal dialogues and use heuristics to modify them. Control students did not receive training. The students taking the course made significantly higher gains than the control students on comprehension retention tests and self-report measures.

Several studies have been conducted examining the effect of self-instructional training on error detection (Miller, 1985, 1987; Miller, Giovenco, & Rentiers, 1987). Miller (1985) assigned average fourth grade readers to one of four conditions: specific self-instruction, general self-instruction, didactic instruction, or control practice. In the first condition, students were taught to internalize the following four self statements (p. 620):

1. Problem definition:
   First, I am going to decide if this story has any problems in it, like if one sentence says one thing and another sentence says something different or opposite.

2. Problem approach:
   Second, as I read I will ask myself, "Is there anything wrong with the story?"

3. Evaluate approach:
   Third, OK I will read two sentences and stop and ask if anything is wrong.

4. Self-reinforcement:
   Fourth, so far so good, I am doing a great job. Now I will read the whole story and decide if there are any problems in the whole story.

5. Task completion:
Did I find any problems in this story?

The instruction involved: 1) the experimenter modeling the statements while reading a passage; 2) the child and experimenter saying the instructions together while reading the passage; 3) the child whispering the instructions as she read the passage; and 4) the child reading the passage orally, using the instructions silently. Students received feedback on their performance. In the general self instruction condition, the above statements were used but were preceded by general guiding statements (e.g., "First, I need to make sure I know what I am going to do"). In the didactic condition, the students were given the same task-specific content but not trained in self-verbalization. Instructions were presented in the second person (e.g., "You should decide if this story has any problems in it ..."). The students in the control practice listened to the passages used in the other conditions, reread them three times, and decided if there was an error. Feedback on performance was given in all conditions.

Instruction was conducted individually over three sessions. Following the third session and again three weeks later, students were given passages and asked to underline problems in them. They were then asked to explain reasons for any underlining. Reminders were given to the General and Specific Self-instruction group to use the thinking instructions. Students in both Self-instruction groups identified a significantly higher number of errors than those in the Didactic instruction or control groups. Students in the Specific

Self-instruction group scored higher than the control group on the delayed but not the immediate posttest. Students in the General Self-Instruction group scored higher than students in the control group on both measure. There were no significant differences between performance of students in the Specific Self-instruction and General Self-instruction groups.

Differential effects of Self-instruction for error detection with fifth grade average and above average students were found by Miller (1987). She compared the performance of these students either receiving Specific Self-instruction or Didactic instruction. Instruction was similar to that described in the study above but was only given over one session. The dependent measures were an error detection task and, for the Self-instruction group, recall of the self-statements. Data analysis indicated that the above average students benefitted from the Self-instructional intervention: their scores were significantly higher on the error detection task that those of the above average students in the Didactic instruction group. For the average students, however, there were no significant differences.

Instruction was increased to three sessions and conditional knowledge included in a study of error detection with average and below average fourth and fifth graders (Miller, Giovenco, & Rentiers, 1987). Self-instruction, including instruction in when to use the strategy and why it was helpful, was compared to Control practice, similar to the control condition in the previous study. In addition to underlining errors on the posttest, the students were instructed to explain the

errors and asked comprehension questions. Students in the Self-instruction group's performance on the direct error (i.e., same type of error as in training), transfer error (i.e., different type of error than in training), and explanation of direct error was significantly higher than that of the control group. The performance of both average and below average students in the Self-instruction group was equivalent on transfer error, explanation of direct error, and explanation of transfer error. Responses to comprehension questions could not be analyzed due to a ceiling effect.

Cognitive Behavior Modification, like Direct Instruction, involves learning the strategies as steps to follow. Unlike Direct Instruction, emphasis is placed on the students' developing self-verbalizations. Cognitive Behavior Modification has been successful in teaching students to detect errors in text. With the use of explicit practice in the steps, and with the teacher's participation which has is systematically faded, students became able to follow the given steps for error detection independently. Little information was provided, however, on their ability to use these or other strategies in a flexible manner to control their reading. Likewise, we have little information on changes in their reading knowledge and attitudes. One study reviewed focused on broader comprehension strategies (Dansereau et al., 1979). Undergraduates learned to use primary and support strategies when reading text. The intervention made use of self talk and heuristics in controlling reading. Students in the course made progress in reading and on self-report measures.

Strategies Intervention Model

The Strategies Instructional Approach, operationalized as the Strategies Intervention Model, was developed at the University of Kansas Institute for Research in Learning Disabilities (Deshler & Lenz, 1989; Deshler & Schumaker, 1986; Lenz, 1989; Schumaker, Deshler, & Ellis, 1986). It has resulted from a continuing extensive research program focusing on identification and intervention issues about learning disabled and other low achieving adolescents and young adults. The model addresses a wide spectrum of academic and social areas as reflected in the four main goals: 1) to make students independent learners and performers by teaching them to use specific learning strategies with academic tasks; 2) to make students skilled in specific social strategies when interacting with others; 3) to empower students to earn a high school diploma; and 4) to enable students to be successful in their transition from high school to postsecondary life (Deshler & Schumaker, 1986). The particular reading strategies that have been addressed are word identification, visual imagery, paraphrasing, interpreting visual aids, and learning from textbook chapters.

Three major areas of instruction are addressed: what will be taught, how it will be taught, and how the environment will be arranged to support students' use of strategies (Deshler & Lenz, 1989). What is taught are strategies, based on their usefulness across school and out-of-school settings. These strategies are presented as a series of steps for students to follow, each involving an overt physical action

and associated mental actions. The steps have been sequenced carefully to be used by the students to guide themselves as they select and utilize procedures, skills, or rules (Lenz, 1989). Metacognitive processes such as self-evaluation are embedded within the steps.

The strategies are taught through the use of instructor's manuals which include scripts, cue cards and instructional activities. There are two main phases of instruction: acquisition and generalization (Deshler & Schumaker, 1986). The focus of the acquisition phase is on students getting the knowledge, motivation, and practice to apply the strategies in a support settings, outside the regular classroom. In the generalization phase, students learn to apply the strategies in the regular classroom.

The acquisition phase has seven steps (Deshler & Lenz, 1989). The first step is **Pretest**. Students are pretested on how they approach a particular task, told what their strengths and weaknesses are, and then make a commitment to learn a strategy to address their weaknesses. In the **Describe** step, the teacher tells the students about the strategy, addressing the steps involved, rationales for learning it, conditions in which it can be used, and the expected benefits of its use. The students determine how fast they will learn the strategy and write a goal to this effect.

The third step, **Model**, involves the teacher modeling the physical steps and presenting the mental processes through a think-aloud focusing on approaching the task effectively and efficiently (Lenz, 1989). Gradually, the students begin to participate, first commenting

and adding their thoughts as the teacher completes each step and finally carrying out the steps themselves while they state the related mental actions.

The fourth step is **Verbal Rehearsal**. In this step, students practice naming the steps in order. During **Controlled Practice and Feedback**, students practice the steps using materials controlled for complexity, length, and difficulty. Practice continues until a specified criterion level is reached. During **Grade-Appropriate Practice and Feedback**, students individually practice the steps using materials that are like those found in their regular classrooms and out-of-school contexts. Once again, mastery criterion is used. The last step is a **Posttest**.

Instruction for generalization occurs both throughout the Acquisition Phase and in the Generalization phase itself. Within the Generalization Phase, there are three phases (Ellis, Lenz, & Sanbornie, 1987a). In the first, **Orientation**, students are informed that they need to generalize what they have learned. The teacher gives them a rationale for generalizing the strategy and tells them to ask themselves questions such as: "How can I remind myself to use this strategy? What parts of the skill help me most? How could the skill be changed to make it work better for me?" (Ellis et al., 1987). In the **Activation** phase, the students try out the strategies in new situations in their regular classrooms. First, they are told to use a particular strategy with a specified assignment and then to report on this to the teachers or peers who provide feedback. Second, the

students are told to use a particular strategy in a content class. The particular assignment with which to use the strategy is not identified. Again, the students report to the teacher on their use of the strategy. Third, the students are told to use the strategy in their regular classes but the particular class or assignment is not specified. In the Implementation phase, the students make plans to remember the strategy and give themselves feedback for using it. Teacher feedback is faded to random monthly checks. (Note: The generalization phases are now being referred to as "Orientation, Activation, Adaptation, and Maintenance" (Lenz, 1989)).

The final aspect of the model is the creation of a "strategic environment." Teachers are to use all opportunities to model their own use of strategic behavior. Throughout the day, they are to provide opportunities for and encourage students' use of strategies. Current research (Deshler & Lenz, 1989) is exploring the critical features of multiple strategic environments (e.g., support classroom, mainstream classroom, home).

The above instruction mainly involves the support teacher and the students. The model also addresses the roles of the content area teacher (Deshler & Schumaker, 1986). These are: 1) to use teaching routines such as advance organizers and concept maps to facilitate understanding and memory; 2) to cue students to use strategies they have learned in the support class; and 3) to reinforce students for using these strategies.

A representative study of the use of the Strategies Intervention Model to teach comprehension focuses on MULTIPASS, a strategy students can use to gain information from textbook chapters (Schumaker, Deshler, Alley, Warner, & Denton, 1982). The strategy involves three substrategies (Survey, Size-Up, and Sort-Out) which were first taught as units. Survey involved students reading or looking at chapter titles, introductory paragraphs, table of contents, subtitles, illustrations, and summary paragraphs and then to paraphrase information from these. In carrying out Size-Up, students read and tried to answer end of chapter questions to determine what facts were important to learn. Then they turned textual cues into questions and skimmed the text to answer these. Sort-Out involved students testing themselves on the material read by trying to answer the end-of-chapter questions again, skimming until the answer could be found if it was not known.

Students were individually taught MULTIPASS through a 10-step procedure. Both prior to and following training, they were given six measures of their ability to use the substrategies using both ability-level and grade-level material. In addition, they were given a chapter to read and to study in any way they wanted. After a minimum of 24 hours, they were given a test on the material. This was repeated so that each student was tested on ability-level and grade-level material. All eight students mastered MULTIPASS using ability-level materials and were also able to use the strategy with grade-level material. In addition, students' grades on the content tests improved.

The Strategies Intervention Model addresses the needs of adolescents in their school and out-of-school environments. Strategies are explicitly presented as steps, as in Direct Instruction and Cognitive Behavior Modification. Much more attention is paid to generalization of what has been learned than in those models, both in the instruction itself and as reflected in the dependent measures utilized. In the MULTIPASS study reviewed, students learned to carry out the strategy taught. They showed evidence of generalization with their increased grades.

Direct Explanation

Direct Explanation (Duffy, Roehler, Meloth, Vavrus, Book, Putnam, & Wesselman, 1986; Duffy, Roehler, Sivan, Rackliffe, Book, Meloth, Vavrus, Wesselman, Putnam, Bassiri, 1987) is an approach to strategy instruction in which skills are recast as strategies. Initially, teachers explicitly provide declarative, procedural, and conditional knowledge about the strategies. Within the presentation of the strategies, the teachers "talk aloud" about the mental processes they use when they are having difficulty understanding text, how application of a skill can help them remove obstacles to comprehension, and what mental steps to take in using the skill strategically. This approach has been integrated with instruction in the basal reader and, as such, focuses on recasting any skill presented in the reader as a strategy. Word attack, context, and higher level comprehension skills are included.

The lessons proceed in a five step sequence. First, the teacher introduces the focus of the lesson. Then she models the use of the strategy, emphasizing the reasoning involved in applying it to a comprehension problem. The following phase is guided interaction. If students are having difficulties, the teacher corrects by modeling her thought processes in using the skill. The last two phases are practice and application.

The two major studies of Direct Explanations have been conducted by Duffy and associates. In both, the focus was teachers working with their low reading groups. The first study (Duffy et al., 1986) focused on: 1) whether teachers who were trained to be more explicit with their low reading groups were in fact so; 2) whether students in the low reading groups whose teachers were trained to provide explicit instruction were more aware of the skills they had been taught and how to use those strategically; and 3) whether those same students would achieve higher scores on a standardized reading comprehension subtest.

The subjects were 22 fifth grade teachers and their low reading groups. Half of the teachers were assigned to the treatment group and half to the control group. The treatment group teachers participated in 10 hours of instruction in which they were taught how to recast reading skills as strategies; how to provide explicit information about the skill including how and when to apply it; and how to organize their lesson presentations. Emphasis was placed on teachers modeling their mental processing. The teachers were told to present the skills in the

context of reading rather than in an isolated manner. Control teachers were trained in effective management principles.

The teachers were observed four times throughout the school year. In addition, five randomly selected students were individually interviewed after each of the observed lessons. These students were asked what they had learned in the lesson, when they would use what had been taught, and how to do what they had been taught. Based on ratings of the observations, the teachers in the treatment group were more explicit in their explanations of the skills. The students in the treatment groups showed significantly higher levels of awareness of what they had learned on their responses to the interviews. However, there were no significant differences between the students in the treatment and control groups on the standardized measure of reading comprehension.

Using modified teacher instruction and a wider variety of student outcome measures, Duffy et al. (1987) addressed the same research questions in a second study. The subjects in this study were third grade teachers and their low reading groups. The control teachers were instructed in behavior management principles. Treatment teachers also were encouraged to use these principles. Both groups were instructed in the use of uninterrupted Sustained Silent Reading and on ways to prepare students to take standardized tests. All teachers were observed six times with selected students interviewed after each observation. In addition, the treatment teachers were observed five more times and given extra coaching after these observations.

As in the first study, teachers in the treatment group were found to provide more explicit explanations about the mental processes used when employing reading skills as strategies. Students in the treatment group were found to be significantly higher in procedural and conditional knowledge about using the strategies. Their scores were also significantly higher than the control students on a concept interview assessing their awareness of the strategic nature of reading.

Four measures were used to assess the students' reading achievement. The first, the Supplemental Achievement Measure, assessed students' ability to perform isolated skill tasks (Part 1) as well as their reasoning while they performed the task (Part 2). This measure was only given to selected students in each group. Significant differences favoring the treatment group were found for Part 2 but not Part 1. The second measure used a modified graded oral reading paragraph. Students were scored on their verbal reports of self-corrections as well as responses to two embedded words. Treatment students were found to report reasoning and describe reasoning more than control students. There were significant differences favoring treatment students on the word study subtest of a standardized reading test but not on the comprehension subtest. Finally, the students in the treatment group scored significantly higher than those in the control group on the Michigan Educational Assessment Program test (MEAP) which was administered five months after the study was completed.

Direct Explanation attends to the strategies in a more holistic fashion than the other models reviewed thus far. In addition, more emphasis is placed on the thinking processes involved rather than on procedures alone, with attention focused on the teachers providing much more than an explanation of steps to follow. The measures used in the studies of Direct Explanation assess procedural and conditional knowledge about the strategies as well as generalization to reading comprehension with progress seen in all of these areas.

Reciprocal Teaching

In Reciprocal Teaching (Brown & Palincsar, 1985, 1989; Palincsar, 1985, 1986; Palincsar & Brown, 1984, 1989a, 1989b), the teacher and students engage in a dialogue while reading text. The dialogue is structured, but not dominated by, the use of four strategies: summarizing, self-questioning, predicting, and clarifying. The instruction is based on the theory of expert scaffolding (Wood, Bruner, & Ross, 1976). The teacher provides support for the students as they gradually acquire the ability to use the strategies independently (Brown & Palincsar, 1985).

For the first several days of Reciprocal Teaching, the students receive Direct Instruction regarding the strategies. The teacher explains and models the four strategies for the purpose of acquainting the students with the language of the dialogue. Following this component, the students and teacher take turns leading discussions, using the strategies to help them understand the text. At all times,

the students are asked to competently use the strategies. They are given as much support as needed to do this. For example, during the first few days of the discussions, the teacher may model a summary or question for the discussion leader to repeat or supply a partial question for her to complete. As the students become more able to independently use the strategies, the teacher provides less support. Throughout, the level of support given is adjusted to each child's needs. Although children take turns in the role of discussion leader, they are encouraged to join in the discussion at any time, adding to summaries and questions, making their own predictions and asking for clarifications.

Brown and Palincsar (1985) present the following principles upon which Reciprocal Teaching is based:

1) the teacher should make the underlying processes of the strategies overt, explicit and concrete through modeling

2) the strategies should be modeled in appropriate contexts, not as isolated, decontextualized skills

3) the students should be informed about the need for the strategies and about situations in which they can use them

4) the students should come to recognize the utility of the strategies

5) responsibility for task completion should be transferred as soon as the children are ready

6) the transfer should be gradual

7) feedback should be adjusted to each student's level and always encourages progression towards independent competence

Reciprocal Teaching has been extensively studied with students in both elementary and junior high school. The initial research (Palincsar & Brown, 1984) involved 37 junior high students. Twenty-four of these were adequate decoders but comprehending several years below their expected level. The remaining 13 students did not evidence reading problems and provided normative data. Six students received Reciprocal Teaching. These students worked with the researcher in pairs for 20 days of instruction. Six received instruction in locating information, six completed daily comprehension assessments but did not receive instruction, and six completed pre and posttests but remained in their regular classrooms for reading instruction.

Examination of the lesson dialogues revealed that the students came to ask a majority of main idea questions and summaries. In addition, their responses became less unclear, incomplete, and detailed. Five of the six students reached criterion-referenced performance levels of 70% to 80% correct. This was comparable to the performance levels of the normally achieving students. Five of the six also increased their comprehension scores in the classroom from 20% to 60% correct. In addition, the students showed improvement in use of condensation rules in summarizing, predicting questions that a teacher might ask, and identifying incongruous sentences in prose passages.

A second study focused on the effect of Reciprocal Teaching used by four volunteer teachers (Palincsar & Brown, 1984). The teachers were trained over a three-day period and then worked with groups of four to seven junior high school students. Students in three of the four groups reached criterion level on the daily assessments after fifteen days of instruction. Those in the fourth group reached this level in five days. The students also showed improvement in the transfer tasks used in the original study described above.

Reciprocal Teaching has also been investigated with six nonvolunteer teachers teaching groups of seven to 15 seventh graders (Palincsar, 1987). Students received 20 days of instruction. The students' performance on the criterion referenced comprehension assessments improved significantly after the first half of instruction. Significant improvements continued in the second half. There was a significant difference between the performance of the students in the Reciprocal Teaching and the control groups. In the Reciprocal Teaching groups, 70% of the children reached criterion performance (70% accuracy on four of five days) while in the control groups, only 25% reached this level. Gains made by the Reciprocal Teaching groups were maintained following the intervention. These students also had significantly higher posttest scores in summary writing than the control group.

In addition to increasing reading comprehension, Reciprocal Teaching has been found to be effective in promoting listening comprehension (Palincsar, 1987). Classroom teachers used Reciprocal

Teaching with groups of six students, five of the six in each group being at risk for potential school difficulty. Students matched on pretest measures were randomly assigned to the experimental and control groups. Instruction proceeded as in the reading studies except the teacher read the text to the students. The students then took turns leading the discussion through the use of the four strategies. Comprehension assessments were administered several times weekly.

The experimental group's performance on the comprehension assessment was significantly higher than that of the control group following the first half of intervention. In addition, these students scored significantly higher on responses to analogy questions and measures of strategy knowledge. Examination of the transcripts revealed that, over the course of instruction, the dialogue became less structured and more spontaneous, and focused more on the content of the text. Students learned to seek clarifications immediately and to ask questions to evaluate their understanding of the text.

Reciprocal Teaching, as described, has been compared to: 1) instruction identical to the first four days of Reciprocal Teaching and then written practice of the strategies with minimal feedback; 2) demonstration of the strategies with minimal opportunity for the students to practice them; and 3) worksheet activities in which the students practiced the strategies and received teacher feedback on their performance but did not practice the strategies in the context of naturalistic reading; and 4) no instruction (Palincsar, 1985). Reciprocal Teaching was found to produce greater comprehension gains

than the other conditions. Demonstration alone (Condition 2, above) was the least effective.

In summary, Reciprocal Teaching emphasizes students' learning strategies in context of their use. The teacher supports the students as they gradually learn to assume responsibility for independently employing the strategies. Reciprocal Teaching has been found to be a powerful means for teaching students to be strategic readers. It has been effectively used by classroom teachers with students in first grade through junior high school. Students have shown gains in criterion referenced as well as standardized measures of comprehension. They have both maintained and transferred these gains.

Informed Strategies for Learning

Informed Strategies for Learning (ISL) is a curriculum for teaching strategic reading that is designed for students in grades 3, 4, and 5 although it can be adapted for younger or older students. It was developed by Paris and his colleagues at the University of Michigan (Jacobs & Paris, 1987; Paris, 1986; Paris, Cross, & Lipson, 1984) and is intended to be used as an adjunct to any reading curriculum.

The purpose of ISL is to increase students' metacognitive knowledge about reading as well as their use of strategies (Paris, Cross, & Lipson, 1984). This is accomplished by heightening students' awareness of declarative, procedural, and conditional knowledge about reading strategies and teaching them to plan, evaluate, and regulate their comprehension.

ISL consists of 20 modules of three lessons. Each module focuses on one comprehension strategy. The emphasis of Modules 1-5 is on Planning for Reading; 6-10 on Identifying Meaning; 11-15 on Reasoning while Reading; and 16-20 on Monitoring Comprehension. In presenting the lessons, the following five techniques are used (Paris, 1986):

1. Informed teaching: The teachers provide explicit information about what the strategies are, how to use them, and when and why they are helpful.
2. Metaphors and bulletin boards: Each module has an accompanying metaphor to make the strategies concrete and meaningful to the students. Examples of the metaphors are "Be a reading detective" for evaluating the reading task and "Bridges to meaning" for integrating ideas and using context. The modules also have bulletin boards which picture the metaphors as well as display focusing questions about the strategies.
3. Group dialogues: Discussions among the teacher and students focus on thoughts and feelings about the strategies and their use, emphasizing the personal aspect of strategy use.
4. Guided practice: Students apply what they have been taught through the discussions and independent worksheets.
5. Bridging to content area reading: Bridging lessons use material from content areas and focus on students generalization of the strategies.

There are three key instructional activities in ISL: informing, discussing, and coaching (Paris, 1986). Informing refers to the

teacher's directly and explicitly providing declarative, procedural, and conditional knowledge about the strategies. In the discussions, the teachers and students talk about the strategies, how to use them, and how to evaluate them. Emphasis is placed on "making thinking public," and having students "...assert, defend, and question their ideas..." (Paris, 1988, p.) to learn about the value of the strategies. The discussions involve use of and reference to the metaphors. Through the Direct Instruction (informing) and discussion components, motivation is attended to through emphasis on the value of the strategies. Coaching refers to the teacher's regulating her level of support as the students become more able to use the strategies on their own.

Paris, Cross, and Lipson (1984) conducted a study to: 1) examine the effect of ISL on reading comprehension and 2) evaluate the efficacy of ISL in the classroom. The ISL program was taught twice weekly to four classes (two third grade and two fifth grade) for four months. In addition, the bulletin boards were used and classroom teachers (who did not conduct the instruction) received a short description of the modules. Four control classes participated in activities such as individual tutoring, movies, and group lessons on topics unrelated reading (e.g., ecology and nutrition). The treatment group's performance on a measure of strategy knowledge was significantly higher than that of the control group. In addition, the experimental group scored significantly higher on a cloze task and an error detection

task. There were no significant differences between the experimental and control groups on two standardized measures of comprehension.

ISL, like Reciprocal Teaching and Direct Explanation, focuses more on the thinking processes used in carrying out strategies. Much emphasis is placed on conditional knowledge. Students are encouraged to adapt the strategies to their needs. Students participating in ISL have made gains in metacognitive knowledge, cloze and error detection tasks.

Comparison of the Six Models of Strategy Instruction

Research on the six models supports the benefits of strategy instruction for both poor and normally achieving readers. Implementation of all of the models has been successful, at least to some degree, as reflected by students' performance on the outcome measures utilized. But how do the models compare with each other? Are some more effective than others in fostering particular student outcomes? Which will be more effective in fostering students' ability to generalize use of the strategies to new situations?

Comparison of the models has been called for by researchers representing several different perspectives on strategy instruction (Ellis et al., 1987a; Palincsar, David, Winn, Snyder, & Stevens, 1989; Pressley, Snyder, Cariglia-Bull, 1987; Stone, 1989a). It is difficult, if not impossible, to make comparisons in terms of the studies conducted thus far. For one, student outcome measures have been quite different. Students' metacognitive knowledge about reading has been

attended to through open-ended questions (Direct Explanation) and multiple choice questions (ISL). Strategy use has sometimes been measured directly (Strategies Intervention Model, Reciprocal Teaching) and other times inferred (Direct Explanation). Comprehension has been assessed through standardized tests (ISL, Reciprocal Teaching), criterion-referenced tests (Reciprocal Teaching), and grades in regular classrooms (Strategies Intervention Model), or not at all (Cognitive Behavior Modification). Second, the instructional group sizes have differed. In many of the studies using Cognitive Behavior Modification, instruction was conducted on an individual basis. Studies examining other approaches (e.g., Reciprocal Teaching, Direct Explanation) have mainly involved small groups. ISL was taught to entire classes. A third difference in the studies is duration of instruction. Several of the studies reviewed involved only one or a few session of instruction (Cognitive Behavior Modification error detection studies, Direct Instruction) while others involved instruction over several weeks or months.

To address questions about similarities and differences among the models, we need to develop a basis for comparing them. One way of doing this is to examine the conceptions of teaching and learning which are embodied in the models. Using these conceptions, we can begin to define commonalities and unique aspects. In addition, we can begin to define alternative models.

In the following section, conceptions of teaching and learning and the way in which they are manifested in goals of instruction, roles of

teachers and students, and academic tasks (Anderson, 1989) in the six models will be discussed.

Conceptions of Teaching and Learning

In a provocative series of articles, Poplin (1988a, 1988b) criticizes the field of learning disabilities as representing a reductionistic perspective in both defining and addressing students' learning problems. This perspective, she argues, has been and continues to be pervasive in the field, even as the dominant paradigms have changed. Poplin, along with others (Gavelek & Palincsar, 1988; Stone, 1989a; Heshusius, 1989) is calling for a broader, more holistic conception of teaching and learning to inform our definition of learning abilities and disabilities, as well as the instruction we provide. Their arguments have relevance for all students.

Reductionism, as described by Poplin (1988a), involves segmenting what is to be learned into parts and then focusing instruction on mastery of these parts. In the case of strategies, segmentation refers to an emphasis on students learning to follow procedural steps in utilizing the strategies rather than learning to use them in the context of making sense of text. The content of lessons within a reductionistic perspective is predetermined, typically through task analysis. Little attention is paid to what the students bring to the tasks provided or to the sense they make of these tasks. Likewise, little attention is paid to the social interactions among teachers and

students or among the students themselves as they learn to regulate their reading.

Conceptions of teaching and learning which have been proposed as alternatives to reductionism (Poplin, 1988b; Gavelek & Palincsar, 1988; Stone, 1989a, 1989b) emphasize the importance of students' contributions to the learning process as well as the nature of the social interactions that facilitate learning. These alternative conceptions have been referred to as holistic constuctivism (Poplin, 1989b) and social constructivism (Gavelek & Palincsar, 1988), with the former emphasizing the active role played by the child in learning and the latter emphasizing the crucial role played by social interactions.

The principles of a holistic/constructivist perspective on teaching and learning (Poplin, 1988b) emphasize the contribution of the learner in all phases of the learning process. Learning is seen as the construction of meaning. The student makes sense of new information within the context of her background knowledge. Since this knowledge varies from individual to individual, what is learned is seen as both personally and culturally relative. This perspective places importance on the student setting her own purposes for learning rather than having purposes imposed. In this view of teaching and learning, generalization occurs as the learner integrates new information with prior knowledge rather than as a separate aspect, or "step," of the learning process. Throughout the learning process, focus is on the whole rather than parts. "The whole must be grasped before the parts

can be related to current knowledge; otherwise there is no scaffolding to attach the specifics, the parts" (Poplin, 1988b, p. 408).

Holistic/constructivism also attends to the learner's emotions and their effect on learning. Students are seen as learning best when they are interested and involved. Therefore, both prior knowledge and attitude towards the topic play a role in learning. In addition, learning is influenced by the students' attitudes towards the instructor. Students learn best from instructors whom they trust.

Other critics of reductionism (Gavelek & Palincsar, 1988; Stone, 1989a, 1989b;) focus on the lack of attention to the critical role in learning played by social interactions. This role is highlighted in Vygotsky's sociohistorical perspective (Vygotsky, 1978; 1987; Stone, 1989a; Wertsch, 1979) on learning. Vygotsky argues that learning is socially mediated. All higher level mental functions occur on the interpsychological plane (socially) before occurring on the intrapsychological plane. From this perspective, the nature of teaching and learning can be understood through an examination of the social interactions facilitating shift of control to the intrapsychological plane.

Learning is seen not merely as a process of reproduction or copying of the knowledge and behavior of others, but as a gradual transfer of regulation to the learner herself through social interaction (Stone, 1989b). The student comes to develop an understanding of and approach to the task at hand through collaborating with more knowledgeable others. Initially, the adult or more knowledge

peer takes major responsibility for task completion. This enables the student to participate in the process well before she is capable of understanding or managing it on her own. She begins to internalize the approach and, in so doing, becomes able to assume increasing levels of responsibility. As the student becomes more responsible, the adult or peer participates to a lesser degree. Gradually, the student comes to be able to complete the task independently.

As in the holistic/constructivist perspective, emphasis is placed on the importance of the whole rather than parts. To facilitate understanding, tasks are seen as best presented in a goal-embedded context. Specific to strategy instruction, the goal would be to develop a strategic conception of the reading task (Stone,1989a) rather than mastery of components of the strategies.

Together, these alternatives to reductionism, holistic/ constructivism and social constructivism, present a view of learning as a process in which the student, through collaboration with others, comes to be able to share understandings and approaches to tasks that she did not previously hold. In so doing, she develops the ability to internally control and regulate her behavior. The level of support needed throughout this process is determined by the learner's understanding of the task in concert with task demands. This, in turn, is influenced by the learner's background knowledge as well as her interest and motivation. Holistic/constructivism, as described by Poplin (1988b), focuses on the learner's role in the learning process. Social constructivism focuses more broadly, on the process itself. As

such, the two are complementary. For the remainder of this paper, the term "social constructivism" will subsume the tenets of holistic/constructivism that have been presented.

Conceptions of teaching and learning are reflected in models of instruction in: 1) the goals for students' learning; 2) the roles of students and teachers; and 3) the nature of tasks (Anderson, 1989) as well as 4) the nature of the discourse. By looking at these features within the six models of strategy instruction, we can identify the implicit conceptions of teaching and learning. The models cannot be neatly "pigeon-holed" but, as will be seen, those most prevalent in special education (Direct Instruction, Cognitive Behavior Modification, and the Strategies Intervention Model) represent much more of a reductionistic rather than a social constructivist perspective.

Goals of Instruction

Reductionistic and social constructivist conceptions of teaching and learning lead to quite different instructional goals. Anderson (1989) contrasts two goals of schooling: 1) those emphasizing expertise; and 2) those emphasizing fact and skill acquisition. The former reflects a social constructivist perspective and the latter a reductionistic perspective. With reference to strategy instruction, development of expertise refers to students becoming able to use strategies flexibly and opportunistically in problem solving situations while reading. The goal of mastering facts and skills refers to a focus on mastery of procedures for carrying out strategies, generally

in a hierarchically sequenced fashion. Three of the six models encompass goals of skill acquisition. The other three, to a varying extent, encompass goals based on development of expertise.

The goal of mastery of skills (i.e., steps for carrying out the strategies) is important in Direct Instruction, Cognitive Behavior Modification, and, although to a somewhat lesser extent, the Strategies Intervention Model. Instruction continues in a particular skill or sequence of skills until mastery criteria is reached. If this criteria is not reached, corrective action (prescribed in Direct Instruction) is taken.

Reciprocal Teaching, ISL and Direct Explanation focus more on development of expertise. They emphasize use of the strategies to identify and solve problems. In Reciprocal Teaching, students are provided the level of support which enables them to use strategies in problem-solving contexts. Decisions about what constitutes this level are made in terms of demands of particular situations rather than in terms of mastery of a prescribed sequence of steps to be used transituationally. In Direct Explanation, the focus is on ways in which expert readers think while reading. In the teacher modeling, there is little emphasis on steps but more on the thinking processes involved. Although there is some emphasis on steps in ISL, it not as intense as in Direct Instruction, Cognitive Behavior Modification, and the Strategies Intervention Model. There is more of a focus on utility of the strategies.

To summarize, three of the models, Direct Instruction, Cognitive Behavior Modification, and the Strategies Intervention Model, focus on goals of mastery of procedures. This seems to be consistent with a reductionistic conception of teaching and learning. The other three models, Reciprocal Teaching, Direct Explanation, and ISL, focus more on flexible use of strategies, a goal that seems consistent with a more constructionist view of teaching and learning.

Role of the Teacher

Anderson (1989) defines two opposing instructional roles for teachers. The first role, one consistent with a reductionistic perspective, is that of provider of information. A teacher in this role engages in didactic instruction, with information flowing from her to the students. Lessons taught by a teacher in this role have a high degree of teacher control. In terms of strategy instruction, the teacher is seen as having particular knowledge about the strategies. Her role is to inform the students of this knowledge, primarily by presenting it in as clear and explicit a manner as possible. The teacher's instructional decisions are based on students' ability to demonstrate mastery of this knowledge, generally in terms of their performance in carrying out the specific steps. The decisions involve changing ways in which the strategies are presented, typically through determining the degree to which tasks should be broken down or the pace at which they should be introduced.

The second role, one consistent with a social constructivist view, is that of mediator. In this role, teachers are not merely providers of information, telling students how to complete a task or solve a problem and then evaluating whether or not they are able to do this. Rather, teachers engage in interactions with students during joint problem-solving, guiding their understanding. This is done through the provision of scaffolded instruction.

Scaffolded instruction refers to a "process that enables a child or novice to solve a problem, carry out a task, or achieve a goal which would be beyond his unassisted efforts" (Wood, Bruner, & Ross, 1976, p. 90). This process involves the teacher challenging students to engage in a task which they are not able to complete independently and then providing the necessary support to enable success. As students become more proficient in meeting task demands, the teacher's support is decreased.

In challenging the students with tasks or problems that are beyond their ability to complete independently but that can be successfully completed with assistance, the teacher is working within the student's zone of proximal development (Vygotsky, 1978) or "the distance actual developmental level as determined by independent problem solving and the level of potential development as determined through adult guidance, or in collaboration with more capable peers" (p.86). Stone and Wertch (1984) refer to the challenges as proleptic challenges, prolepsis being "in anticipation of competence."

Based on the students' responses to the challenges, the teacher must determine the nature and degree of support needed. This involves flexibly using a model of ways in which experts approach the task. Based on the model and on the students' responses, the teacher must decide how best to provide support to facilitate development of a shared understanding of the task. Support can be given through modeling, prompting, or guiding questions. Once the teacher selects the nature of support, she must calibrate the level to the needs and ability of the students. These kinds of decisions are more complex than those made by the teacher as knowledge provider.

Scaffolded, or mediated, instruction, occurs through dialogue among teachers and students (Palincsar, 1986). The dialogue is mutual with its course determined by all participants. The teacher is the expert, but her role is not to "tell" what she knows; rather it is to guide students to share her understanding of the tasks she presents. As student input determines the course of the dialogues to a great deal, lessons are significantly less teacher-controlled than if taught by a teacher assuming a knowledge provider role.

The next part of the discussion focuses on the role of the student. As with the teachers' roles, those of the students reflect the two very different perspectives on how students learn and how instruction should occur.

Role of the Student

Anderson (1989) describes two ways in which student roles can be viewed: 1) knowledge recipient; or 2) knowledge constructor. The role of knowledge recipient is consistent with that of teacher as knowledge provider. The recipient role is a passive one. Little if any attention is paid to the ways in which students might use their prior knowledge to make sense of new information or to their participation in any type of reciprocal process during learning. Likewise, there is not a focus on personalizing what is to be learned.

The role of knowledge constructor involves the child taking an active part in her own learning, assimilating new information into her existing schemata, restructuring her schemata when encountered with knowledge incompatible with existing structures, and, at times, changing her theories or fundamental modes of thinking (Brown & Palincsar, 1989). Students not only actively construct their knowledge base, but also their ability to self-regulate. (Anderson, 1989). They come to internalize and personalize that which they experience in social interactions as they are led to actively integrate what they know with new information and ideas.

An important aspect of the role of the student is her role as a member of the peer group and, more broadly, the role of the peer group. If the child is seen as a recipient of knowledge transmitted by the teacher, the peer group has a minimal role in learning. If, however, the child is seen as a constructor of knowledge, especially within a

socio-constructivist perspective, the role of the peer group becomes more important.

Vygotsky's (1978) definition of working in the zone of proximal development involves working on tasks that cannot be completed unaided but that can be completed with guidance. Forman and Cazden (1985) suggest, based on experimental work by Forman, that the process by which self control moves from the interpsychological to the intrapsychological level can occur in the context of collaboration with peers who are not necessarily "more capable" than each other. Thus, within a social constructivist perspective, collaboration with the peer group can be seen as having an important function in students' learning.

Peer collaboration involves students working together to solve tasks that they are not able to do independently. All students are working on the task at the same time rather than each member completing a component independently and then combining the product. However, the thinking load is distributed among all of the members (Brown and Palincsar, 1989) who share responsibility for defining the task goals and strategies (Forman, 1989).

In collaborative problem solving, students assume the roles of: 1) executive or doer, planning actions and solutions; 2) skeptic or critic, questioning premises or plans; 3) instructor or educator, explaining and summarizing; 4) record keeper, keeping track of what has occurred; 5) or conciliator, resolving conflicts and attempting to minimize stress. This distribution of roles is advantageous in two

ways (Brown & Palincsar, 1989). The cognitive load for each member is reduced, allowing them to participate in solving problems that they could not solve on their own. In addition, the students have the opportunity to observe others in their roles. All of the processes that a successful problem solver uses on her own in concert are modeled.

Work by Forman (Forman & Cazden, 1985) illustrates the role peer collaboration can play in learning. Forman observed nine year old student dyads attempt to solve a logical reasoning task involving chemical reactions and compared their performance to students working alone. She found that the students working in dyads outperformed students working alone. However, the dyad members did not show the same superior performance when posttested individually. The level of problem-solving that was attainable in collaboration exceeded the level attainable independently.

Conflict, the catalyst of conceptual change (Palincsar & Brown, 1989), is more likely in group rather than independent problem solving. Concurrently, students are more likely to become aware of their own viewpoints and the ways in which these may differ from others. They are called on to justify and elaborate their ideas as they try to reach group consensus. Providing elaborations has been found to be positively related to achievement (Webb, 1989). It may be particularly important for special education students. Cherkes-Julkowski, Gertner, and Norlander (1986) found that learning disabled students and slow

learners who gave extended elaborations in small groups had higher scores on strategy use on several memory tasks.

Overall, the peer group serves little function in instruction based on reductionist views of teaching and learning. However, within a social constructivist perspective, peer collaboration has an important role in learning. Working collaboratively, peers can complete tasks beyond the level of the individual members. Through this process, control and regulation of problem solving is made overt. Students become more aware of their own thinking as they are required to justify and elaborate on it. Likewise, they become more aware of conflict which can foster conceptual change.

In summary, the students' role can be one of knowledge recipient. In this role, the student is passive and has little control over what is learned or how it is learned. Alternatively, the students' role can be one of knowledge constructor. In this role, the student is seen as an active participant in the learning process, working collaboratively with the teacher and/or the peer group.

The six models of strategy instruction incorporate varying degrees of teacher and student control in the following areas: 1) definition of strategies; 2) provision of conditional knowledge; and 3) evaluation of strategies.

Definition of strategies refers to declarative and procedural knowledge about the strategies: what they are and how use them to understand text. The models reviewed all involve an initially high degree of teacher-direction in defining strategies. Teachers tell the

students which strategies will be learned and, in most cases, provide specific steps to follow in carrying them out.

Although the initial definition of the strategies is teacher-directed, the responsibility for continual definition differs across the models. In Direct Instruction, Cognitive Behavior Modification, and the Learning Strategies model, the teacher continually defines the strategies, explaining and demonstrating how to use them. In Reciprocal Teaching, the students develop procedural knowledge through using the strategies to understand the text. The focus is on the application of the strategies and even this is subsumed within comprehension. Students assume more and more responsibility for developing procedural knowledge through a focus on criterial knowledge (Bereiter, 1986). The teacher's focus in Direct Explanation becomes centered on the thought processes involved in employing strategies rather than on procedures. Definition of strategies remains rather teacher controlled but this is done in response to students' level of understanding, not based on their mastery of steps. The discussions in ISL focus on personal use of the strategies. Within these discussions, students begin to assume a role in strategy definition.

Provision of conditional knowledge is seen as essential for generalization (Brown, Bransford, Ferrara, Campionne, 1983; Paris, Lipson, & Wixon, 1983). Students need to fully understand the purposes for strategies to be able to apply them in new situations. Purposes can be set for students with little input from them. Poplin (1988a) argues that this interferes with generalization. In contrast, students

can set their own purposes, determining why the strategies are helpful. This scenario, in Poplin's argument, would maximally facilitate generalization. The models differ in the degree to which conditional knowledge is explicitly provided to the students as well as the extent of and manner in which they are involved in developing this knowledge.

Conditional knowledge is initially provided directly by the teacher in all of the models. As with strategy definition, there is a difference in the extent to which this remains teacher-controlled. In Direct Instruction and Cognitive Behavior Modification, the teachers retain control throughout instruction. In contrast, students play a more active part in determining the conditions under which the strategies are helpful in the Strategies Intervention Model, Reciprocal Teaching, Direct Explanation, and ISL. This is done explicitly in the Strategies Intervention Model and ISL. In Reciprocal Teaching, the development of conditional knowledge is more implicit as the strategies are being focused on in the context of reading text.

Evaluation of the strategies can be in terms of determining whether or not the procedures for carrying them out were followed or it can be in terms of determining whether or not using the strategies in context facilitated self-regulation. If the evaluation is in terms of procedures, the criteria tend to be rather stable (e.g., A good summary never contains unimportant information) and to have limited potential for facilitating flexible use of the strategies. In contrast, if evaluation is in terms of strategy utility, the criteria tend to be more flexible (e.g., That summary included just the main idea of that

story. That's all I need to tell Tom so he'll be able to follow along when the teacher reads Chapter 3).

The models differ in terms of the criteria used for evaluation. Generally, those focusing on procedures have goals of knowledge reproduction. They tend to involve a large degree of teacher input in evaluation. The teacher tells the students how to use the strategies, often presenting rules or heuristics, and then refers to these in evaluating whether or not the steps were carried out successfully. This is seen in Direct Instruction, Cognitive Behavior Modification, and the beginning phases of instruction in the Strategies Intervention Model.

When the goals of instruction are development of expertise in problem solving, the evaluation generally reflects a criterion of personal utility and, to some extent, includes student participation in evaluation. Student participation is evident in ISL, the later phases of the Strategies Intervention Model (when students report on the use of the strategies in the regular classrooms), and the discussions of Direct Explanation. The most context-embedded student control occurs in Reciprocal Teaching as the students are discussing the strategies in the context of discussing the content.

Tasks

Tasks are defined as "any activities associated with academic instruction that are engaged in by students, usually at the teacher's behest, for purposes of acquiring and/or using knowledge, skills, or

strategies" (Anderson, 1989, p.27). Tasks presented to students in instruction embodying a reductionistic conception of teaching and learning differ from those presented instruction embodying a social constructivist perspective in terms of: 1) their nature; 2) whether they remain intact or are presented in a hierarchically sequenced manner; 3) the context within which they are presented; and 4) the type of materials used. These differences can all be seen within the strategy instructional models.

The nature of tasks reflecting goals of knowledge reproduction tend to center directly on that: students are expected to reproduce the use of procedures that are clearly stated by the teacher. The tasks are generally unambiguous, embodying a clear sense of a correct and incorrect method of accomplishing them.

In contrast to unambiguous, clearly defined tasks, tasks reflecting goals of expertise tend to be more complex and more ambiguous, both in terms of how to approach them and notions of correct and incorrect responses or solutions. In approaching the tasks, students become involved in both defining and resolving problems (Anderson, 1989). The tasks often have multiple correct solutions. Errors, to be avoided in tasks reflecting goals of knowledge reproduction, are seen as fostering students' learning, enabling them to perceive incongruities between new information and existing schemata (Poplin, 1988b).

Reductionism focuses on presentation of tasks as series of steps to be mastered. This involves a careful task analysis in which what is

to be learned is hierarchically sequenced. It is possible, and perhaps too often the case, that students may focus on the steps, losing sight of their relationship to the whole. Proleptic challenges, utilized within a social constructivist context, focus on the intact task. Students are given the necessary support to enable them to carry out the task in its entirety. In the process, their attention can remain on the task itself rather than on component parts.

Critical to proleptic instruction is the creation and maintenance of a goal-directed context (Stone, 1989a). Tasks are presented within the context of real problems to be solved rather than as ends in themselves. Applied to strategy instruction, this would involve a focus on using the strategies in service of understanding text rather than a focus on mastery of procedures in a context divorced from their actual use. In approaches not utilizing proleptic instruction, the context of the tasks tend to be much more narrow, with the focus on the procedures of the task itself.

The materials used when tasks are broken into component steps are often divorced from the purpose of the intact task. For example, in strategy instruction presented in steps, the text may be isolated paragraphs, written especially to facilitate the use of a particular step. The level of the material may be lowered so the students can more easily use the strategy. The materials utilized within a goal-directed context are those in which the problem is embedded. If the goal of strategy instruction is to use the strategies as means of

regulating comprehension, then the materials would be challenging connected text.

Related to the issue of goal-embeddedness and particular to strategy instruction is the issue of whether the strategies are taught one at time or in concert. If the goal of strategy instruction is flexible and opportunistic control of reading, students need to be able to select from a range of strategies particular one(s) that are appropriate to given situations. To do this, they have to be able to compare the strategies. This may be facilitated by learning to use the strategies in concert. Palincsar (1986) compared the comprehension performance of students instructed in the four strategies of Reciprocal Teaching with that of students instructed in two of the strategies separately and then all four together. Those students working with all four strategies simultaneously made greater gains and made them more quickly.

Strategies within a reductionistic perspective tend to be focused on individually, in isolation from other strategies. There is little if any emphasis on comparing or evaluating the strategies in relation to the purpose for using them. If the strategies are taught in goal-embedded contexts, they are more likely to be focused on in concert.

There is a wide variance of tasks utilized within the six models with those in Direct Instruction and Reciprocal Teaching representing the widest degree of difference. Direct Instruction makes use of task analysis, presenting the strategies to students as a series of steps.

Emphasis is on mastery of the steps rather than the use of the strategies to solve real comprehension problems. Therefore, the strategies are highlighted as ends in themselves rather than as means. Steps are presented in an unambiguous manner with a clear sense of the correct and incorrect way of carrying them out. The materials tend to be contrived. Texts used are often sentence or paragraph length rather than approximations of those found in naturalistic reading situations.

The task presented to students in Reciprocal Teaching is using the strategies to regulate their comprehension of text. Through the teacher's scaffolding, the students use all of the strategies in their entirety rather than practicing steps. The tasks are ambiguous, with much less of a fixed notion of correct and incorrect ways to carry them out. Dialogues are carried out within the context of reading connected, often challenging texts.

In both Cognitive Behavior Modification and the Strategies Intervention Model, the tasks involve students practicing discrete steps of strategies to mastery. As in Direct Instruction, the focus in Cognitive Behavior Modification remains on following procedures for the strategies rather than the development of an increased understanding of the ways in which the strategies can be used to regulate reading comprehension. There is a heavy emphasis on procedures in the Strategies Intervention Model. However, in the generalization phase of the Strategies Intervention Model, emphasis shifts to usefulness. In both models, the tasks are unambiguous, incorporating a clear sense of correct and incorrect performance. The materials utilized in the

majority of the Cognitive Behavior Modification studies reviewed were artificial as they involved insertion of errors. Students ultimately use material from their content area classes within the Strategies Intervention Model but not until they have mastered the strategies with more simplified materials. Tasks presented through Direct Explanation involve actual reading situations. Focus is on the purpose of the strategies and the reasoning involved in using them rather than following procedures. Tasks are rather ambiguous. They are presented in goal-directed contexts involving materials students are using in their classrooms.

The tasks in ISL are also rather ambiguous as they incorporate the thinking processes involved in carrying out the strategies and emphasize personal adaptations of the strategies. The emphasis on conditional knowledge makes the tasks goal-directed.

Discourse

A final dimension on which the strategy instructional models can be compared is the nature of the discourse that occurs within them. The nature of discourse, or talk, in classrooms, can be seen along a continuum. Towards one end are interactions that are highly teacher controlled and predictable; towards the other end are interactions that are more dialogic, involving sharing of ideas. This type of discourse is less teacher controlled; there is a greater degree of student control and thus the discourse takes a somewhat less predictable

course. These two types of discourse can be seen as representing and reflecting differing conceptions of teaching and learning.

The most common form of classroom discourse is the three part sequence of: 1) teacher initiation; 2) student response; and 3) teacher evaluation. This sequence is referred to as IRE. The IRE pattern is the most apparent in recitation, or teacher led-lessons with the content and participation structure (who talks to whom and when) determined by the teacher (Cazden, 1988). In recitation, students offer responses to the teacher's questions; these responses are generally evaluated by the teacher in terms of their similarity to the expected response. Most often, the students are not asked to elaborate on their responses nor does the teacher use them to formulate her next statement (Bellack, 1966; Flanders, 1970). Talk proceeds between teacher and one student at a time, with little interchange among the students.

Teacher-led recitation can be seen as reflecting goals of knowledge reproduction prevalent in reductionistic views of teaching and learning. The teacher generally asks questions which have correct, predictable answers (Gallimore, Dalton, & Tharp, 1986) and evaluates the responses in those terms while the student's role is to identify the expected response. Little opportunity is provided for the student to develop problem-solving skills of question-asking, divergent or creative thinking (Morine-Dershimer, 1987).

Dialogue, or joint participation in problem solving, represents a quite different pattern of interaction between students and the teacher

than is seen in recitation. Dialogue is critical to the development of problem-solving ability within social constructivist theory (Vygotsky, 1978; Wertsch, 1980). Learners are seen as coming to solve problems by "...internal collaboration with (themselves)" (Vygotsky, cited in Wertsch, 1980, p. 153). This develops as the learner gradually internalizes problem solving learned through participation in social interactions with others. Dialogue between a more knowledgeable other and the learner is the means by which the learner can carry out an activity which she does not fully understand (Wertsch, 1980). The problem solving becomes internalized, moving from the interpsychological to the intrapsychological plane. As this process occurs, the student comes to understand the activity and to develop the ability to control her actions within it. Thus the student, through participation in dialogue with more knowledgeable others, is able to move upward in her zone of proximal development.

Within an instructional dialogue, the teacher mediates the students' understanding of the task by engaging in several different types of activities based on the students' needs. Palincsar and Brown (1989) have identified at least three broad categories of statements teachers make during dialogues. The first category is instructional/modeling statements in which thought processes used in carrying out a task can be shared. The second category is prompting statements in which students can be led and guided to carry out the task (e.g., "Why don't you ask us about ...") and the third category is

reinforcing statements (e.g., "Good for you, that was an important idea to clarify.").

Palincsar (1986) examined transcripts of first grade teachers engaged in dialogue with students as they used Reciprocal Teaching to discuss text that the teacher read orally to the group. She identified five features that appeared to distinguish dialogue among classrooms. The five features were: 1) the extent of teacher support of students' contributions at the idea rather than the word level; 2) the extent to which the teacher deftly used students' ideas and linked these to new knowledge; 3) the extent to which the dialogue had focus and direction; 4) the extent to which the point of the dialogue was presented explicitly to students and seemed explicit to the teacher; and 5) the way in which evaluative statements the teacher made changed the complexion of a student response from negative to constructive. Seen within all of these features is the teacher purposefully involving the students in sharing their ideas and then integrating and broadening these ideas rather than evaluating them in terms of right or wrong. Students in classrooms in which these features were prominent achieved a higher level of independence in using strategies within dialogues about texts than did students in classrooms in which these features were not as prominent. Students in the former classrooms also became more proficient in applying the strategies focused on as evidenced by their performance on a transfer test.

Dialogue can be distinguished from recitation in several ways. For one, the participation structure, or speaking rights, is more

undefined. The teacher has less control over whose turn it is to talk and discourse does not necessarily proceed in an IRE pattern. Students are more likely to interact with each other (Cazden, 1988) or to ask questions of the teacher. Also, a particular idea may be "on the floor" for a longer period.

As dialogue involves sharing of ideas, there is less of a sense of right and wrong than in more teacher controlled discourse. Evaluation is more in terms of asking for expansions, elaborations or justifications rather than a statement of correctness. Students may be more involved in evaluations of this type, both of their own and of others' contributions. Also, through sharing and discussing ideas, students are exposed to and participate in problem-solving to a greater extent than they are able to within recitation.

The only one of the six strategy instructional models in which dialogue is clearly prominent is Reciprocal Teaching. Direct Explanation focuses on the teacher's talk in context of the children's understanding of the use of the strategies; however, there is not as much of a focus on the nature of the dialogue. Similarly, in the literature on ISL, there is scant attention to student and teacher dialogue. While Cognitive Behavior Modification attends to Vygotsky's (1978) notion of internalization of cognitive control as speech moves from the inter to the intrapsychological plane, the focus is on learning and internalization of set procedures or steps. Thus the discourse is not dialogic but rather more teacher controlled and predictable. The Strategies Intervention Model does incorporate

students' sharing their classroom use of strategies which could take the form of a dialogue. The process by which the students learn the strategies is not dialogic, however. The nature of discourse in Direct Instruction also does not involve dialogue but rather is in the form of IRE.

In this section, the six models of strategy instruction have been considered in term of the conceptions of teaching and learning that are embedded within them. Strategy instruction of any form is not prevalent in instruction for poor readers (Swanson, 1989) but does occur. The models which are most prominent--Direct Instruction, Cognitive Behavior Modification, and the Learning Strategies Model--embody goals, teacher and student roles, and tasks that reflect a reductionistic perspective on teaching and learning. ISL and Direct Explanation reflect more of a social constructivist perspective, particularly in their goals. Of all six, Reciprocal Teaching seems to most reflect a social constructivist perspective. The students actively collaborate with the teacher as they learn to control their use of strategies in reading situations.

As discussed, the conceptions of teaching and learning as reflected in the goals, roles of teachers and students, and tasks can provide a basis for making comparisons among the models that are not possible from the studies that have been done to date. In addition, they can provide a way of conceptualizing new approaches. The model of strategy instruction in the study being proposed has been designed to reflect a social constructivist perspective. Its conception resulted

from a study (Palincsar, David, Winn, Synder, Stevens, 1989; Palinscar, David, Winn, Stevens, 1990, in press a, in press b) which differential outcomes of three approaches to strategy instruction incorporating differences in goals, participant roles, and tasks were compared. Many of the questions and issues raised in the comparative study have informed and guided the proposed study. In the following section, the Palincsar et al. study will be presented.

Differential Effects of Three Approaches to Strategy Instruction

In the Palincsar et al. (1990) study, the three instructional approaches, or conditions, represented a continuum with teacher control at one end and student control at the other. The three conditions were Direct Instruction, Collaborative Problem Solving, and Reciprocal Teaching.

The first condition, Direct Instruction, was based on the work of such investigators as Baumann (1984, 1986, 1988) and Gersten (Gersten et al., 1986). In this condition, teacher control was maximized. The teacher, following scripted lesson plans, explained what the strategies were and how they could be helpful, demonstrated their use, and presented explicit steps for the students to follow in carrying them out, making use of rules and heuristics. Students practiced the steps as directed by the teacher and received immediate feedback on their performance. Evaluation was in terms of the teacher leading the students to state whether or not the steps were carried out as directed

(e.g., "Did you leave out unimportant information in your summary?"). Students practiced the steps independently, through the use of worksheets.

Lessons were based on task analysis. The steps were presented in an unambiguous fashion, with a clear sense of correct and incorrect. Mastery criteria for individual students was utilized to determine whether a new step could be introduced or whether tasks already introduced needed to be further broken down. The flow of talk was from teacher to individual students in the form of recitation with little if any discussion among the students. The talk centered on correct or incorrect employment of the strategies rather than on the content or on the ways in which the use of the strategies was fostering comprehension of that content.

While Direct Instruction represented maximum teacher control, the second condition, Collaborative Problem Solving, represented maximum student control in all aspects of learning about the use of strategies to regulate reading. This condition was mainly informed by social constructivist theory with a focus on the active role of the students, through collaboration with peers. The students suggested strategies to use, tried to employ them as a group or in pairs, evaluated their helpfulness, and, in so doing, developed procedures for using the strategies. Poplin (1988b) argues that purposes and meaning of strategies must originate from the students rather than being externally imposed to facilitate generalization. Collaborative Problem Solving afforded maximum opportunity for this to occur. In addition,

it provided opportunity for procedural knowledge to develop in context of purposes for using the strategies.

As working collaboratively may have been a novel experience for the students, the initial activities focused on participation in group problem solving projects. First, the students constructed a picture of a creature, each adding a body part in turn. After completing the picture, the group described the creature and explained how the body parts would influence its behavior. In the next activity, the students completed a cloze activity, discussing various ideas for the missing words. As there was more than one acceptable response for each blank space, the children were given experience with an open-ended task and with the group collaboration processes needed to reach consensus.

The third activity was more directly focused on strategies. The students were given a purpose for a reading task and then two vignettes depicting different approaches to the task (e.g., one child copying every word of a chapter and one child asking herself questions when reading a chapter in a science text). The students voted on which approach was more helpful. They discussed their selections and were encouraged to reach consensus.

After the students experienced these group activities, strategies were introduced. The students were presented with the "Reading Robot" who had a problem: it could pronounce every word it encountered but could not understand anything it read. The students listed suggestions of activities the robot could engage in to alleviate this problem. These suggestions were put on a chart and labeled as strategies. The

concept of what a strategy is was explained to the students. Following that, the list was supplemented with other suggested strategies.

Following the robot activity, the students read the expository texts used in the other condition, a section at a time. Before reading each section, the students selected a strategy to use as a group or in pairs. They read the section, employed the strategy, and then evaluated its effectiveness. Periodically, pairs of students used the strategies and the results were compared in the group. Also, pairs of students tried different strategies for the same segment of text and the strategies were compared.

The teacher did not engage in any modeling. She initially observed what the students could do working collaboratively and unassisted, and then provided a series of prompts through further questioning and suggestions. Proleptic challenges were utilized: students were asked to carry out the strategies in their entirety. At no time were students asked to perform the tasks in isolation from connected text or in a series of steps. There was much more ambiguity within the tasks than in Direct Instruction as no firm procedures for ways to employ the strategies were presented. In addition, the teacher had only a marginal role in evaluating the use of the strategies so there was not a clear, external (and unambiguous) standard of, for example, a good summary or self-question. As the tasks involved students working collaboratively, there was more student-student dialogue and much less recitation than in the Direct Instruction condition.

The third condition, representing much more student control than Direct Instruction and more teacher control than Collaborative Problem Solving, was Reciprocal Teaching. The students received guided practice in applying the strategies as they and the teacher engaged in dialogues about the content of the text. The dialogues were guided by the use of summarizing, self-questioning, predicting, and clarifying. (See earlier section of this review for a more complete description of Reciprocal Teaching).

The teacher had a more active role in defining the strategies and modeling their use than in collaborative problem solving. She provided more support to the students as they attempted to use the strategies while reading and was more involved, through modeling and thinking aloud, in their evaluation. However, this role involved less Direct Explanation of the strategies and more emphasis on scaffolding students' attempts to use them in their entirety. In contrast to Direct Instruction, Reciprocal Teaching also involved more attention to students' understanding of the strategies' use than ability to carry out the procedural steps.

Although the students received more guidance than in Collaborative Problem Solving, they still assumed an active role in developing procedural and conditional knowledge about the strategies. As in Collaborative Problem Solving, the students learned how to use the strategies through trying them out while reading the text. The students were involved in evaluation of the strategies, and

consequently in their definition, as they added to the contributions of their peers about both content and strategies.

The strategies were presented holistically rather than as a series of steps to follow. As in Collaborative Problem Solving, the students were asked to use the strategies in context of reading connected text. Evaluation was in terms of the strategy's helpfulness in understanding the particular segment, making the tasks more ambiguous and less governed by absolute standards of correct and incorrect. Interactions between teacher and student took more the form of a dialogue than of a recitation as the focus was not on the students' provision of predetermined responses. Students discussed the meaning of the text, as well as ways to employ the strategies, with each other.

The study was carried out in two third grade classrooms (N=41). Based on their performance on criterion referenced comprehension tests and strategy measures, students in each class were placed in triads. One student in each triad was randomly assigned to one of the three instructional conditions, resulting in two groups of heterogenous students experiencing each instructional condition. The investigators were assigned to instructional conditions such that each condition was taught by more than one investigator. Instruction occurred for 30 minutes three times a week for a total of 25 sessions. The strategies covered in all three conditions were summarizing, self-questioning, and predicting (although the latter was only covered briefly at the end of the instructional period in Direct Instruction). The same expository texts were used in all instructional groups.

Students were given the following measures on a pre and posttest basis: 1) the reading comprehension subtest of the Metropolitan Achievement Test; 2) criterion-referenced measures of comprehension; 3) metacognitive interviews about their conceptions of reading, characterization of skillful reading, feelings of self-competence, awareness of text features and task demands, and strategy knowledge; 4) measures of strategy use; and 5) a "think aloud" assessing on-line processing of ambiguous text.

The results indicated that there were not significant differences across the six groups on any of the pretest measures. Instruction had a significant positive effect for the criterion-referenced, metacognitive, strategy, and standardized measures but not for the Think-Aloud, across the three instructional conditions. Further analyses examining whether one of the three instructional conditions was more effective than the other two, indicated that only one measure was sensitive to differential outcomes. For these heterogenous groups of students, the Collaborative Problem Solving condition was the most effective, as determined by changes on the criterion-referenced measure. When enquiring about differential effects according to the entering achievement levels of the students, the analyses indicated that, overall, lower achieving students showed greater gains from instruction than higher achieving students on all but the metacognitive measure, regardless of the instructional condition. Finally, when asking about main effects for instructional condition when the sample is divided inot lowest and highest achieving thirds, the analyses

indicated that, for the strategy measure alone, Direct Instruction was not as effective as Reciprocal Teaching nor Collaborative Problem Solving for high achieving students. There were no significant differences among the instructional conditions for low-achieving students.

The findings suggest that teacher Direct Instruction may not be any more effective in fostering self-regulation than more student controlled approaches. This applies to all readers, including those whose achievement is low and for whom a Direct Instruction approach is often recommended. The focus on teacher-directed procedural knowledge and mastery of steps, so often dominant in special education and remedial education literature, did not seem any more effective than more holistic, constructivist approaches in facilitating the use of strategies to aid reading.

A number of issues were raised as the research team reflected on the teaching/learning process in each of the three conditions. These issues revolve around: 1) ease of implementation; 2) assessment; 3) the role of heterogeneity; and 4) the focus of the discussions. An examination of these issues highlights critical differences among the three conditions, differences that may help us understand the dynamics of each one.

Issue One: Ease of Implementation

Ease of implementation refers to the on-going decisions the teacher must make while conducting instruction. The fewer on-going

decisions, the easier instruction is to implement. Of the three conditions, Direct Instruction had the greatest degree of ease of implementation. The lessons were scripted, with embedded guidelines for determining correct or incorrect student performance and procedures for error correction. Attention was entirely on students' mastery of discrete steps of the strategies.

The degree of ease of implementation was far less in Reciprocal Teaching. Scaffolded instruction cannot be planned in advance and requires that the teacher attend to multiple variables. In determining the level of support required by each child's response, the teacher needs to consider characteristics of the learner and the task in relation to the particular text. Her focus is much more complex than the teacher's focus in Direct Instruction. In addition, her decisions must be made during the course of instruction rather than planned in advance.

Collaborative Problem Solving was, in many respects, the most difficult condition to implement. All of the complexities involved in decision making within Reciprocal Teaching were evident in this condition. In addition, the structure and tasks were the most unfamiliar to the students. There was little if any teacher instruction and, often, the group discussions did not reach consensus. Tasks were generally highly ambiguous. The participation structure and, as will be discussed below, the role of the teacher, was continually being defined and, as such, created a certain level of confusion both in the teachers and students.

Issue Two: Assessment

The issue of assessment is twofold, one aspect being the level at which assessment was possible and the second the focus of assessment. Assessment on an individual level was built into the Direct Instruction condition but was more elusive in the other two, especially Collaborative Problem Solving. In Direct Instruction, individual students were assessed on their performance on the independent worksheets. Based on this assessment, decisions were made about the course of instruction for the group. This form of assessment resulted in a clear record of students' progress toward the goals of strategy use and specific data indicating points at which students were having difficulty.

The dialogues of Reciprocal Teaching provided the teachers with opportunities to assess each students' level of competence in using the strategies. This type of assessment is more complex than in Direct Instruction as the students are being asked to use the strategies in a way in which it is expected that they will need assistance. Defining the level of assistance needed often requires much probing on the teacher's part.

Collaborative Problem Solving did not involve the use of structured dialogues and thus did not provide the same opportunity as Reciprocal Teaching for individual assessment. The focus was on the group rather than individual students and there was no provision for directing each member to participate. Some students took little part in the discussions making it difficult, if not impossible, to determine

their level of understanding or of competence in strategy use. Planning decisions were made on the basis of the instructor's "sense" of the group's progress, a basis which was, at times, uncomfortably vague.

The focus of assessment, or what was being assessed, was more constrained in Direct Instruction than in the other two conditions. Throughout the lessons, emphasis was on mastery of the strategies. Students' performance in carrying out the component steps was assessed. Both in Reciprocal Teaching and Collaborative Problem Solving, the students used the strategies to understand the text. The discussions provided the teacher the opportunity to assess strategy use in service of content and, concurrently, comprehension of that content.

The nature of Collaborative Problem Solving led to one other area of assessment: students' conceptions about reading. The students' generation and evaluation of strategies provided particularly rich opportunities to assess their standards for good reading and to examine naive conceptions they may have held. Palincsar et al. provide the example of students suggesting strategies of memorizing every word and picturing it all in your head.

Issue Three: Heterogeneity of Group Members

Heterogeneity of group members was more easily accommodated in the Reciprocal Teaching and Collaborative Problem Solving groups but was more problematic in Direct Instruction. In Reciprocal Teaching and Collaborative Problem Solving, incorporation of students of varying

abilities was accomplished through the format of the instruction. The structure of the discussions in Reciprocal Teaching involved each student participating at his own capability with teacher assistance adjusted accordingly. Thus students who more quickly became competent in the strategies were able to practice using them independently while those who needed more teacher assistance could receive it. The absence of absolute standards for correct and incorrect responses and the presentation of use of the strategies as a problem-solving task in the Collaborative Problem Solving condition seemed to foster participation of students of all levels. In this condition, as in Reciprocal Teaching, the structure was adaptable to students of varying abilities.

Both in Reciprocal Teaching and Collaborative Problem Solving, the students were challenged to provide backings and justifications for their positions. This was particularly prominent when the students evaluated the strategies in the Collaborative Problem Solving groups. Webb (1989) has found a positive correlation between providing elaborations and achievement. The heterogeneous nature of the Reciprocal Teaching and Collaborative Problem Solving groups afforded the higher level students opportunities to elaborate and justify their statements. Concurrently, it provided the lower achieving students opportunity to observe others doing this as well as to participate themselves.

The structure of Direct Instruction was not as adaptable to heterogenous groups of students. The group worked on the strategies in sequential steps, moving to a higher level only when students had met

mastery criteria for the prerequisites. There were no provisions for students who mastered the steps before other group members did. These students did not receive the opportunities to work on higher level skills, nor were they given the opportunity to develop or defend their particular personal uses of the strategies, as occurred in the other two groups. Rather, these students had to practice steps they had already mastered, or practice lower level steps if the decision was made to further break down the task, until the other group members reached mastery criteria.

Issue Four: Focus of the Discussion

The issue of focus of the discussion refers to tension that developed between an emphasis on strategy instruction and one on content instruction. The discussions in Direct Instruction were entirely focused on the strategies. At times, the students made comments about the content but were redirected to focus on the strategies. Within this format, it was difficult for the students to understand the value of the strategies in helping them understand and learn the content.

In the Collaborative Problem Solving group, the focus was also on the strategies. This was due, it appeared, to the students' struggling to identify them. More teacher assistance in defining the strategies when the level of confusion became too high may have allowed the students' attention to be focused more on content and the ways in which use of the strategies facilitate understanding and learning.

Reciprocal Teaching involved a greater degree of content focus than the other two conditions, giving the students the opportunity to see the strategies as vehicles for understanding content. The strategies were not presented as ends in themselves, as they tended to be in Direct Instruction. They also were defined to a degree which fostered their use as means to the end goal of comprehension and learning from text.

Issue Five: Defining the Role of the Teacher

One further issue which pertained mainly to Collaborative Problem Solving was defining the role of the teacher. The notion of gradual transfer of responsibility, prominent in Reciprocal Teaching and present in the guided and independent phases of Direct Instruction, was not as pronounced in Collaborative Problem Solving. Edwards and Mercer (1987) discuss the tension between a view of education as "drawing out" children's potential and ability while at the same time wanting to introduce them to the culture of knowledge, thought, and practice to which the teacher belongs. Decisions about when to provide explanations, prompt the students, or model were complicated by the goal of maximum student control in defining, selecting, and evaluating the strategies.

An example of this dilemma occurred in one lesson in which the students were discussing which of two summaries was the most effective. The majority stated that the longer, more detailed summary was "best" because it gave more information. Several other students argued for

the shorter, more concise summary. The students could not reach consensus and turned to the teacher to tell them her choice. The decision made by the teacher (who happened to be me) was to let the debate continue and hope that the students would come to understand on their own that the more detailed summary was the least helpful. But what if they did not come to this conclusion, or what if they only did after much debate? Would the time be well-spent? In this instance, the answers are unclear. It does seem that teacher mediation may have been a better choice.

Upon reflection, the research team found that all three conditions had strong features, or features which seemed to facilitate teaching and learning of strategic reading knowledge and behaviors. The main strength of Direct Instruction, it was felt, was the opportunity for assessing individual students. Although assessment only focused on procedural knowledge in Direct Instruction, the process provided the teacher with a precise indication of each child's progress in a form that was easily communicated. This was the only area in which Direct Instruction seemed to be advantageous in comparison to the other conditions.

The focus on criterial knowledge, the use of proleptic challenges, and the opportunity for peer collaboration were felt to be the strongest features on both Reciprocal Teaching and Collaborative Problem Solving. In both conditions, the students learned about the strategies through using them in context of understanding text. This focus on learning procedural knowledge through focusing on criterial

knowledge has been advocated in the literature (e.g., Bereiter, 1986). The higher performance of the students in these conditions on the comprehension measures suggests that the students were able to use the strategies purposefully. The use of proleptic challenges enabled the students to immediately assume as much responsibility for task completion as possible. At the same time, the teacher was able to determine what the students could do unassisted.

In both conditions, the students collaborated in solving real problems. The collaboration provided opportunities for students to formulate and deliver backings and justifications of their positions along with the opportunities to observe that process in others.

Two strong features particular to Reciprocal Teaching were the role of the teacher and the structure of the dialogues. The role of the teacher in Reciprocal Teaching is one which, through the use of scaffolded instruction, allows her to provide the necessary support to enable each child to successfully carry out the strategy in context. Instruction is not as teacher-controlled as in Direct Instruction. However, there were opportunities to provide support in collaboration with the students. These opportunties were not present, to the same degree, in the Collaborative Problem Solving condition.

The structure of the dialogues in Reciprocal Teaching facilitated assessment of each student. Within the structure, each group member was able to demonstrate her level of competence in using the strategies. In addition, she was able to demonstrate her understanding of (or confusion about) the content. The structure provided the

teacher with an opportunity to focus on each student in determining the level of support needed to use the strategies in context of the particular type of text being read.

The strong feature of Collaborative Problem Solving was the level of student control in defining and evaluating the strategies. The students suggested the strategies rather than the teacher defining them. In addition, they took responsibility for using and evaluating them, learning more about their use through evaluation. Because they selected the strategies, they were setting the purposes for using them and thus facilitating generalization (Poplin, 1988b). In evaluating the strategies, they had to elaborate and justify their positions, activities which, it has been argued (Cherkes-Julkowski, Gertner, & Norlander, 1986; Webb, 1989) facilitate learning for normally achieving as well as special education students.

In conceptualizing Mediated Collaborative Problem Solving, the model of instruction that is the focus of this study, an attempt was made to address many of the issues raised in the Palincsar et al. study. In addition, an attempt was made to capitalize on the knowledge gained about the features of instruction which seemed to show the greatest potential for facilitating self-regulation. Following is a description of the model of instruction outilized in this study.

Description of Mediated Collaborative Problem Solving

As discussed in the last chapter, the prevailing instructional models in special education are informed by reductionistic conceptions

of teaching and learning (Poplin, 1988a). This is true of strategy instruction although, as noted by Swanson (1984), very little strategy instruction of any kind is occurring. The Direct Instruction model utilized in the Palincsar et al. (in press, 1989, 1990), an approach grounded in reductionist principles, was found to be no more effective than the models grounded in holism and constructivsm (Reciprocal Teaching and Collaborative Problem Solving) in promoting students' development of strategic knowledge and behaviors, as well as increased reading comprehension. The calls for alternatives to reductionistic instruction in special education (Gavelek & Palincsar, 1988; Heshusius, 1989; Poplin, 1988a, 1988b; Stone, 1989a, 1989b) received support from the Palincsar et al. study. Although the student participants in that study were in a regular third grade class, some of them were reading below grade level. The low achieving students, as well as the higher achieving ones, made progress working within all three models. In this study, another model of strategy instruction is explored. The model focused on in this study, Mediated Collaborative Problem Solving (MCPS), was informed by social constructivism. It was designed to incorporate what were felt to be the strongest features of Collaborative Problem Solving and Reciprocal Teaching. The study focused on both the implementation of and student outcomes associated with MCPS.

Following is a description of the features of MCPS. A more detailed desciption of the instruction is provided in Chapter Three.

The features common to both Collaborative Problem Solving (CPS) and Reciprocal Teaching (RT) that were incorporated into MCPS were the use of proleptic challenges, focus on criterial knowledge, and opportunities for the students to collaborate. In MCPS, the students were challenged to identify, define, and evaluate strategies to use to understand and remember connected text. Working in a group with the teacher, they suggested, discussed, and utilized a variety of strategies. As in RT and CPS, the students learned about strategies through participation in dialogues involving discussion and use of the strategies. This participation was seen as essential for two reasons: 1) it would enable them to develop a shared understanding of the task; and 2) it would enable the teacher to assess their understanding and calibrate her level of support accordingly.

Another feature of MCPS that was present in RT and CPS was the focus on strategies in purposeful contexts. All discussions occurred while the students were using the strategies to understand text they were reading or while focusing on ways in which the strategies could be used to meet certain goals (e.g., to prepare for a test). This feature was incorporated into the model as it was felt that discussions of using the strategies in these contexts would lead to development of procedural knowledge that could be applied flexibly, based on the goals of the task.

In addition to these features, MCPS incorporated the high degree of student control found in CPS. Students had much opportunity to assume responsibility for identification, definition, and evaluation of

strategies. This feature was designed to foster their ownership of strategy use as well as to foster their engagement in problem solving discussions in which they were called on to clarify and elaborate on their positions.

Along with the opportunity for maximum student control, MCPS incorporated the teacher scaffolding and structured dialogues utilized in RT. The teacher's role involved providing proleptic challenges to the students, asking them to carry out tasks unaided, as occurred in CPS. However, to a greater degree than in this model, she was to scaffold the students' talking about and utilizing the strategies through modeling, questioning, and providing specific feedback. Her role as a collaborator was much stronger than it was in CPS. MCPS was designed so several phases included students' taking turns selecting and utilizing strategies while reading the stories. This kind of structure, utilized in RT, required all students to participate, thus giving them the opportunity to practice the reasoning and problem solving it was hoped they would internalize.

MCPS was conceptualized as a new model of strategy instruction that would address the issues of assessment, role of the teacher, and (to some extent) ease of implementation that were raised in the Palincsar et al. study. The issue of level of assessment was addressed by both the provision of teacher's scaffolding and inclusion of all students in the dialogues. Through scaffolding, the teacher could follow the principles of dynamic assessment (Feuerstein, 1979; Palincsar, Brown, & Campionne, 1989; Palincsar & Winn, 1990),

determining what the students could do on their own and with gradually increasing levels of support. Through the structure of the dialogues, she had the opportunity to assess each student's understanding of the strategies and proficiency in using them. The issue of focus of assessment was addressed by maintaining the types of discussions held within CPS in which the students had the opportunity to provide information about their knowledge about and application of strategies as well as their conceptions and misconceptions about strategies and their ideas about the reading process.

Regarding the issue of the role of the teacher, MCPS was designed to lessen the degree of tension about how to participate in the discussions that was present in CPS. Her role involved more scaffolding of the students' understanding of tasks in the context of maintaining a high degree of student control. It was felt that, through purposefully engaging in more scaffolding, she would not experience the degree of confusion about engaging in and guiding collaboration that was experienced in Collaborative Problem Solving.

The issue of ease of instruction was addressed to some degree in developing MCPS. The very nature of the model, it was realized, would still involve many "on the spot" decisions and the tension associated with those. However, it was hoped that, with a clearer role of the teacher as well as opportunities for individual assessment, the instruction would become more manageable.

MCPS involved seven phases of instruction, described in detail in the next chapter. The initial phase involved focus on working together

as a group to solve non-reading and reading problems that had multiple approaches. In the second phase, the students and teacher worked together to jointly identify strategies and to focus on evaluating their effectiveness. Phase Three and Four involved using selected strategies while reading connected expository text. In Phase Five, the students made a video to share their use of strategies. In this and the next phase, they also continued to use strategies in the context of reading connected text. Phase Seven was a review.

In sum, MCPS was a model of instruction for self-regulation in reading based on the tenets of social constructivism. The model was designed to involve tasks that proleptically challenged the students to work together to identify, define, and evaluate strategies to control their reading. In her role as mediator, the teacher was to ascertain what the students could accomplish independently and then provide the level of support necessary for them to use and evaluate the strategies. The model involved a high level of student control in selecting strategies and evaluating them through collaboration with the teacher and their peers. All activities were goal-embedded.

Research Questions

The first two research questions focus on implementation and involve the ways in which MCPS addressed several of the issues raised in the Palincsar et al. study.

Question #1

At what level was assessment possible in Mediated Collaborative Problem Solving and what areas were open to assessment?

Especially when working with heterogenous groups, it is critical for the teacher to be able to assess each student's understanding of the instructional tasks as well as her proficiency in carrying them out. In the Palincsar et al. (in press, 1990, 1989) study, assessment on the individual level was possible within the structure of Direct Instruction (DI) as well as RT. This occurred during independent practice of DI and as each student served as discussion leader in RT. In contrast, assessment occurred mainly on a group level within CPS. To increase the possibility of assessment on the individual level, the structured dialogues from RT were incorporated into MCPS.

The focus of assessment was limited to the student's procedural knowledge within DI while, within the other two models, the focus was broader. In RT, the students' procedural as well as conditional knowledge about strategies were open to assessment. These areas as well as the students' conceptions and misconceptions about strategies and the reading process could be assessed in CPS. MCPS was designed to maintain the wide focus of assessment available within CPS while also facilitating this assessment on an individual as well as group level. This research question addressed both the level as well as focus of assessment possible during instruction.

Question #2

What factors mediated the researcher/teacher's ability to provide scaffolded instruction within the dialogues of Mediated Collaborative Problem Solving?

As discussed in Chapter One, the teacher's role was rather undefined in CPS. Student control was tantamount to the model; for the most part, the teacher participated in the discussions mainly through asking questions. In MCPS, the teacher's role was strengthened; she was to provide support through scaffolded instruction as was done in RT. Decisions about how to scaffold in the context of a dialogue must be made based on the students' contributions; thus these decisions are on-going throughout the course of instruction. It was expected that the provision of scaffolded instruction would make the teacher's role clearer and at least somewhat increase the ease of instruction. This question examines these issues by focusing on the researcher/teacher's ability to scaffold within MCPS.

The next four questions examined in this study focused on the students' knowledge about and competence in using strategies, as well as their ideas about reading and comprehension performance, both prior to and following participation in MCPS.

Question #3

What was the nature of the students' declarative and conditional knowledge about strategies before participation in Mediated Collaborative Problem Solving and what kinds of changes occurred in this knowledge over the course of instruction?

Although students may master procedural knowledge of strategies, they may not be able to apply them flexibly and opportunistically. MCPS was designed to emphasize the variety of strategies available for monitoring and regulating reading. It was also designed to focus on

strategy utility, and, in so doing, to foster students' ability to select strategies that can be effective in meeting task demands. It was expected that the participants, after instruction, would show knowledge of a wider range of strategies, would be more able to elaborate on the strategies they identified, and would show increased knowledge of flexible strategy use.

Question #4

What was the students' level of proficiency in summarizing, question-asking, and predicting prior to participation in Mediated Collaborative Problem Solving and what kinds of changes in their use of these strategies occurred over the course of instruction?

To successfully use strategies to regulate their reading, students must develop a certain level of competence in employing them. For example, the questions that they ask themselves about the text should focus on main ideas rather than details. Likewise, their summaries, to be helpful, should highlight important information rather than unnecessary details. It was expected that, through discussions of the usefulness of the strategies, the students would develop criteria for them and that the way they employed these strategies would reflect this criteria.

Question #5

What was the nature of the students' concepts about reading before participation in Mediated Collaborative Problem Solving and what kinds of changes occurred in these concepts over the course of instruction?

As discussed in the review of the literature, poor readers have been found to have narrow and rather inflexible definitions of the nature of reading. Their conception of reading typically focuses on a goal of decoding rather than meaning-seeking one. In addition, it has been found that they engage in little monitoring of their reading performance.

It was expected that the tasks and discussions in MCPS would lead to increased awareness of reading as a process of constructing meaning as well as to increased knowledge about the role of self-regulation.

Question #6

What was the students' level of performance in comprehension prior to participation in Mediated Collaborative Problem Solving and how did this level change over the course of instruction?

Both in classrooms and on standardized tests, students' comprehension is typically assessed through their responses to comprehension questions. Increased metacognitive knowledge about reading and use of strategies to self-regulate are not ends in themselves but rather means to comprehension and learning. It was expected that, as students developed more control of their reading, they would become more able to comprehend and learn from text and that this would be reflected in their responses to comprehension questions.

CHAPTER TWO: METHODS

Participants

Twelve students, nine females and three males, participated in the study. All of these students attended the same elementary school, one of four in a small midwestern town. The school population, and that of the town itself, is of average socioeconomic status.

In January, the resource teacher in the school was approached about her interest in becoming involved in the study. Both the teacher and the school principal expressed interest in the project and a willingness to identify students for participation. Subsequently, the researcher met with the resource teacher, the teacher of the self-contained Educable Mentally Handicapped (EMH) class, and the school principal to discuss details of the study. After this meeting, the researcher described the characteristics of the students she hoped could be included in the study. The resource teacher and the principal worked together to identify students meeting these criteria and the resource teacher then contacted all of the parents and obtained verbal permission to include their children in the study. Written permission was obtained from all of the students' parents for their children's participation in the study and, later in the study, for the investigator to examine the students' school records (CA-60 files). See Appendix A for Letters of Permission.

Student selection resulted in twelve white student participants, nine females and three males (See Table 1 for identifying information about these students). In all, the students were from six different

classrooms although three attended the resource room together for reading. Four of them were third graders, seven were fourth graders, and one was in a self-contained special education classroom. With the exception of the student in the self-contained classroom, the students seemed to know each other even though they were not in the same classrooms. Carol, a fourth grader, and Teddy, a third grader, were sister and brother.

The majority of the students was experiencing reading difficulties and was receiving either special education services (resource or self-contained classroom) or enrolled in the school's Chapter One reading program. Three of the fourth graders and the student in the self-contained classroom were classified as Learning Disabled (LD) using the Michigan State Criteria. In Michigan, a student is classified as having a learning disability if he or she has:

> a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which may manifest itself in an imperfect ability to listen, think, speak, read, write, spell, or do math calculations. (Michigan State Board of Education, 1986, p.11)

and is identified by a multidisciplinary team to have a severe discrepancy in one or more of the following areas: a) oral expression; b) listening comprehension; c) written expression; d) basic reading skills; e) reading comprehension; f) math reasoning; and g) math calculations. Three of these four students received resource room reading support which supplanted their regular classroom reading program. Two of the third grade students also received resource room support for reading, one who was classified as a student who was Speech and Language Impaired, and the other who was classified as a student

who was Physically and Otherwise Health Impaired (POHI). The resource support for these two students supplemented their regular classroom reading program.

One of the third and two of the fourth graders were enrolled in the school's Chapter One reading program. To be eligible for this program, the student's percentile ranks on the Total Reading Section of the California Achievement Test (CA) must be below 50. In addition, they must be referred by their classroom teachers. The Chapter One reading classes were supplementary to the students' regular classroom reading program.

The remaining three students (one third grader and two fourth graders) were normally achieving and received all of their instruction in regular classrooms. The school utilized the Joplin plan for reading, in which students are grouped by ability across classrooms and grades for the reading period.

IQ data, based on scores on the WISC-R administered within the last two years, were available for all of the students receiving special education services (in one case, only range {i.e., Average, borderline} rather than exact scores were given) and for two of the students in the Chapter One reading program. The range of Verbal IQ scores was 70 to 123 while the range of Performance IQ scores was 70 to 114. Full Scale IQ scores ranged from 72-121.

Ten of the students had been given the California Achievement Tests (CAT) in April, 1989. The percentile rank (National norms) on the reading comprehension subtest for the students in the resource program (n=4, one student absent for testing) ranged from 9 to 29. For

students in the Chapter One reading program (n=3), the percentile rank range was 1 to 23. The range of the normally achieving students' scores (n=3) was 59 to 90.

The study involved a heterogenous group of students for two reasons. First, the growing heterogeneity of classrooms (Reynolds, 1989; Reynolds, Wang, & Walberg, 1987; Will, 1986) brought about by changing demographics and the proposed reintegration of special needs students into the mainstream, indicates that teachers will be called on to provide instruction to students with a wide range of reading levels. Examining instruction in the context of only low performing students may be unrealistic in terms of applicability to future classroom situations. Second, the instruction was designed to provide opportunities for the more advanced students to provide elaborations and backings for their positions. The lower achieving students had the opportunity to observe the others model means of justifying their arguments. Third, the model was designed to allow each student to participate at her own level and thus to incorporate a range of abilities.

After the assessment measures were administered, the students were placed in dyads based on: 1) their performance on criterion-referenced comprehension measures (See Dependent Measures); 2) a global scoring of their performance on the Strategy Measure (See Dependent Measures); 3) their 1989 CAT grade equivalents; 4) whether or not they were in special education or Chapter One programs; and 5) for the normally achieving students, their grade placement. Each dyad was composed of the two children who were the most alike in all of these areas.

The students in each dyad were assigned to one of two instructional groups (n=6). Assignment was initially done randomly; due to scheduling problems, some of the group assignments were changed. The necessary switches were carried out within the dyads.

Table I contains the following information about the students in each of the three groups: class placement; classification; IQ data (if available); CAT reading comprehension national percentile ranks; and decoding (words per minute and errors).

Dependent Measures

Following is a description of all dependent measures. (See Appendix B for samples.)

Pre and Posttest

Decoding

This measure was primarily administered to determine the extent to which reading difficulty may have been due to decoding problems. In addition, it was used to determine whether the texts used during the intervention would be read silently or orally (read-along). Decoding performance was determined by having the students read aloud the second/third grade level passages used to assess comprehension (see below). This assessment was waived with some of the fourth graders known to be proficient readers. It was also carried out with the fourth grade level passages for several of the students who were tested on that level.

Table 1

Student Participants

	Grade	Clsf.	IQ: FS	IQ: V	IQ: P	Reading Comp. NP	Decoding WPM	Decoding Error
SE								
Anita	4	LD	105	108	100	21	89	5
Susan	4	LD	88	100	80	9	79	3
Alicia	3	SP/L	72	70	78	11	72	2
Julia	SC	LD	85	82	90	NA	44	6
Sandra	4	LD	AV	HiAV	AV	29	94	5
Sharon	3	POHI	80	92	70	NA	80	1
ChI								
Billy	4		78	87	71	23	130	0
David	3		121	123	114	1	86	3
Karen	4					23	64	1*
NA								
Kate	4					90	>80	0
Carol	4					90	145	2*
Teddy	3					59	>80	2*

*Fourth grade level passage

The criterion set for silent reading of the texts used in the intervention was all students achieving a decoding rate of 80 words correct with a maximum of two words incorrect per minute (Lovitt & Hansen, 1976). This criterion was not reached so the text was used as a read-along, read orally by the students and the investigator.

Criterion-referenced Assessment

Students silently read a 350-400 word expository selection and answered ten comprehension questions without access to the text. These ten questions included one question focusing on the gist of the passage as well as one question in which the students were asked to apply information from the passage to a novel situation or problem. The remaining questions were a balance of text explicit (answer directly from text); text implicit (answer obtained from information across sentences), and script implicit (answer from background knowledge) as defined by Pearson and Johnson (1978).

The passages used initially in this assessment were written on a second-third grade level, as determined by the Fry Readability scale (Fry, 1977). In general, the following criteria were used to determine appropriate passage levels for each student. Those students with a score of greater than 45% on the comprehension measure were given a somewhat longer assessment passage written on a fourth grade level. Again, they were instructed to read the passages and to answer ten comprehension questions without access to the texts. If their score was less than 50% correct on this passage, they were given another

passage on that level. If their score was greater than 50% correct, they were given two passages written on the fifth grade level. Students with scores between 20% and 40% on the original second-third grade level read a second passage on that level and answered comprehension questions. Those with scores less than 20% were given listening comprehension assessments. The third grade passages were read to them and they responded to the questions orally.

The students' performance prior to instruction, along with their decoding correct and incorrect rates, were used to determine the most appropriate level for posttesting and for on-going criterion-referenced comprehension assessments. Students whose scores on particular level passages showed much discrepancy (e.g. 60% and 10% correct) were given extra passages on that level.

Karen's decoding performance was similar on the third and fourth grade levels. Her performance on the third grade level passages was 65% correct and 30% correct. On the fourth grade level, it was 50% and 30% correct. She was given two passages on both levels following instruction.

Administration of the passages was counterbalanced prior to and following instruction. On the third grade level, however, two new selections were added for the posttest as several of the students had read or listened to all of the stories prior to instruction. In total, nine different passages were administered prior to and following instruction, five on the fourth grade level, and four passages on the fifth grade level. Appendix B includes sample criterion-referenced measures on each of the three levels.

Metacognitive Interviews: Concept of Reading and Strategy Knowledge

Students' metacognitive knowledge about reading was assessed with the use of two open-ended interviews. In these interviews, the students responded orally to questions about their conceptions of reading, reading behavior, and sensitivity to task and text variables. These interviews are both adaptations of the metacognitive interviews used in the Palincsar et al. (1989, 1990, in press a, in press b) study.

The first interview focused on the students' conception of reading. Specifically, the interview addressed whether the students' view reading as more of a decoding or a meaning-seeking process through questions about what reading is, how they know if someone is a good reader, how they would teach a younger student to read, how reading is thinking, and how difficult reading is for them.

The second interview assessed students' sensitivity to features of texts and to demands of different tasks. In addition, it assessed students' knowledge and use of strategies to regulate their reading. The students were given a selection from a science book and asked to describe how they would prepare to answer questions on this text before, during, and after reading it. In addition, they were asked to describe the functions of such features as bold print and headings. To further measure sensitivity to varying task demands, students were asked to describe: 1) if and how they would read a comic and a science book differently; 2) if and how different levels of prior knowledge would affect their reading of a science selection; and 3) how they

would prepare for a test when they had limited study time. (Each interview protocol is included in Appendix B.)

Think-Aloud

While metacognitive interviews focus on past performance or hypothetical situations, think-alouds focus on concurrent processing (Garner, 1987). Students pause at various points while performing a task and report what they are thinking. This method has been used to study on-line processing in reading with students as young as third grade through college age (Alvermann, 1984; Lytle, 1985; Palincsar et al., 1989, 1990, in press a, in press b).

Students were given one of two 250 word passages (counterbalanced for pre and posttest) to read and were asked to stop at the end of each sentence and report what they were thinking while reading that sentence. "Thinking aloud" was first demonstrated by the investigator using the two tasks of putting a series of pictures in order and reading a short story. Following this, the students were asked to retell the story. The Think-Aloud passages are included in Appendix B.

Strategy Use

Students' competence in summarizing, self-questioning, predicting, and clarifying was directly assessed using two 250-300 word passages from the Palincsar et al. (1989, 1990, in press a, in press b) study. These passages, "The Story of Bread Baking" and "The Story of Car Manufacturing," are comparable in terms of difficulty, conceptual

density, type of information presented, format, and length. The last paragraph in each passage was deleted. Before reading the passages, students were given the title and asked to make predictions about what they thought they would be reading about. After reading the passages, they were asked to summarize it and then develop 10 questions that a teacher might ask to check students' understanding of the passage. Following this, the students were asked to write an ending to the passage. The passages were available to the students except when writing their predictions based on the title. The passages and directions used in this measure are included in Appendix B.

During the Instructional Phases

Comprehension

Five times during the study, the students in the instructional groups were given a comprehension assessment passage to read and ten questions to answer from recall. These passages were comparable to the ones used in the pre- and posttesting and, like the others, had been extensively fieldtested. The passage level and mode of response (written vs. oral) for each student was determined by his/her performance with the initial passages. The students' performance was shared with them.

Affective/Motivational

Five times during the study, the students' motivation and attitudes during instruction as well as their understanding of the

purpose of the activities was assessed. In the Affective measure, students indicated: 1) their level of performance (great, okay, not so good) in that day's lesson; 2) how hard they tried (very hard, hard, not so hard); 3) what they tried to do; 4) what they learned; and 5) how they liked the lesson.

Procedure

Assessment Prior to Instruction

All students were given the assessment measures by the investigator in a small room off of the resource room. The initial third grade criterion-referenced passage was administered first, followed by the other passages and the decoding measure. The Think-Aloud and two metacognitive interviews were administered next (generally with the Think-Aloud first although the order was sometimes altered due to time constraints). The criterion-referenced, decoding, Think-Aloud, and metacognitive interviews were individually administered with the exception of a few of the criterion-referenced assessments which were taken in groups no larger than four. The strategy measure was given in small group settings for the fifteen students who wrote their responses. Two students (Alicia and Julia) whose performance on the decoding measure indicated that word attack would interfere with their understanding of and performance on the strategy measure were given this measure individually as a listening activity. Their responses were oral.

For most students, the assessments were given in three to four sessions. Responses to the Think-Alouds, the two metacognitive interviews, the decoding measure, and the orally administered Strategy Measure were recorded in writing. In addition, they were audiotaped with the tapes being used to supplement the written records when they were not complete.

Intervention

Setting

Instruction was conducted by the investigator (researcher/teacher) in the school's resource room for all but three sessions which were conducted in the school library. Small group instruction was also being conducted in the same room by the resource teacher (and, in the morning, her assistant) during the majority of the lessons. The first group, Group One, met from 10:30 to 11:00; and the second group, Group Two, met from 1:45 to 2:15. There were 35 days of instruction for Group One and three of the members of Group Two. The other members of Group Two received 30 days of instruction (See below). Every attempt was made to have daily lessons. However, due to the researcher's prior commitments as well as to school activities (e.g., vacation, fieldtrips, achievement testing), it was often not possible for the groups to meet five days a week. The 35 days of instruction, therefore, spanned from March 6 to May 10.

In the next section, the instructional activities will be presented. In general, Group One and Group Two received the same

instruction for the first 29 days. However, due the nature of the instruction, the focus of particular lessons or discussions varied from group to group. On Day 29, three of the students in Group Two were excused from the last five days of instruction. The instruction provided the remaining three students was different from that provided to Group One during those days and will be described separately.

Phase One: Introductory Activities (Days 1-3)

The introductory activities occurred over the first three days of instruction. All of the students were present each day. Before beginning the activities, the researcher/teacher explained that the purpose of meeting together was to try a brand new way of helping students to understand what they are reading. Following this, the group discussed why it was important for both adults and students to understand what they read. The purpose of the study was further defined; the students were told that they would talk about how to realize when they were "stuck" in reading and what to do when this occurred. Finally, they were told that they would work together to figure out what to do when they were "stuck" but that what one person would do would not always necessarily be the "right thing" for all of them to do all of the time.

The activities in this phase were: 1) drawing an imaginary creature as a group with each member, including the researcher/teacher, adding parts; 2) naming the creature and writing a story about it; 3) discussing and voting on choices for words to complete sentences in a

cloze activity in which successive amounts of text were revealed; and 4) giving advice to a fictitional student about a reading problem.

The first two activities were selected to provide the students with an opportunity to work together on group projects in which they had to attend to and build on each other's contributions. Each member had to plan the parts to draw based on what the other members had drawn. Similarly, she had to listen to the others defend choices for names before deciding which one to vote for. What was said in composing the story was also dependent on what others in the group had said. In all of these activities, there was no right or wrong response but a need to listen to and watch others, and modify contributions accordingly.

The cloze activity provided further opportunity for the students to work as a group as well as to engage in the type of discussions planned for later phases. The students were called on to elaborate on and justify their suggestions; the researcher/teacher explained what she was thinking about their contributions. The activity had a sense of ambiguity as several words could have been appropriate in many instances. As such, it was an activity in which the researcher/teacher did not always have the correct answer. Finally, the activity was one in which sense-making could be emphasized and used as a standard from which to judge the appropriateness of responses.

The last activity, the letter, was used to give the students the opportunity to discuss approaches to reading difficulties that may occur in their classrooms and outside of school. This particular

letter was from a student who did not find reading fun but realized that her brother and friends did. She asked for advice about how to enjoy reading.

Phase Two: Identification of Strategies (Days 4-7)

In the next set of activities, the students and researcher/teacher jointly identified strategies they could use to help themselves understand and remember what they were reading. They also began to evaluate the effectiveness of using these strategies for different reading purposes. The activities in this phase were: 1) brainstorming about activities that are helpful for understanding and remembering what is read; 2) discussion of vignettes in which fictitional students used different strategies to reach the same goals; 3) identification of strategies that could be used to accomplish "real life" and reading tasks; and 4) programming a robot to understand what it read (Group One only).

The first brainstorming activity focused on activities that could be helpful in reading. The task was defined quite broadly (i.e., "What can we do to help ourselves understand what we are reading?"). The vignettes, in contrast, focused on specific reading tasks. Four vignettes were presented; each one focused on a task (reading to prepare for a test; reading to tell two other students about the text; reading directions in preparation for making a pinata; and reading a page in science in preparation for telling the whole class about the page) and how two different students approached this task (e.g., In

preparing for the test, Sally read to the end of each paragraph and then asked herself questions while Susie read to the end of the chapter and then reread it). The vignettes were discussed and the groups voted for the student in each pair had who used best approach. (The vignettes are included in Appendix C.)

Activities to help people understand and remember what they are reading were listed on a chart for each group. These charts were expanded and modified throughout subsequent lessons. In most cases, the students' language was used; however, in some instances the investigator provided a label for the activities. As the lessons proceeded, the students were periodically asked to define and clarify some of the activities they had listed (e.g., Ask for help). The charts are included in Appendix D.

The term "strategy" was introduced using a basketball metaphor. Michigan State University, close to the school, was in the midst of the NCAA semi-finals in basketball; the students were asked what they thought the coaches and players were talking about as the day's game was about to begin. Their responses were expanded by the investigator to include making plans for the game; these plans were labeled as "strategies." Following this, the group shared their strategies for accomplishing everyday tasks. The students drew cards from a pile. Each card had an activity (e.g., cleaning a room, doing homework, remembering to come to the resource room for the class). The student who picked the card read the activity and shared the strategies he or she used to accomplish the activity; other students jointed in by

sharing their strategies. The group then focused on strategies for reading, labeling the behaviors on the list as such and adding new ones to it.

The final activity in this phase was programming an imaginary robot. The students were told that, although currently robots could not read, in the near future technology might make this possible. They were then introduced to a picture of the "Reading Robot" and told it had been programmed to pronounce any word it saw but was not able to understand anything it read. Their job was to program the robot to do things so it would understand what it was reading.

The robot activity was designed to focus the students' attention on strategies that could be used for comprehension. When used with Group One, the students did not seem to understand the task nor to make connections between what the robot could be programmed to do and the strategies listed on the chart. The activity was not repeated with Group Two.

Phase Three: Definition of Strategies (Days 7-14)

At the end of Day Seven, the groups began to explore the strategies in the context of using them to read connected text. For the next eight days, they mainly focused on three strategies introduced one at a time. Although the overall goal of instruction was to help the students flexibly employ an array of strategies while reading, at this point it seemed necessary to develop some degree of procedural knowledge about each one. The purpose of this phase was not

for the students to become fully competent in using the strategies; rather, it was to focus attention on developing criteria for effective use of the strategies as well as employing and discussing them in terms of these criteria.

The majority of the lessons centered on the students "trying out" selected strategies while reading expository texts. The texts used in this and succeeding phases were written at the third to fourth grade level and were all five to seven pages in length. Topics covered were sea turtles, "living lights" (animals that glow), chimpanzee communication, exploration of the sea, and, for some of the students in Group Two, Daddy longlegs.

The first strategy to be focused on was summarizing. This one was on both groups' charts and was selected by the researcher/teacher. The students first selected the best of three sample summaries for paragraphs in the text. One of the samples focused on the main idea, one on details, and one on information not in the text. Following this, the researcher/teacher modeled two summaries and the students commented on it. Next, the students worked in partners to prepare summaries. All of the summaries were based on the story as the group read it. The summaries were discussed and evaluated by the group. From the discussion, the researcher/teacher extracted criteria that the students seemed to be using and presented it to them in chart form. The chart included the following:

Focus on important parts

Stick to the story

Sometimes give examples

Say enough.

The last criteria was added by the researcher/teacher as it had not been focused on in discussions as the children attempted to summarize. The groups continued to practice summaries, with the researcher/teacher and students using them and referring to the criteria. These were evaluated using the criteria as well as in more text-specific terms (e.g., Should we say what the sea turtles eat?) The students had much input into the evaluations.

To foster the students' conditional knowledge about and generalization of strategy use, a second letter from a fictitional student was presented. The letter focused on the student's desire to "do better" in social studies, a difficult subject for her; she described her current approach as reading everything slowly. The students in both groups wrote individual responses. These responses included:

Rereading (Anita, Teddy)

Asking yourself questions (Anita, Karen, Sandra,

Sharon, Susan, David)

Ask your friends (Kate, Sandra)

Don't go out and play; keep studying (Sandra)

Picture it (story) in your mind (Carol)

Think about what you read (Kate)

Write important parts down (Kate)

Read slowly (Billy)

At this point, the students were showing awareness of strategies not mentioned in their initial interviews. The suggestion given most often was to ask herself questions, one of the strategies focused on in one of the vignettes.

The students selected a strategy to focus on next as they continued reading their stories. Group One chose picturing and Group Two decided to work on asking themselves questions. They were given sample descriptions of pictures or samples of questions and asked to determine which one was the "best" for a paragraph they had just read. For example, Group Two was given three questions that could be asked about a paragraph from the story. One was not in question form; the second was a question relating to an important part of the paragraph; and the last one was a question which was about the topic but could not be answered from information in the paragraph. The students selected the best question and discussed their choices. They were then instructed to think about their choices and to develop criteria for what makes a good, in the case of our example, question. The criteria developed were written on charts that were posted along with the list of strategies.

Each group continued to focus on its selected strategy, with the members taking turns using it as they read the story. The researcher/teacher participated by: 1) modeling her use of the strategy; 2) directing the students' attention to the criteria they had set; and 3) commenting on the students' use of the strategies. Other students were asked to also comment on the way the strategy was used.

Group One focused on picturing and then asking questions during this phase; Group Two remained with asking questions. Both groups made predictions before reading and used the strategy "ask for help" (mainly about vocabulary words). These two strategies were not studied in the same depth (i.e., development of criteria and discussion of how well they were being used) as summarizing, picturing, and question asking.

During this phase, the students in Group Two began to spontaneously and quite eagerly discuss other reading strategies they used both in and outside of class including rereading difficult parts on a criterion referenced test, and reading the back of the book and the inside cover before selecting a book.

Day 15 was the day before the school's spring break. The students played "Hangrabbit" (a version of "Hangman"), using strategies and words from the stories they had been reading.

Phase Four: Continued Definition of Strategies and Exploration of Strategy Selection (Days 16-20)

During the next five days, the groups "pulled back" from the focus on one strategy at time and began to discuss the range of strategies they had identified. Along with this, they continued to try out strategies while in the context of reading their stories. In this phase, both groups had the opportunity to talk about and select strategies to use for specific reading tasks.

The list of reading strategies on each group's chart had expanded and become a bit unwieldy. Together with the investigator, the

students divided the strategies into: 1) those that could be used all of the time (e.g., summarize, ask questions); and 2) those that were to be used when needed (e.g., use words around big words; use the dictionary) or when possible (e.g., predict from title, ask for help). As instruction progressed, the students were encouraged to select strategies from the first list before they began to read and then to select from the second list as needed or indicated.

The students selected strategies to use as they continued to read the text. In Group Two, the focus generally remained on using one strategy at a time, in part because the spontaneous discussions about strategies had taken much time and the students had not had the same opportunities as Group One to explore individual strategies. The students in Group One practiced the strategies singly for most of this phase although they did use then in concert on Days 18 and 20. They took turns being group leader, with each leader identifying and using two to three strategies from the list of strategies that can always be used; in addition, the leader identified and used strategies from the list of those that could be used sometimes. Other students also shared their use of the strategies selected by the leaders.

Both groups discussed, selected, and used strategies for specific and realistic purposes during this phase. Kate, in Group One, had been absent for a week and returned while the group was in the middle of a story. The group members talked about strategies they could use to review the story for her, finally selecting summarizing. In both groups, the students answered review questions about the story they

were reading; to prepare for this, they selected different strategies and used them with their partners. For example, in Group One, two partner groups asked each other questions and one made mind pictures. In Group Two, one group skimmed, one asked each other questions, and one made mind pictures.

At this point, it was decided to extend the study for five days, providing 35 rather than 30 days of instruction. The students, it was felt, had not had sufficient opportunities to practice the strategies; much time had been spent on identifying them and discussing situations in which they could be used. More emphasis had been placed on "talking about" the strategies rather than actually using them. There had been little evidence of gains on the criterion-referenced assessments, suggesting that the students' knowledge about the strategies was not sufficient to affect independent use of them. Given the time constraints, five days was the maximum the study could be extended. The extension was approved by the resource teacher as well as the school principal.

Phase Five: Sharing Strategies through a Video (Days 21-27 in Group One and Days 21-28 in Group Two)

One of the features of mediated collaborative problem solving is the learning of strategies in meaningful contexts. It was felt that, even though "trying out" the strategies and discussing them in the context of reading naturalistic texts, the students were not fully understanding, and also not fully motivated by, the use of the

strategies. Along with this, there was concern that they were losing awareness of the purpose of the strategies. This phase was designed to address both the purposefulness of strategies as well as the students' motivation to use them.

The students in both groups made a videotape which was later shown to all of the students in the study as well as to the resource teacher. In the tapes, the students explained and demonstrated what had occurred in the lessons. They focused on their current story and the strategies they used to help themselves learn and remember it. In preparation, they students discussed who should be invited to view the tapes (the list was actually much more encompassing than the actual audience when the tape was shown), which strategies should be demonstrated, and the order in which the strategies and discussion of the story currently being read should be presented. The students had not finished reading their current story so they selected and used strategies that they felt would be helpful in learning the story so it could be shared on the videotape. The students also prepared and practiced their parts. The students used and/or demonstrated the following strategies in preparing for and making the videotape:

Use your experience

Summarize

Question asking

Ask for help on words you don't understand

Guess from the title

Guess from pictures

Make mind pictures

The strategies were selected by the students as well as by the researcher/teacher. One of the strategies that was used in preparing for the video was summarizing. Both groups did return to selecting the best of three sample summaries for given paragraphs; the purpose of this was to focus their attention on criteria for good summaries as this appeared to be a strategy the students were having particular difficulty using.

The videos were filmed in the school library during the group periods. All of the students participated.

Phase Six, Group One: Guided Practice in Using the Strategies (Days 28-33)

For the next six days, the group read the last story together. Students served as leaders with each one selecting and employing strategies with assigned sections of the story. The strategies were used in concert, with each student using at least two or three with his or her paragraph. In comparison to the other phases, the structure of this one was most similar to that of Reciprocal Teaching. Again in comparison to the other phases, in this one there was less discussion of the strategies outside of using them (e.g., less talk "about" the strategies). The discussions also involved more of a focus on content along with strategies. Students raised more questions and made more comments about the content than they had previously.

One strategy that was particularly attended to was predicting as the students were not explicitly linking the use of background

knowledge to making predictions. The students and researcher/teacher talked about what they knew about the topic (exploring in the sea) and how they had learned this information (e.g., social studies, books, tv, vacations). Then they made predictions about what they would learn.

As in the other phases, the chart of strategies continued to provide structure for the discussions. The group frequently referred to the list of strategies that could be used all of the time as well as those that could be used sometimes. As the strategies were used, they were checked off on the chart, with the students closely monitoring this.

Phase Seven, Group One: Review (Days 33-34)

The review activity focused on the multiple purposes of reading as well as the variety of strategies that can be used for reading tasks. Initially, the students picked a card on which the researcher/teacher had written a reading task (e.g., reading a recipe to make a cake, studying for a test). They then discussed what strategy (ies) they would use in carrying out that task. The next day, the students worked with partners to brainstorm about other reading tasks and wrote these on cards. Then the group members took turns picking cards and identifying strategies they would use in accomplishing the tasks on the cards.

Phase Six, Group Two: Guided Practice in Using the Strategies (Days 29-34)

On Day 29, the students began this phase by focusing on predicting. As in Group One, they talked about what they knew about the topic and how they knew it and then made predictions about what they would learn. The discussions during this lesson, and in several previous ones, did not seem as productive as those in Group One. The students seemed less interested and motivated and were more often off-task. The fieldnotes for that day reflect much discouragement:

> The lesson did not go well. Carol was negative about doing another story. Behavior was a problem with Alicia and Julia not attending and Teddy being silly...

Questions were being raised about this group possibly being too heterogenous to benefit from the tasks and texts being used. The students ranged in ability from the high-achieving fourth grader, Carol--who, along with Sandra, seemed to have become bored with the discussions--to Alicia, the language impaired third grader who had much difficulty with reading tasks. Alicia and Julia were having a great deal of difficulty participating in the discussions without a great deal of support. They seemed, at this point, to need more sustained and directed practice using the strategies.

It was decided to limit the group to Julia, Alicia, and Sharon for the next five days of the study and to have all six members present the last day. Sharon was included in part to be a model and, in part, because she seemed to have difficulty participating in the discussions;

although she generally added to them when called on, she rarely volunteered, perhaps due to difficulties expressing herself.

For the first two days, these students reviewed what they had learned and used strategies to discuss the story the whole group had been reading. After two days, a new, simpler story was introduced and read. The group made predictions about the story and then they used multiple strategies, selected by the students and the researcher/ teacher, as they read it. As in Group One, the structure was more similar to that used in Reciprocal Teaching than in previous phases. At this point, there was a high degree of researcher/teacher guidance, such as would occur during the first phases of reciprocal teaching:

Alicia: The first pair is in the back of the head

Researcher/teacher: Can you turn that into a where question?

Alicia: Where is the first part

Researcher/teacher: The first pair of legs?

Alicia: Yeah

Final Interview (Day 35)

On the last instructional day, the school's resource teacher, at the request of the investigator, interviewed the students in both groups about what they had been learning. She asked questions about the nature and usefulness of strategies, which ones they preferred, and what they had liked and disliked about the instruction. The interview questions are included in Appendix E.

Group One and Two were interviewed separately. All students except David were present. Both interviews were audiotaped; in addition, Group One's was videotaped. Unfortunately, both audiotapes were inaudible so information is only available for Group One.

The students' responses provided much information about their perceptions of the purpose of the activities and their understandings about strategies. When asked what they had been doing in the group, the students focused on strategies; throughout the interview, they mentioned a wide variety of them. For the most part, they defined the strategies similarly to the way in which they had been talked about in the group. In response to the question about how strategies could help them, the students mentioned remembering the text and reading hard words. When asked if the strategies could help them in science, they said yes and then named some they could use. Their favorite activities were:

Drawing the monster (Billy and Karen)

Playing Hangrabbit (Anita)

Reading stories (Susan)

Their least favorite activities:

Making the video (Anita)

What we did with the stories (Karen; she seemed to mean stopping so often to use the strategies)

Affective measure (Susan)

Criterion-referenced assessments (Kate and Karen)

It should be noted that there was disagreement about the affective measure. Several students argued that they liked writing about their feelings although others seemed to find this difficult.

All lessons except three were audiotaped and 80% of these transcribed. Two lessons in each group were videotaped in addition to the video made in Phase Five. Group One's final interview was also videotaped.

Appendix D includes sample texts and materials used during instruction.

On-Going Assessment

Criterion-referenced comprehension assessments were administered to the students in the instructional groups on five occasions over the course of instruction. The measures were administered on Day 5 (Phase 2), Day 10 (Phase 3), Day 15 (between Phases 3 and 4), Day 20 (Phase 4), and Day 29 (Phase 6). These assessments were given during group time and only to students who were present. There were no make-up sessions except in one case in which a student became particularly frustrated and was given a second passage on the next day the class met.

Additionally, the affective measures were administered five times; this occurred during Phases Two, Three, and Five. Only students who were present were given the measures.

Assessment Following Instruction

The assessment was conducted by the investigator and one assistant in a space apart from the resource classroom. The students were given two criterion-referenced passages on the level used prior to instruction. Karen was given both third and fourth grade passages. One student was given extra passages as his performance indicated he was giving up" and putting forth little effort.

Following completion of the first passage, the students whose performance prior to instruction indicated decoding difficulties were asked to read orally for one minute. The Think-Aloud was individually administered to all students, with the passages counterbalanced over the two administrations. The Concept of Reading and Strategy Knowledge metacognitive interviews were also individually administered. The Strategy Measure was given orally to Alica and Julia due to their decoding difficulties. The other students completed this measure in writing, mostly in small group settings.

As before instruction, oral responses were recorded in writing and audiotaped; the tapes were used to clarify the written notes when necessary. In addition, three of the interviews were videotaped.

Analysis

Scoring of Student Outcome Measures

Conceptions of Reading (Metacognitive Interview One)

Questions 1-5 of the first metacognitive interview specifically focused on the students' conceptions of reading. These questions were

scored using the criteria from the Palincsar et al. (1989, 1990, in press a, in press b). Each question was rated 0-4 points based on the following criteria (Interview questions are in boldfaced type and the students' responses are in normal type):

0 points: No response

Ambiguous or irrelevant statement

What is reading? Reading is like read a book, like read words and stuff.

If you were teaching a younger student to read, what would you tell him or her to do while reading? How to read easy words first, fourth grade words like "pery," not "pery" but "arithmetic"

1 point: Response indicates a focus on decoding or on behavior

What is reading? Something you got to concentrate; try to sound out words, long words and short words. Got to think hard.

How do you know if someone is a good reader? You can tell by how they pronounce words, say words, like act out really good, make voice really good, stop at period.

2 points: Response indicates a focus on meaning at the word level

What is reading? When you look at words and just know what they mean.

How is reading thinking? You have to think about all the words and what they mean, so it makes sense in the sentence, so you can learn more words.

3 points: Response indicates a focus on meaning beyond the word level

What is reading? Where you have all the new words and look at them and try to say them and put it all together and makes a story.

How do you know if someone is a good reader? If they understand what they are reading and could write down about it after they are finished reading it

4 points: Response indicates awareness of different purposes for reading or different strategies

What is reading? Reading a story about somebody else, and they're explaining how to do things, or how there's a problem with what they're doing, and then at the end, just work out the problem.

How is reading thinking? Because when reading something you don't know what's going to happen next. Try to figure out what's going to happen next. Think about what sentence meant that they had written down.

Strategy Knowledge (Metacognitive Interview 2)

The procedures for scoring the students' responses to the second metacognitive interview were modification and adaptations of the

criteria used in the Palincsar et al. study (1990). The total score for this measure was a combination of three subscores. The first score reflects the range and specificity of strategies used by the students. Range of strategies was scored by assigning points as follows:

0 points: Identification of behaviors which were not strategies (e.g., read, put your name on the paper, look at words and learn them)

1 point: Identification of a previously mentioned strategy

3 points: Initial identification of a strategy

Specificity was scored by weighing responses which focused on identifiable strategies (e.g., summarize, make a mind picture, sound it out, ask for help) by multiplying them by two. For example, if the student said she would "picture the story" when asked **If you were going to tell someone what this story was about, what would you do to learn and remember the information that you were reading?**, and this was her first identification of this strategy, she would receive six points (three for initial identification of a strategy, weighted by multiplying it by two because the strategy was specific). If picturing had previously been identified, it would have then been assigned two points (one for identification of a strategy that had previously been mentioned, weighted by multiplying it by two because it was specific). Strategies which were vague (e.g., study, pay attention) were not multiplied by two.

The second subscore reflects justifications for identified strategies. As part of the interview, the students were asked why they

would use the strategy(ies) they mentioned. Even when not asked, the students periodically mentioned reasons they would use particular strategies or would elaborate on the strategies they identified. Evidence of reasoning and elaboration about strategy use was assigned five points. In general, these points were assigned if the students' responses indicated a sense of purpose or helpfulness in using the strategies. Following are examples of responses that received justification points:

1. **If you have difficulty answering some of the questions, what could you do?**

   Look back in the story.

   Why would you do that?

   Then you could find the answer because usually questions are out of the story, so if you look back, then you could find the answer.

2. **Suppose you were reading the story and you came across a sentence that you did not understand. What would you do?**

   Read it over a couple of times.

   Why would you read it over a couple of times?

   So I could learn why the sentence didn't make sense. Or maybe they had a mistake in it. Or maybe it didn't make sense to me.

3. **If you have difficulty answering some of the questions, what could you do?**

Summarize and try to remember what was in the story, and what you were doing on it. Like, if it was about boys and it said,"What was the story about?" and you didn't remember what it was, you could keep it in your mind. And it would help you learn and then you guess and wouldn't realize it.

4. **Why would you summarize?**

So it, you could. Summarizing means like asking yourself the questions but it's not asking yourself the questions. You, I just would. It would help me, I think.

The third score reflects flexibility of strategy use. This is a holistic score based on students' responses to the three questions that focused on variations in learner characteristics, texts, and task demands. Points were assigned using the following criteria:

0 points: No evidence of flexibility

10 points: One or two instances of flexibility, but weak strategies mentioned

If you were going to tell someone what this story is about, what would you do to learn and remember the information you were reading?

Read it over and over again.

If you were going to take a test, how would you go about reading this same story?

Read it carefully cause you might not know something about rocks that's in there.

20 points: One clear instance of flexibility involving use of more powerful strategies

If you were going to tell someone what this story was about, what would you do to learn and remember the information you were reading?

If I could, I'd bring the book with me. **If you couldn't?** Ask myself questions like "What's this rock? What's the color of this rock or what's the name?" Remember what scientists are called that might learn about rocks.

If you were going to take a test, how would you go about reading the same story?

If enough time, reread. If I could look back to help us answer the questions, I'd look back. If I couldn't, I'd ask myself questions.

30 points: Two or three clear instances of flexibility

Strategy Use

Scores were assigned to the students' summaries, questions, and predictions. Each is described below.

The summary score was assigned on the procedures used in the Palincsar et al. study (1990). In that study, four main ideas were identified for each of the two passages. Along with this, the passages were divided into idea units and each idea unit rated on a scale of 1 (least important) to 4 (most important). The rating was done

separately by two researchers who identified one fourth of the units as being the least important, one fourth as the next least important, and so forth until all units were assigned an importance rating. These procedures were developed by Brown and Smiley (1977) in their work on summarization. Discrepancies, both in division of the passages into idea units and assignment of importance rating to each idea unit, were resolved by discussion.

Each summary was assigned three subscores, one for completeness, one for quality, and a holistic score. For completeness, each summary was rated 0-4 points, based on the number of main ideas included. Quality was scored by assigning each idea unit in the summary 1-4 points based on the importance level rating of that idea in the passage itself. One point was subtracted for each idea unit in the summary that was not in the passage. The holistic rating was assigned using the following criteria:

1 point: Summary consists mainly of material not in the passage

> You have to put the hood on first. You use a belt to start a car up. There is a machine in the angine in the car.

2 points: Summary consists of one to two main ideas and irrelevant information

> They put conveyor belt, then they put it together. And they don't have one person work on it. They have a few people. And then in a couple days they get it done.

Summary consists of one main idea and details

Many people help put a car together and help put the weels and other things together to make the car go.

Summary consists of statement of topic

How people put pieces to a car together

Summary consists of statement of topic and detail

This story is about good smells, and how to make bread. Step by step.

3 points: Summary consists of topic and one main idea

It is about people that have spelie (special) jobs and How they assemble cars

Summary consists of two or more main ideas but omits some important information

Cars cannot be made by just one person. In the factories many many people work thar and each person puts a bifferent part on

4 points: Summary consists of most of the important ideas in the passage

This story is about bread. When they make bread they half to let it rise. Then after it is don they put it in the oved and insted of it ricing in the oven it can ge brown

The students' questions were assigned four subscores. The first subscore represents productivity, or the number of questions the

students generated. As all students did not write the ten assigned questions, the next three subscores were given in terms of percentages of generated questions. The second subscore reflects the percent of questions reflecting main ideas. A question was scored as reflecting a main idea if it focused on one of the four identified main ideas in the passages. The third subscore focused on sophisticated use of the text for question formulation. Questions were scored as representing sophisticated use if they had any of the following characteristics:

Formed by substituting superordinates for details in sentences

What are the ingredients?

Focused on material from one sentence but wording is more of a paraphrase than the exact words of the sentence

What do the workers build on?

Reflects material across sentences

How do they make cars?

The fourth subscore represented quality of the question and reflects the percent of questions that were clearly formed with no grammatical errors.

Two prediction scores were assigned, one for predictions made from the title and one for the predictions made about the end of the stories. Predictions from the title ("The story of car manufacturing"; "The story of bread baking") was rated 0-5 points using the following criteria:

<u>0 points</u>: Prediction makes no sense, is vague, is a repetition of the title

About car manufacturing, about people and moms and dads with their kids; they might do something

1 point: Only one prediction, centered on paraphrase of title

About making cars

About topic only marginally related to title

How to bake cookies and other good stuff like that

2 points: Predictions focus on one topic likely to be in story but emphasize details

First you get flour. Then you get 3 eggs and corn. Mix 3 cups of cholet.

3 points: Predictions focus on one topic likely to be in the story

Ingredients

Hohw to put the parts in and half to know where they go

4 points: Predictions focus on two topics likely to be in the story

I think it will be about how they are made and how they dizeny (design) the car

Predictions focus on one topic likely to be in the story as well as one other topic that makes sense but is less likely to be in the story

Cars that might be made or repaired or fixed at a car station. And people might be working or repairing or fixing

5 points: Predictions contain at least three topics that are likely to be in the story

To make bread, what to put in it, and what not to put in it. And what heat to put it on

Predictions about the ending of the story were assigned scores of 0-3 points as follows:

0 points: No response

1 point: Prediction makes little sense, given what has been read

About cars and how they make it

2 points: Prediction (s) fairly likely to follow what has been read

That the people will try the bread and the people will open their own bread bakery

3 points: Prediction (s) highly likely to follow the story so far

How the parts are numbered. How the worker puts them in place.

Think-Aloud

The students' responses to each sentence were scored using the following criteria:

0 points: No response

Response is repetition of the sentence

Response is close paraphrase of the sentence

Response has no relation to the sentence, makes no sense

2 points: Response indicates monitoring through expressions of confusion, doubt, or understanding

4 points: Response is paraphrase of the sentence which indicates understanding

6 points: Response indicates elaboration and reasoning on the sentence level but does not involve linking across sentences

12 points: Response indicates monitoring to confirm previous hypotheses

Response indicates elaboration and reasoning across sentences

Criterion-Referenced Comprehension Assessment

Each response to the questions in the criterion-referenced assessments was assigned full, half, or no credit. Responses to each story were compared across students for consistency of scoring.

All measures were scored by the researcher. As a check for reliability of scoring, 20% of the each interview and of the strategy measures as well as 25% of the criterion-referenced assessments were scored by one of three independent raters. Inter-rater reliability was determined using Pearson product moment correlations for each measure.

The students' scores on each of the measures were used as the basis for a narrative comparison of their knowledge and performance

both prior to and following instruction. In addition, these scores, as well as the responses themselves, were used to identify similarities and differences among the SE, ChI, and NA students.

Transcripts and Fieldnotes

The transcripts of instruction and the researcher/teacher's fieldnotes were examined using procedures similar to those suggested by Bogdan and Biklin (1982) and Mirriman (1988). These data sources were read on multiple occasions, with the focus of the readings changing over time. Initially, the transcripts and fieldnotes were read in an open-ended manner, with notes made the nature of the activities, instances in which the students were particularly successful or unsuccessful in participating in the discussions, the nature of the researcher/teacher's participation, and instances in which she had difficulty supporting the students. During this reading, questions were raised about particular interactions, questions that guided further reading and reflection. In subsequent readings of the data, some of which were done in concert with analysis of the outcome measures, the transcripts were examined to identify opportunities for assessment as well as to identify patterns of scaffolding difficulties.

In Chapter Five, descriptive analyses of the performance of two participant students are presented. To prepare for these analyses, all transcripts involving these students were read, with a focus on identifying particular ways in which these students participated in and responded to instruction. These readings were guided, in part, by

hypotheses about these students made during previous transcript readings as well as by comments in the fieldnotes.

CHAPTER THREE: RESULTS

This exploratory study focused on both the implementation and outcomes of 35 days of instruction for self-regulation in reading using Mediated Collaborative Problem Solving (MCPS), a model of instruction utilizing social constructivist principles. In this chapter, the research questions will be addressed using lesson transcripts, fieldnotes, and student outcome measures.

The first two questions focus on implementation and reflect issues raised in the Palincsar et al. (1990) study of three approaches to strategy instruction for self-regulation. These questions center on: 1) the opportunities for and nature of assessment; and 2) factors that mediated the researcher/teacher's ability to scaffold the students' understanding within this model.

The remaining research questions concern student outcomes and focus on both the nature of and changes in the students': 1) declarative and conditional knowledge about strategies; 2) strategy acquisition (procedural knowledge about strategies; 3) concepts of reading; and 4) reading comprehension performance.

Question 1

<u>At what level was assessment possible in Mediated Collaborative Problem Solving and what aspects of the students' knowledge were open to assessment?</u>

The first assessment issue raised in the Palincsar et al. (1989, 1990, in press a, in press b) study and examined in this one was the level of assessment. For the most part, the Collaborative Problem

Solving model used in the Palincsar et al. study did not provide the opportunities for individual assessment that were provided in Reciprocal Teaching and Direct Instruction. Dialogues structured similarly to those of Reciprocal Teaching, with individual students taking turns employing the strategies while reading the stories, were incorporated into several phases of MCPS. When these structured dialogues were utilized, assessment on the individual level could and did occur. This assessment was especially possible when the researcher/teacher assumed the role of scaffolder; following the procedures of dynamic assessment (Feurstein, 1979; Palincsar, Brown, & Campione, 1991; Palincsar & Winn, 1990), it was possible to ascertain the type and level of support needed by individual students to use the strategies successfully.

Assessment on an individual level was still not as precise as in Direct Instruction and Reciprocal Teaching during unstructured discussions. Some students readily participated while others, (especially Billy, Sharon, Alicia, David, and Julia), participated less, often only when asked to by the researcher/teacher or by other students.

The second assessment issue was the focus of assessment within MCPS, or the kinds of information that were open to assessment. Mediated Collaborative Problem Solving afforded opportunities for assessment of multiple aspects of the students' knowledge and understanding, as did the Collaborative Problem Solving model utilized in the Palincsar et al. (1989, 1990, in press a, in press b) study. It

was possible to assess: 1) the students' declarative, procedural and conditional knowledge about the strategies as well as their more general conceptions and misconceptions about them; 2) their conceptions about reading and the factors that influence the reading process; and 3) their understanding of the content of the texts.

The students' declarative knowledge about the strategies was assessed throughout the phases of instruction when they were asked to identify strategies they could or had used to help them in their reading, as well as when they were asked to clarify what the strategies were (e.g., "What do we mean by mind pictures?"). Their procedural knowledge was assessed through their actual use of the strategies individually or in working with their partners, as well as when they added to other's use of the strategies (e.g., adding questions to the ones posed by the leader). Opportunities to assess the students' conditional knowledge were plentiful in the context of planned activities/discussions (e.g., selecting strategies for tasks in the vignettes, for studying for the review questions, and for reading the stories). In addition, the students' spontaneous comments about the strategies provided information about their understanding of why they are used and when to use them.

The students' understandings, or their conceptions and misconceptions about the strategies, were also open to assessment, especially as they talked about and evaluated them. For example, Sandra and Carol showed differing ideas about skimming, a strategy the group had not focused on but one Carol had suggested they use to prepare for review questions.

Sandra: And skim I don't think is a very good one because if you just skim through the pages then you wouldn't know anything about it. Then you just go 'I don't know this because I skimmed through it.'

Researcher/teacher: You think you might miss something if you skim. Christy, do you want to answer to that?

Carol: Well, when you skim through, even if there isn't boldfaced words, you still have, you can still look at words like big words that are important and then try to think of what they mean and maybe read like just a sentence in each paragraph you think is most important.

Sandra seemed to understand skimming more in terms of "glancing through" the text while Carol had an understanding of the strategy that involved a much more active role of the reader.

The criteria the students used to evaluate strategies revealed a great deal about their understanding of the strategies. For example, Teddy's reason for selecting one of three summaries as the best one :

the story says it, so it should be in

showed a possible misconception of what summaries involve.

It was also possible to assess the students' conceptions of reading during instruction. For one, they frequently mentioned the problem of "hard words" in many of the discussions, indicating the importance of word level reading to many of them.

Researcher/teacher: Now what kinds of jobs do we have to do in reading that we need strategies for? What do we have to do in reading? Karen?

Karen: Remember the hard words

Researcher/teacher: You've gotta remember the hard words. Do you have to remember the important parts for tests? What are other jobs in reading?

Anita: To remember what the vocabulary words are.

The students' comments about their reading problems provided information about what aspects of reading they focused on, at least in terms of aspects that were difficult for them. This occurred in Group Two on the first day when the students were talking about why they get "stuck" in reading:

Researcher/teacher: And when I say stuck, I mean I'm not understanding

Teddy: Like stuck on a word?

...

Researcher/teacher: When did you get stuck?

Sandra: I got stuck in like social studies on a words and I just raised my hand.

Researcher/teacher: 'Cause you knew you were stuck. You'd come across something you didn't understand.

...

Carol: I get stuck when I can't, when I read a sentence over and over again and I don't know what they are trying to say. I don't know what they mean.

...

Sharon: Um yeah. But I don't get stuck on meaning. I just get stuck on some words.

In one discussion, the researcher/teacher was able to gain information not only about the students' understanding of reading but of their ideas about differences between expository and narrative text. Group One was dividing their strategy list into those that can always and those that can only sometimes be used and was focusing on the strategy "think about meaning":

Researcher/teacher: What about meaning (referring to "think about meaning")? Is there always meaning or do we sometimes read and it doesn't mean anything?

Anita: Yeah. It can be a fiction book.

Researcher/teacher: But does that have meaning?

Susan: Yes

Anita: No it doesn't. Fiction does not have meaning

Researcher/teacher: Ok, Dusty's saying yes.

Susan: It doesn't

Researcher/teacher: Does it? You mean we're just pronouncing the words in fiction, or are we thinking about what's happening? Meaning is kinda' what's happening.

Karen: Yeah, but sometimes it isn't really happening.

Researcher/teacher: But it's happening in the story, isn't it? It's happening in the story.

Anita: ...in the story

With the researcher/teacher and students holding very different conceptions of the term "meaning," there was much potential for confusion as "think about meaning" was discussed, confusion that would not have been revealed without discussions like the above.

MCPS also afforded opportunities to assess the students' understanding of factors that affected reading comprehension as they talked about their own reading performance. Several students emphasized the importance of background knowledge in commenting on their performance on the criterion-referenced assessments. Another factor that was discussed, particularly by Kate and Karen, was interest.

Assessment of understanding of content was possible as the strategies were utilized in the context of reading connected expository texts. The students' summaries, predictions and questions, as well as their answers to questions posed by other students indicated their understanding of the stories. In addition, questions and comments they made in the context of the discussions gave information about their comprehension.

In sum, two areas of assessment were examined: the level at which it could occur and the areas which could be assessed. The structured dialogues of MCPS, when utilized, provided the opportunities for

dynamic assessment on an individual level. Both in the structured and unstructured dialogues, there were frequent opportunities for obtaining information about the students' knowledge and understanding of the strategies, the reading process, and the content of the stories.

Question 2:

What factors mediated the researcher/teacher's ability to provide scaffolded instruction within the dialogues of Mediated Collaborative Problem Solving?

MCPS was designed to provide teacher scaffolding through participation in the dialogue over the course of instruction. Palincsar and Brown (1989) have identified at least three ways in which dialogic support can be given: 1) instructional/modeling statements; 2) prompting statements; and 3) reinforcing statements. All of these were present during instruction:

Instructional/modeling statements:

Researcher/teacher: And I, you know, when I think about the title, I think, well, I know that the last part, when it said "Living lights in our world," was about animals that glow. So it makes me wonder if this is about maybe fish that glow or something.

Prompting statements:

Excerpt One

Researcher/teacher: How about a question about their size? Can you ask us a question about their size?

Excerpt Two

Researcher/teacher: Does the text say it sets the water on fire?

Reinforcing statements:

Excerpt One

Researcher/teacher: She's connecting it with the last paragraph. The last paragraph was about the little one, so you're saying, "What is a kind of large animal that lives near the sea?"

Excerpt Two

Researcher/teacher: Great job!

It was hoped that the strengthening of the researcher/teacher's role by having her engage in more scaffolding would at least somewhat reduce the tension about how to participate in the dialogue inherent in the Collaborative Problem Solving model of the Palincsar et al. (1989, 1990, in press a, in press b) study. MCPS, however, seemed even more fraught with uncertainty as the researcher/teacher tried to determine how to scaffold within this "strengthened role." She frequently raised concern about the nature and quality of the scaffolding she was providing, as evidenced by excerpts from her fieldnotes:

Day 5: My role is still so hard for me in situations such as talking about who is doing the most valuable activity. This is different than scaffolding the students as they engage in the strategy. I think I need to share my thinking and how I look at and use the strategies and leave it at that. What is the shared understanding here?

Day 9:I still feel I am not scaffolding sufficiently, not giving them the support they need to meet the challenges I am providing.

Day 12: It is still so difficult for me to catch and follow up on opportunities for the students to justify their choices. Rather, I am focusing too much on trying to model what I am thinking and not allowing for debate. I am becoming increasingly concerned that I am straying too far from what I had intended in this condition. The teacher's role is still so puzzling and ambiguous for me.

Day 15: I really don't know why I am having so much trouble but feel I am not seeing in the transcripts the kind of scaffolding I had envisioned and feel I am supposed to be studying.

Scaffolding through dialogue is complex; the teacher must simultaneously consider task, person, and text variables as she engages in on-the-spot decision making. She must provide challenges that are within the students' zone of proximal development, the parameters of which are constantly changing. Additionally, she must determine the level and nature of support that will enable the students to meet the task requirements as well as to develop a shared understanding of the task. Hence, the scaffolding must be continually adjusted.

All of these features of scaffolding contributed to the difficulty of providing this type of instruction within MCPS. There were also features peculiar to this model that seemed to further add to the uncertainty the researcher/teacher had about her role. The most salient of these were: 1) the tasks themselves; 2) the lack of a

consistent "metascript" within which to discuss and utilize the strategies; and 3) the lack of a gradual release of responsibility for task completion. Finally, there was another factor, not necessarily particular to this model of instruction but mediating its implementation nonetheless. This was the researcher/teacher's low level of comfort in implementing an approach that was, in many ways, quite different from the kind of classroom instruction she had implemented and that put her in the role of novice.

All of these factors were interrelated. Implicit in all of them was the high level of ambiguity involved in this model of instruction. This ambiguity was particularly seen in terms of the goals of the tasks themselves, especially when the group was "talking about" the strategies; the structure of the discussions; and the degree of responsibility the participants assumed for task completion. Although the factors were interrelated, they are separately defined and discussed below.

Tasks

Among and within each of the phases of MCPS, there was a variety of tasks. The nature of these tasks, and the ways in which they were presented, affected the opportunities for and nature of scaffolding. Some of the tasks presented many clear opportunities for scaffolding; with other tasks, there were not as many opportunities. Similarly, some of the tasks were structured such that the scaffolding within them was more manageable. With these tasks, the researcher/teacher was more

able to identify the nature of the students' needs as well as to determine and provide the appropriate support to meet those needs.

The tasks involving students serving as leaders and actually using selected strategies in the context of reading the texts provided occasions for teacher scaffolding in which the nature of the support needed could be fairly easily determined. Several qualities of these tasks made scaffolding within them more manageable. First, the goal was defined: using the strategy productively. Second, the researcher/teacher had a clear idea of what meeting the goal of productive strategy use entailed, even though there was more than one way to approach the task. And finally, using the strategies in the contexts of reading the texts provided a concrete base from which to scaffold the strategy use.

In contrast were tasks in which the group more abstractly "talked about" the strategies, such as when comparing the effectiveness of two of them or discussing the members' own strategy use. In these tasks, the goals tended to be somewhat more ambiguous, the range of approaches wider, and the researcher/teacher less clearly in the role of the more knowledgeable other.

The difficulties inherent in scaffolding within the context of these tasks was evident in the discussions about the different approaches taken by the fictitious students portrayed in the vignettes. The goal of this activity was not as defined as when the students were practicing the strategies. The activity was planned to familiarize the students with conditional knowledge about strategies rather than to

develop their procedural knowledge. Conditional knowledge is broader than procedural knowledge, with more room for variation; the particular considerations of reader, task, and text variables are different for different readers. Thus, what was being scaffolded was sometimes hard to identify; similarly, deciding how to provide support through the dialogues was difficult.

This occurred in Group Two's discussions of the vignette about strategies used by two fictitious students to study for a test. These strategies were: 1) reading to the end of the paragraph and asking herself a question (Sally); and 2) reading the lesson two times (Susan). The students provided sound justifications for both strategies used by the fictitious students.

Excerpt One

Researcher/teacher: Why do you think asking yourself questions was the best thing to do?

Teddy: Cause the questions she asked herself, because, well, if she doesn't get it right, she'll know that she's just not, that she might not do that good.

Excerpt Two

Sandra: I still think Susan because I just think Sally wouldn't get done and she would just get half through the paper and it was time to take the test and she wouldn't be ready for the test.

Validating their justifications for both strategies was one way to lead to the goal of thinking about why strategies are used. However, the

researcher/teacher did not agree with all of the justifications provided. This leads to a question regarding the necessity of expressing her disagreement in order to help the students reach this goal. A related question involves the students' need to share the researcher/teacher's understanding of which of the two strategies was most effective in order to understand the need to consider many variables. Finally, there is the question of how consistent the researcher/teacher and students' understanding needs to be. These types of questions made the scaffolding decisions within this, and similar activities, quite complex.

The focus on personalization of the strategies raised similar questions. There was concern about the nature of the researcher/teacher's scaffolding when the students were talking about ways in which they form pictures. When the students were initially discussing picturing, Karen said that picturing a golfer would help her remember a segment of text about sea turtle's eggs being the size of golf balls. This was a picture the teacher would not have formed. Scaffolding decisions were particularly confusing in this instance. Neither Karen nor the other students needed to picture exactly as the teacher did. However, they were just beginning to learn about this strategy and may have been confused, at this point, by talk about different ways of forming pictures.

The way in which the tasks were cast, or framed, refers to how they were presented to the students. Some tasks were presented as more "open for discussion" and others not as much so; in the latter, the

researcher/teacher had more defined ideas of what constituted task completion. Scaffolding difficulties particularly occurred when the tasks were open-ended, as during the vignette activities. They also occurred when they were presented as open-ended but were, in actuality, more closed, with the researcher/teacher knowing the exact response she wanted from the students and the discussion seeming a bit like an exercise in "Guess the teacher's answer". This happened when the researcher/teacher asked the students in Group One about the use of quotation marks in the title of a story they were about to read, "Chimps that 'Talk' to Humans":

Researcher/teacher: Chimps that talk to humans. Why do you guys think that talk is in quotation marks?

?: Just because that

Researcher/teacher: Why is it in quotation marks?

Susan: Cause he talks a lot

Karen: No, cause that's

?: I know

Karen: what some person said.

Researcher/teacher: Kate?

Kate Because, like, you want to get ...

Researcher/teacher: ...when people say things we put in quotation marks? There's another, ah, reason for quotation marks...Does anybody know what it is? Once in a while, you see words in quotation marks. It means it doesn't' really

mean this. It means something like it. Do you think that we're going to learn that chimps really use their mouth and talk, Billy?

?: Let's see.

Billy: Maybe

?: It means.

Kate: I think it means maybe, it means kind of like a sound that they make. Cause they, people say, they talk to dolphins but really they're understanding their sounds.

Researcher/teacher: So that when we have the word in quotations, it may not mean exactly the same way that we talk.

There was a particular reason for the quotation marks in the title of the story. However, the task was presented to the students as one to be discussed. Scaffolding then became difficult and confusing because the form of the talk did not match its goal. If the task had been cast differently (e.g., "Most often, quotation marks are around people's exact words but that is not the case in this title. Has anyone encountered different uses of quotation marks in other stories? Tell us about it...."), the researcher/teacher would have been better able to lead the students to the goal of understanding the use of the quotation marks.

Lack of a Metascript

The second factor influencing the researcher/teacher's ability to support the students through scaffolding involved the format in which the tasks were presented. Gallimore and Tharp (1983) have used the term "metascript" for verbal instruction utilizing a format which, although not prescriptive, provides structure to discussions. Within this structure, the teacher can still interact with the students based on their contributions, calibrating her responses to meet their needs in relation to the tasks. However, the discussions within the instruction have guidelines and some form of structure. As such, they can provide opportunities for talking about and using the strategies in a consistent manner. They also can serve to reduce complexity for students and teachers (Doyle, 1986). For students, the tasks can become less ambiguous and confusing, and roles within them clearer. For teachers, the structure provided by metascripts can at least somewhat constrain the types of decisions to be made and thus make these decisions more manageable.

The dialogues of Reciprocal Teaching, in which group members use four strategies to structure their discussions about the text, is an example of the use of a metascript (Palincsar, 1986). MCPS incorporated similarly structured dialogues into some of the lessons; the students took turns being leaders, employing strategies either selected from the chart by them or by the researcher/teacher for their assigned segment of the text. These structured dialogues did not consistently serve the purposes of metascripts. The routines within

the general structure varied, often due to the researcher/teacher's concern with maximizing student participation, especially for strategy evaluation.

Throughout the phases of instruction, there was much variation in the way in which the strategies were evaluated, even when the students were taking turns being leaders in using them. On many occasions, the researcher/teacher evaluated the strategy use, either explicitly by referring to the criteria or implicitly through the types of guidance she provided. On other occasions, she asked the students to evaluate, either by using the criteria or through referring to the text. On still other occasions, both the researcher/teacher and the students were involved in evaluation. The inconsistent procedures for evaluation were frequently due to the researcher/teacher's uncertainty about whether or not she was providing sufficient opportunities for the students to participate in strategy evaluation. This lack of consistent evaluation made it difficult for the researcher/teacher to scaffold, as she needed to provide different kinds of support with different evaluation formats. This increased the incidence and complexity of her decision making.

The structured dialogues, when utilized, did provide guidelines to some extent for scaffolding. However, the instruction did not involve daily use of these dialogues. Discussions such as those around planning the videotapes, sharing strategy use, and identifying strategies for particular reading tasks did not utilize a metascript or involve any sort of routine. While these "looser" discussions were

valuable, especially in terms of helping the students develop conditional knowledge about strategies, the level of ambiguity within them was high and determining the nature of support needed by the students was difficult.

Lack of Gradual Release of Responsibility

The third factor identified as contributing to the difficulty and uncertainty about how to scaffold the students within this model was the lack of a gradual release of responsibility by the teacher. Scaffolding has been conceptualized (Wood, Bruner, & Ross, 1976; Campione, 1983) within the framework of the more knowledgeable other assuming major responsibility for task completion and gradually relinquishing this as the child becomes able to carry out the task on her own. This gradual release of responsibility did not occur in MCPS. The researcher/teacher was a dominant participant in the group in all phases.

Given the goals and design of MCPS, with the focus on maximizing opportunities for the students to identify, define, and evaluate strategies, the researcher/teacher did not always assume maximum responsibility for task completion when the tasks were first introduced. The students identified the strategies to be explored along with her, talking about strategies that could be used to help understand and remember text as well as sharing strategies they used while reading. Strategies suggested by both the researcher/teacher and students were written on the chart throughout instruction. The researcher/teacher did model the use of the strategies but the students

also used them from the beginning. For example, in initially exploring summarizing, the students first selected the best of three samples, the researcher/teacher next modeled two summaries (one in Group One), and then students composed their own summaries in partners.

The lack of a metascript contributed to difficulties in handing over responsibility. Because the tasks varied within and among the phases, opportunities for gradual release of responsibility, as well as gradual assumption of responsibility by the students, were lessened. Within a consistent structure, there is more clarity about "what is being handed over;" in addition, there are more opportunities for this to occur.

Without the framework of this gradual release, and in the context of trying to provide opportunity for maximum student input, ambiguity about the nature of support needed by the students was high and scaffolding decisions difficult. There was much tension about when to "step in" and how to do so, too often resulting in inconsistent demands or challenges to the students. In some instances, the researcher/teacher provided what may have been too much support:

Researcher/teacher: Julia, any other questions you'd like to ask? Look at this sentence. "It can turn itself on and off whenever it wants."

Julia: When can it turn itself...

Researcher/teacher: Do you mean the light?

Julia: Yeah.

Researcher/teacher: When does the firefly

Julia: When does the firefly

Researcher/teacher: Turn the light on

Julia: Turn the light on

At other times, she provided too little. Throughout the phases of instruction, she was continually questioning the level of support she was providing, with particular uncertainty about modeling.

These uncertainties especially occurred as the strategies were first being explored, and have raised questions about the level of initial support needed to enable the students to have opportunities to participate in and develop ownership of the strategy exploration yet still be able to meet task demands and thus to profit from their attempts to do so. The researcher/teacher had to decide how to resolve the goal of maximizing student responsibility with the need to provide support that would allow the students to move to shared understanding of the tasks as quickly as possible as well as to assume responsibility for strategy use over time. These decisions would have been less difficult if made within a model of gradual release of responsibility.

Difficulties of Being a Novice

The final factor identified as mediating the researcher/teacher's ability to provide scaffolded instruction within MCPS was the difficulties associated with being, and becoming, a novice teacher, or one involved in changing her practices. Duffy and Roehler (1989), in discussing the complexity of teacher as learner, identify teacher's knowledge, understandings, and expectations as factors contributing to

the difficulty of changing practice. These factors were present in this study. The researcher/teacher was, without doubt, a novice in implementing MCPS. This was a new model of instruction, one that in many ways was continually being defined and re-defined. The model represented conceptions about teaching and learning very different from those represented in her previous teaching practice. Although she had taught one of the Collaborative Problem Solving groups in the Palincsar et al. (1989, 1990, in press a, in press b) study, her classroom teaching experiences had primarily involved direct instruction. As a classroom teacher, her interactions with students had been more prescriptive and her concerns for maximizing student responsibility were less prevalent than they were in this study. Overall, her role had been one of knowledge provider rather than mediator of students' construction of knowledge.

The researcher/teacher in this study frequently responded to the students' contributions in a rather disorganized fashion. A characteristic distinguishing novices and experts is experts' ability to perceive patterns or to "chunk" (Simon & Chase, 1973). By doing so, they are able to free more cognitive capacity for decision making; novices are less able to "chunk" and thus make decisions based on less organized information. Leinhart and Greeno (1984) found that, in implementing preplanned routines, more experienced teachers were able to attend to information obtained in student interactions and still keep their agenda. As a novice, the researcher/teacher in this study had difficulty attending to the whole and perhaps shifted the agenda

too often, changing the tasks too quickly rather than scaffolding through supportive dialogue.

Another aspect of being a novice was difficulty the researcher/teacher had in adjusting to "feeling like a novice." Implementation of new practices has been characterized as "an awkward and inefficient period" (Duffy and Roehler, 1989). This may be particularly problematic for one who has formerly well-developed routines and interaction patterns and has become accustomed to smoothly flowing lessons. The conceptions of herself as a master teacher held by the researcher/teacher in this study were challenged by the confusion and uncertainty she felt in implementing MCPS; this uncertainty, and the self-doubt it engendered, further complicated scaffolding decisions.

In sum, scaffolding within MCPS was complex and quite difficult. There was a high degree of ambiguity in the tasks themselves as well as in decisions about ways in which to support the students' progress towards independent use of strategies to monitor and regulate their reading. The nature of scaffolding within any model involves on-going decision-making which, by nature, creates a certain degree of tension. Other factors identified as contributing to the difficulties of providing support within this particular model were the tasks themselves, the lack of a metascript for using and discussing the strategies, the lack of adherence to a model of gradual release of responsibility, and the inherent difficulties of being a novice.

The next four questions focus on the students' knowledge about strategies and competence in using them, as well as on their concepts about reading and reading comprehension performance, both prior to and following instruction. The questions were addressed through examining the students' performance on the outcome measures.

Question #3

What was the nature of the students' declarative and conditional knowledge about strategies before participation in Mediated Collaborative Problem Solving and what kinds of changes occurred in this knowledge over the course of instruction?

To address this question, the students' performance on the Strategy Knowledge metacognitive interview was examined. As inter-rater reliability on the Strategy Knowledge measure was low (Pearson r=.55), two raters discussed all of the students' responses to the questions until they reached consensus.

As indicated in Figure 1, prior to instruction the special education (SE) and Chapter One (ChI) students had rather limited knowledge about behaviors they could engage in to monitor and regulate their reading in comparison to the normally achieving (NA) students. Although Sandra (SE) and Karen's (ChI) responses were rated the highest of all of the students, the SE and ChI students, as a group, identified and elaborated on fewer strategies and showed less evidence of knowledge of flexibility of strategy use than did the NA students.

The students' scores for range and specificity of strategy knowledge are presented in Figure 2. All of the students were able to

Figure 1

Total Strategy Knowledge Scores

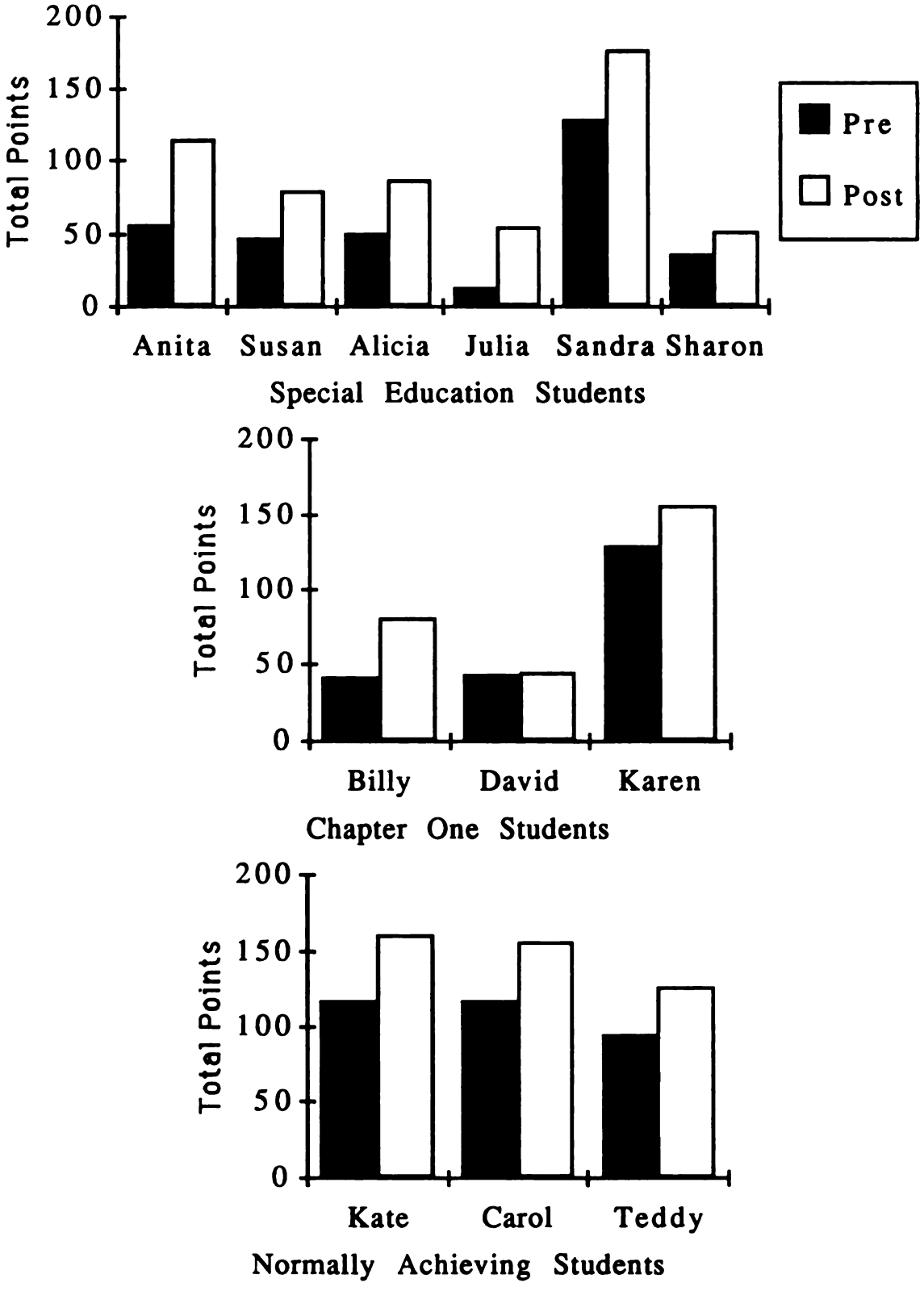
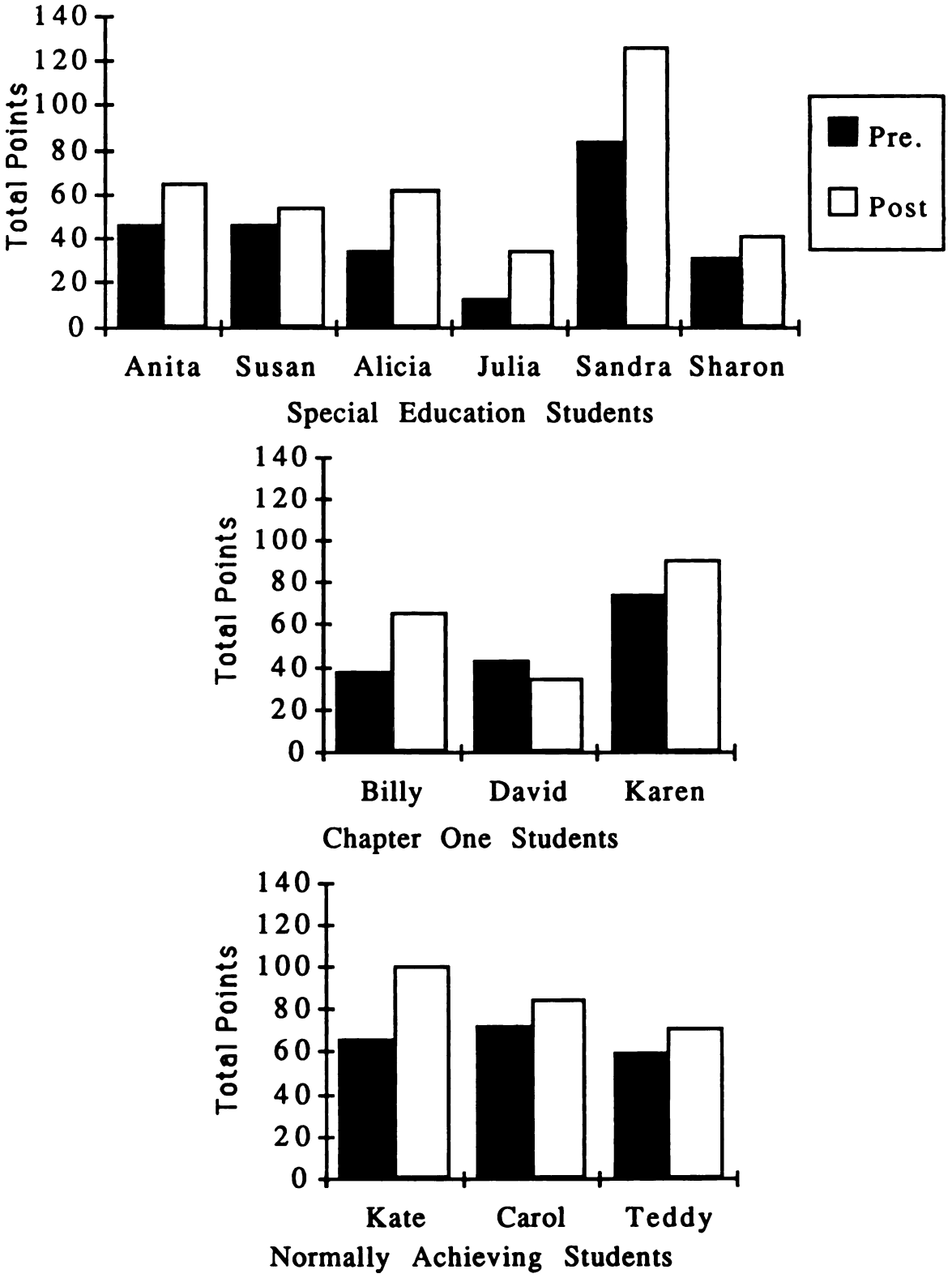


Figure 2

Range and Specificity of Strategy Knowledge Scores



identify strategic behaviors they could use to monitor and regulate their reading; however, Sandra, Karen, and the NA students mentioned a wider range of strategies and were more specific. Following are the strategies Sandra (SE), the student with the highest score, identified in response to the interview questions:

If I didn't understand questions, go back and see if I could find the question and answer

Read slowly

Ask the teacher to give me the questions beforehand

Say dark words in my mind

Sound out

Use experience (not her words) to get words right

Say it (story) in my mind

Go in the paragraph and find the most important information (if she had limited time to read)

Skip unimportant information

Look at pictures

The range and specificity of these strategies was similar to those identified by Carol, the NA student with the highest score in this area:

Go back and look in the story

Read title and think of the pictures

Look at the words underlined or put in darker print

Ask for help

Read slowly

Write something down

Try to say (word she does not know)

Skim

Don't spend time reading questions (if time is limited)

More typical of the SE and ChI students' responses were those given by Anita:

Read questions

Look back

Memorize

Glance through again

Read like a flash

Ask

Glance through

or those identified by David:

Look back

Read the title

Read directions

Ask somebody

Study

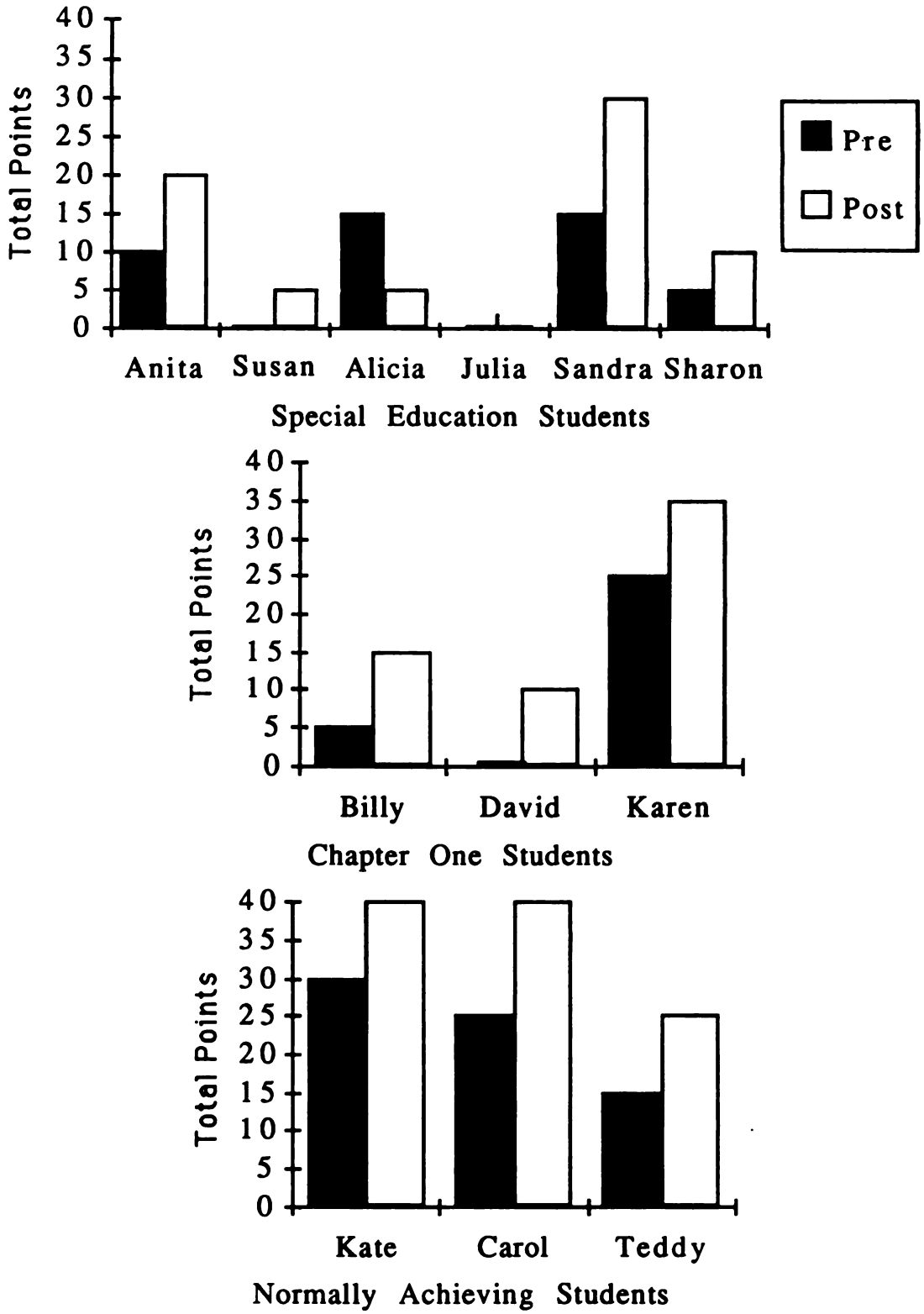
Sound it out

Skip through

The students' scores for elaborations about strategies are presented in Figure 3. Differences among the SE and ChI students and the NA students were evident. No SE student's responses were rated more than 15 points (each elaboration worth 5 points); two of the six

Figure 3

Strategy Elaboration Scores



students' interview responses contained no elaborations. Karen, a fourth grade ChI student, elaborated on five of the strategies she identified, but the other ChI students elaborated on fewer occasions, with their responses similar to those given by the SE students. The NA students, as a group, provided more elaborations for the strategies they identified. Kate elaborated on six strategies, Carol on five, and Teddy on three.

The NA students, along with Sandra (SE) and Karen (ChI) elaborated in a more sophisticated manner than did most of the other students. Sandra gave perhaps the most sophisticated response of all of the students in discussing why she would reread a sentence she did not understand:

> **Why would you read it over a couple of times?** So I could learn why the sentence didn't make sense. Or maybe they had a mistake in it. Or maybe it didn't make sense to me.

The SE and ChI students' elaborations were generally less advanced:

> Alicia (SE): See what pictures are like to see what it is going to be about.
>
> Sharon (SE): Look over the story to find if there are hard words in it
>
> Billy (ChI): Read title to know what story might be about.

The students' knowledge of flexible use of strategies (holistic flexibility) was assessed by examining their identification of different strategies when presented with differences in the reader's background knowledge, tasks, and texts. The SE and ChI students, as a

group, showed little knowledge of flexibility of strategy use prior to instruction, as shown in Figure 4. Only one of the six SE students and one of the three ChI students were assigned any points in this area. In contrast, all of the NA students were assigned 20/30 points. As with the range and specificity scores, even though the NA students as a group showed more knowledge of flexible strategy use, the two students with the highest scores were Sandra and Karen, fourth grade SE and ChI students. Karen said that, because she did not know very much about rocks, she would:

> read everything and make sure I understand every word

while, if she did know a great deal about them, she would:

> maybe just read parts I didn't know about, check over other parts.

The two different tasks were: 1) reading to learn and remember information to tell a friend; and 2) reading to prepare for a test. When asked what she would do to learn and remember the information in the story so she could tell a friend about it, Karen said:

> Maybe read over a second time and say really important stuff in my mind.

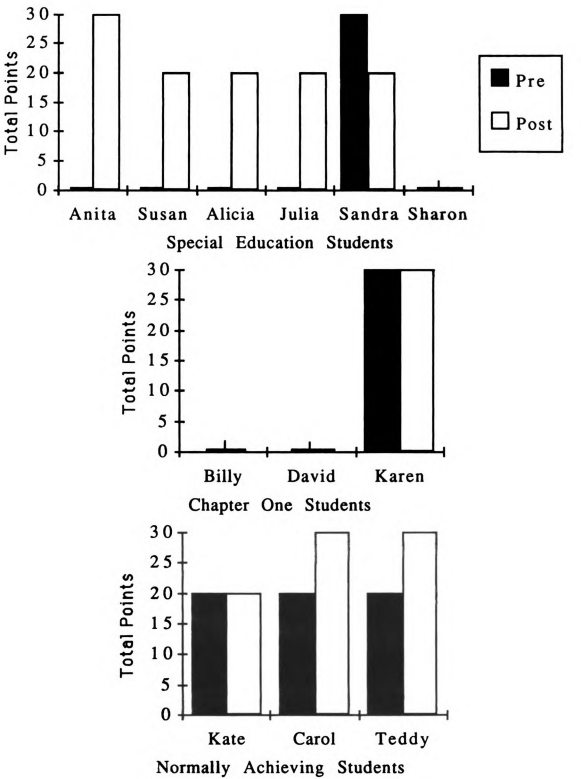
If she were reading the story to take a test, Karen said:

> I'd do every page, make sure I looked over again and didn't skip a page

When presented with two different texts, the rock and the comic, Karen said she would read the comic "more slower" (thinking it would be more interesting!).

Figure 4

Knowledge of Flexibility of Strategy Use Scores



In sum, prior to instruction, the SE and ChI students, except for Sandra and Karen, did not seem familiar with as many strategies as did the NA students. They were not as able to reason and elaborate about the strategies they identified and showed less knowledge of flexible strategy use. Sandra and Karen, however, evidenced knowledge of a wider range of strategies than did the other students in their groups, were more able to elaborate on them, and showed more knowledge of flexibility of strategy use than was shown by the NA students.

The interview responses of students in all groups following instruction showed evidence of changes in their declarative and conditional knowledge about strategies. The degree of change was greater than in any other area assessed in this study. After instruction, the students identified more strategies than they did previous to instruction (See Figure 2). They more often mentioned the strategies that had been focused on in instruction, particularly questioning. They were somewhat more able to elaborate on these strategies and, as a group, more aware of flexible use of them. In general, these changes were seen in the SE, ChI, and NA students although the overall scores of the NA students after instruction were still higher than those of the students in the other two groups (with the exception of Sandra and Karen).

Sandra showed the greatest increase of the SE students in range and specificity of strategies identified, followed by Alicia. Compare Alicia's strategies before and after instruction:

Alicia before instruction:

Go over again

Ask

Look at pictures

Go over words carefully

Split words into two parts

Alicia after instruction:

Read two times

Ask myself questions

Look at words

Guess

Stop at periods

Look for important words

Skip through

Write down information

Alicia did not identify as many specific and powerful strategies as did some of the other students. However, following instruction, she was able to more clearly identify behaviors she could engage in to monitor and regulate her reading. Susan's score did not increase a great deal; however, she identified more specific strategies than prior to instruction. Anita, whose performance is discussed in detail in the next chapter, identified more strategies as well as more specific ones. Julia and Sharon identified the least number of strategies both prior to and following instruction, although each identified more afterwards than before.

The strategies Billy identified after instruction were more numerous and specific (his performance will also be discussed in the next chapter). Karen, quite knowledgeable about strategies prior to instruction, continued to be even more so after instruction. David showed little change. The NA students, overall, were able to identify a broader range of strategies, as well as more powerful ones, following instruction.

The students provided more elaborations for strategies they identified (See Figure 3) although the change in this area was rather modest. As a group, the SE students continued to have difficulty discussing strategies they identified. Sandra elaborated six times, showing in her elaborations a level of sophistication similar to that shown by the NA students. She had the highest score of all SE students before instruction as well as afterwards; in addition, her gains (three elaborations) were greater than those of the other SE students. Anita's score doubled; she elaborated twice prior to instruction and four times afterwards (her changes will be discussed in the next chapter). Two of the other students did not show gains and two minimal gains. Susan, for example, did not elaborate at all prior to instruction. Afterwards, she said she would look at pictures and guess what's going to happen before reading because:

it might help you on hard words. Might tell in pictures.

All of the ChI students made progress in elaborating about strategies they identified. Their level of sophistication varied greatly. David elaborated two times.

David after instruction:

Read carefully so you don't miss any words

Read front, middle, end (if you don't have time). You are mostly getting all of it

These are fairly minor elaborations but are an improvement from before instruction, when he did not elaborate at all. Karen's elaborations represented much involvement in her reading:

Karen after instruction:

Guess from title. If I knew a little about it, that would help me read.

Think in my mind. Make sure I got the main idea.

Check to see what questions are. If I come across a hard word, look in questions and maybe that would help a little bit.

Write down the main idea. Make cue cards (to use to tell someone about the story)

Read carefuller so I get every main idea.

Sound out and think if I'd heard it before. Grownups talk about it a lot. So if I heard it, might be able to sound out and make sure what it was.

Skim, so I don't have to read all of it. Making sure I got the important parts.

Her reasoning, both prior to and following instruction, was more sophisticated than that of the other ChI students. Billy elaborated once prior to instruction, and three times afterwards, focusing on

asking himself questions, telling himself that something would be on the test, and skimming.

The NA participant students all gave more elaborations after instruction, with the two fourth graders each elaborating eight times. Both of these girls showed a relatively high level of sophistication before instruction and maintained this level. Teddy, the third grader, was able to elaborate more than before instruction. His elaborations were fairly sophisticated on both occasions but were linked with a wider range of strategies afterwards. Teddy was one of the few students who, following instruction, identified summarizing as a strategy he would use. This was one of the strategies focused on during instruction. Teddy talked about why he would summarize:

> Summarize and try to remember what was in the story, and what you were doing on it. Like, if it was about boys and it said, "What was the story about?" and you didn't remember how it was, you could keep it in your mind. And it would help you learn and then you guess and wouldn't realize it.

As portrayed in Figure 4, the students showed more knowledge after instruction about flexible use of strategies, naming more different strategies in response to the sets of questions focused on differences in readers, texts, and tasks. Four of the six SE made at least 20 point gains. Two of the ChI students, Billy and David, did not show progress in this area. Karen, the third, was rated 30/30 points both before and after instruction. Two of the NA students made 10 point gains, scoring 30/30 points after instruction.

In sum, the participant students showed increased knowledge about strategies, were somewhat more able to reason about them, and showed increased knowledge of flexible strategy use. Sandra (SE), Karen (ChI), and the NA students continued to demonstrate a higher level of knowledge than the other two groups after instruction; however, substantial gains were made by students in all groups.

Question #4

What was the students' level of proficiency in summarizing, question-asking, and predicting prior to participation in Mediated Collaborative Problem Solving and what kinds of changes in their use of these strategies occurred over the course of instruction?

The students' level of proficiency in using the above strategies was assessed by the Strategy Use measure in which they were asked to employ the strategies before and after reading a story. Their use of each strategy will be presented and discussed separately.

The students' summarization scores prior to and following instruction are presented in Table 2. The table includes ratings for completeness and quality, holistic ratings, and total scores. Inter-rater reliability for this measure was determined to be .93 (Pearson r).

The students' total scores before instruction ranged from 1 (Billy, ChI student) to 51 (Carol, fourth grade NA student). Carol's summary was a close paraphrase of the story and may have represented proficiency in "strategic copying" rather than summarizing. The next highest score, 19, perhaps a more valid indicator of the student's

Table 2

Summarization Scores

	Completeness		Quality		Holistic		Total	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
SE								
Anita	0	3	6	15	2	4	8	22
Susan	0	2	0	9	1	1	1	12
Alicia	0	2	0	20	1	3	1	25
Julie	2	2	9	11	1	2	12	15
Sandra	2	1	6	7	2	3	10	11
Sharon	1	1	7	12	2	3	10	16
ChI								
Billy	0	1	0	7	1	2	1	10
David	1	0	4	4	2	2	7	6
Karen	0	1	5	8	2	3	7	12
NA								
Kate	2	2	14	16	3	4	19	22
Carol	4	4	43	22	4	4	51	30
Teddy	1	1	4	8	2	2	7	11

ability to summarize, was assigned to Kate's summary of "The Story of Car Manufacturing:"

> Cars can not be made by just one person. in the factories many many people work thar and each person puts a different part on.

As a group, the SE and ChI students seemed less proficient than the NA students in summarizing as illustrated by comparing Kate's summary, above, to the one written by Sandra (SE; score of 10):

> They work together and they have a different job. But if they all work together they would probably get hurt or one person has a job on the steer wheel or the brakes. but I can't name all the jobs (Spelling errors corrected)

and to Karen's (ChI, score of 7) for "The Story of Bread Baking:"

> The story is about good smells, and how to make bread, step by step

Kate's summary focused only on main ideas. Sandra includedthe same number of main ideas but also included information not from the story. Karen focused on the topic and one detail.

As a group, the SE students composed summaries that included fewer main ideas along with more information not in the text than those of the NA students. The ChI students also included fewer main ideas than the NA students. Kate included two of the four main ideas in her summary, Carol included all four, and Teddy included one. Three of the six SE students and two of the three ChI students included no main ideas.

Summarizing was a strategy that the students, as a group, made modest changes in over the course of instruction. Anita included three of the four main ideas of the story in her summary after instruction and Carol included four; the other students included two or fewer. In all, only five students showed an increase in the number of main ideas.

The most dramatic change in summarizing was made by Alicia (SE third grader) and involved inclusion of a greater proportion of information that was from the story as well as more main ideas.

Alicia before instruction:

You got to have the wheels and the steering wheel and a person who drives it so they can ride in a car. And if they didn't make cars, they'd have to ride a bus or a cab or a bus. They might have fun riding it.

Alicia after instruction:

That it's about bread baking and that it's cooked. And then it rises and when it rises it comes up really high. And then he pounds it down so it doesn't get up so high. And then he does it again when it gets up so high.

More typical of the gains were those made by Sharon (SE fourth grader):

Sharon before instruction:

The ingrediens for the bread are flour and milk butter and sugar salt. Bead make a wonderful smell in the morning.

Sharon after instruction:

The story tells How they make cars and How worker put on one part at a time and How they get the part for the cars.

Before instruction, Sharon included a main idea and a detail. After instruction, she focused on the topic, a main idea, and an important detail as well as one of the four main ideas.

As illustrated in Table 2, the summarizing gains of the students in the study ranged from one to 23 points with both the least and greatest gains made by the SE students. These students, as a group, showed more changes in their summaries than did the students in the other groups. Two of them, Anita and Alicia, had total scores equal to or greater than the scores of two of the three NA students.

The students became more competent in question-asking over the course of instruction, with growth in some areas more modest than in others. The subscores for questioning were not combined as three of them represent percentages (the students did not all write ten questions as directed). The students' scores in each area prior to and following instruction are presented in Table 3. Inter-rater reliability for this measure was determined to be .82 (Pearson r).

Prior to instruction, the SE and ChI students had more difficulty with productivity than did the NA students. Four of the six SE students generated ten questions; Julia generated two and Sharon three. David, a ChI student, generated ten questions, Karen three and Billy four. All three NA students generated ten questions.

David (ChI) focused on main ideas in 60% of his questions; Carol (NA) did in 50% of hers. No other student focused on main ideas in more than 33% of his/her questions, with the SE students appearing to have the most difficulty with this. Sophistication level was similar

Table 3

Question-Asking Scores

	Productivity	Main Idea	Sophistication Level	Grammatical Correctness
SE				
Pre				
Anita	10	20	10	30
Susan	10	10	20	0
Alicia	10	20	30	40
Julia	2	0	0	0
Sandra	10	20	30	20
Sharon	3	33	67	67
Post				
Anita	10	40	10	80
Susan	10	20	30	40
Alicia	9	33	44	22
Julia	5	0	0	80
Sandra	9	0	33	33
Sharon	10	60	30	20

Table 3 (Cont'd)

	Productivity	Main Idea	Sophistication Level	Grammatical Correctness
ChI				
Pre				
Billy	4	25	0	25
David	10	60	20	30
Karen	3	0	0	100
Post				
Billy	9	44	0	67
David	5	60	20	40
Karen	10	30	30	80
NA				
Pre				
Kate	10	20	10	80
Carol	10	50	0	50
Teddy	10	20	30	60
Post				
Kate	10	60	20	80
Carol	9	44	0	67
Teddy	10	30	10	50

Note. The scores for Main Idea, Sophistication Level, and Grammatical Correctness are stated as proportions of total number of questions generated.

in all groups (slightly lower in the ChI group), with the students generally asking more questions which were either unrelated to the story, generic (e.g., Did you like it?), involved yes/no responses, or closely parallelled particular sentences rather than those which connected ideas across sentences or focused on superordinates (e.g., What are the ingredients?). The students' questions were generally stated in question form, with the exception of Susan's, an SE student. More of the NA students generated grammatically correct questions than did the students in the other two groups.

The students, as a group, were highly productive after instruction (See Table 3). Three of the SE students generated ten questions, two generated nine, and one generated five. Two of the three ChI students (Billy and Karen) made substantial progress in productivity while David generated fewer questions after instruction. All of the NA students maintained high productivity.

Four of the six SE students generated a higher proportion of main idea questions than they had before instruction, with the highest proportion being 60% (Sharon). Two ChI students gained in this area. The highest score in this group was also 60%. This group's proportion of main ideas was identical to that of the NA students and similar to that of four of the six SE students (Julia and Sandra did not focus on main ideas in any of their questions.)

Minimal gains were made by students in all groups in terms of the level of sophistication of their questions. After instruction, as before, most of the students' questions did not involve integration of

information across sentences. Three of the SE participant students did show some change in this area. Although these gains were fairly small (3%-14%), they were commensurate with those made by other students in the study.

Four of the SE students made gains in grammatical correctness. Two SE students' sets of questions were rated 80% correct, the highest rating in the study. The overall level for grammatical correctness after instruction in the SE group was still generally below that of the ChI and NA students. At least 40% of all ChI students' questions and 50% of all three NA students' questions were rated as grammatically correct.

As with summarizing, the performance of the SE and ChI students was more similar to that of the NA students following instruction than previous to it.

The students' scores for predicting are shown in Table 4. Reliability for this measure was determined to be .797 (Pearson r). Proficiency in making predictions was assessed in two ways. First, the students were given the story title and asked to make a prediction about the kinds of information they thought they would be learning about in the story. Second, after reading the story (last paragraph deleted), they were asked to predict the ending. Their performance on each of these tasks will be presented and discussed separately.

Although two SE students' predictions from the title were rated at ceiling level (5), as a group, these students entered instruction evidencing less proficiency than the other groups of students in making

Table 4

Prediction Scores

	Predictions from Title		Predictions for Story Ending	
	Pre	Post	Pre	Post
SE				
Anita	5	4	0	3
Susan	0	5	2	2
Alicia	0	3	2	2
Julia	5	3	2	2
Sandra	1	5	3	3
Sharon	3	1	2	3
ChI				
Billy	5	4	1	2
David	4	1	3	3
Karen	1	4	2	3
NA				
Kate	5	1	3	3
Carol	2	4	3	3
Teddy	3	5	3	2

predictions from the story title. Three of the six students' predictions were rated 3 (focus on one topic likely to be in the story) or above while two of the three ChI students and two of the three NA students had these ratings. Two of the SE students made predictions rated 0, (makes no sense, is vague, a repetition of the title); none of predictions made by students in the other groups was rated 0.

The SE students' predictions were more like those of the students in the other two groups after instruction. Three of the six SE students had ratings at least three points higher than they did prior to instruction. Alicia's score, for example, was 0 prior to instruction and 3 afterwards.

Alicia before instruction:

About car manufacturing. About people and moms and dads with their kids; they might do something

Alicia after instruction:

About bread. And they might cook it and make stuff. **(More?)** That it might be, just be put in something, doesn't' have to cook that long.

One ChI participant student showed gains in predicting over the course of instruction; Karen's prediction rating was 1 before instruction and 4 afterwards. Two of the three NA participant students made gains of two points. The prediction of one student, Kate, was rated four points lower after instruction, most likely reflecting her motivation level rather than her actual proficiency.

Prior to instruction, ten of the twelve students' predictions for the story ending were rated 2 (fairly likely) or 3 (highly likely). The SE and ChI students' predictions were similar. Both groups were slightly less proficient than the NA students. One of the six SE students' predictions and one of the three ChI students' predictions were rated 3 (highly likely to follow what has been read) while all of the NA students' predictions were assigned this rating. All students' predictions were rated 2 or 3 following instruction. Two of the three NA students' scores remained at 3, ceiling level. Two of the six SE students' predictions were rated 3 as were those of two of the three ChI students. Karen's predictions illustrate change from a prediction rated "fairly likely" to one rated "highly likely:"

Karen before instruction:

How to bake cakes, cookies

Karen after instruction:

A person who buys a car, a new kind of car (Spelling corrected)

In sum, this research question focused on the students' proficiency in summarizing, question-asking, and predicting prior to and following instruction. Prior to instruction, the SE students, as a group, were not as proficient in using these strategies as were the NA students. On most measures, the ChI students were more similar to the SE students than to the NA group. Overall, the students showed improved proficiency in utilizing all three strategies with the performance of the three groups being more similar to each other than it was prior to instruction. Changes in composing summaries were

modest, especially in terms of inclusion of main ideas. Improvement was seen in the students' question-asking, with the exception of level of sophistication. Following instruction, they were more productive in asking questions, focusing more on main ideas, and generating more grammatically correct questions. Many of the students were quite competent in making predictions prior to instruction and remained so afterwards.

Question #5

What was the nature of the students' concepts about reading before participation in Mediated Collaborative Problem Solving and what kinds of changes occurred in these concepts over the course of instruction?

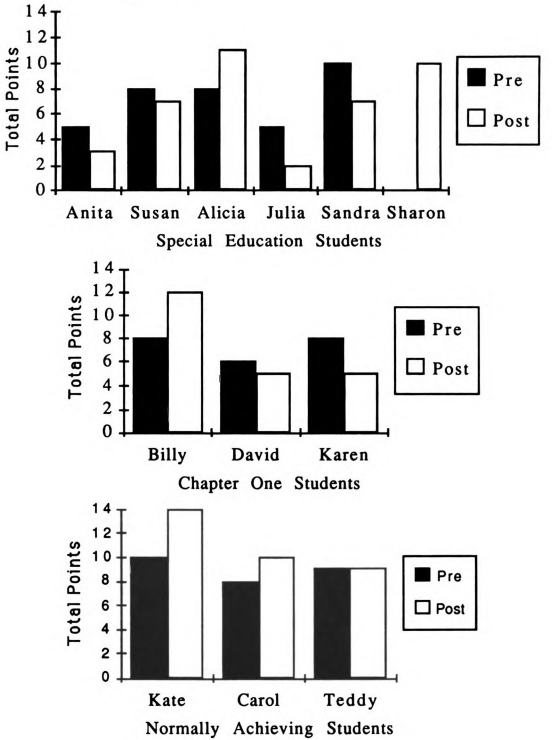
Question 5 was addressed by examining the students' responses to the first metacognitive interview. The students' scores on this measure before instruction are presented in Figure 5. Inter-rater reliability on this measure was determined to be .884 (Pearson r).

As evidenced by their responses to the interview questions prior to instruction, most of the students focused on both decoding and meaning-seeking in thinking about reading. Five of the six SE students emphasized decoding in responding to at least one question as well as meaning beyond the word level on at least one question. Sharon, the sixth student, gave responses which were all scored as vague, for example:

How do you know if someone is a good reader? They know all of the words in the book

Figure 5

Concept of Reading Scores



What is reading? When you read an interesting book; people like to read

All of the ChI students had at least one response scored as reflecting meaning-seeking beyond the word level. These students' other responses were either scored as vague, or reflecting an emphasis on decoding or vocabulary. The three NA students all gave at least one response reflecting meaning seeking and at least one reflecting decoding.

The range of scores on this measure was 0-10 of a possible 20 points. Interestingly, both the lowest and highest scores were those of SE students. As a group, the NA students' responses were rated higher than those of the other two groups. Forty percent of their responses were scored as level 3 (focus on meaning beyond the word level) or level 4 (focus on different purposes for reading or different strategies) while 26% of the responses given by the SE students and 30% of those given by the ChI students were scored on those levels.

The students emphasized different aspects of reading in responding to the different questions. This was particularly noticeable in comparing their responses to question 3 (**If you were teaching a younger student to read, what would you teach him or her to do while reading?**) to their responses to question 4 (**Some people say that reading is thinking. What do they mean? How is reading thinking?**). Seven of the students, or 58% of the group, focused on decoding in their response to the first question while only one, or 8%, focused on meaning above the word level (the others four gave vague responses). In contrast, 83% of the students emphasized meaning in their responses to question four

while 8% emphasized decoding. Carol's responses to the two questions illustrate the difference in focus:

> If you were teaching a younger student to read, what would you tell him or her to do while reading?
>
> To sound them out, at least try. And I would tell them the word if they've already tried and just didn't know it.
>
> Some people say that reading is thinking. What do they mean? How is reading thinking?
>
> Reading is thinking because when you are reading something you don't know what's going to happen next. Try to figure out what's going to happen next. Think about what the sentence meant they had written down.

The majority of students (58%) responded to Question 5 with vague answers that were scored as 0. This question was:

> I am going to ask you some questions and give you some choices for your answers. How do you feel about reading?
>
> Is reading easy for you?
>
> Is reading a little difficult for you? _____Is reading very difficult for you? _____Can you explain what is (easy, a little difficult, very difficult) about reading?
>
> Is reading (easy, a little difficult, very difficult) no matter what you are reading?

In many of these responses and others scored as 0, the students emphasized "hard words;" it could not be determined from their

responses what they meant by this. Karen's response to question 5 had such a focus:

> Little difficult, cause sometimes I don't get all the words, and I, everybody else is all done and I'm not and that really confuses me.
>
> Is reading a little difficult no matter what you are reading?
>
> No. It matters like if I am reading a little bit easy book, it's easy. If I'm reading a big book, it gets harder.

The students participating in MCPS, as a group, showed little change in their conceptions of reading over the course of instruction. Of the six SE students, two had higher scores after instruction while four had lower scores. One of the three ChI students had a higher score while two had lower scores. Two of the three NA students had higher scores while one's total score remained the same. No score dropped over the course of instruction more than three points. Gains ranged from two to ten points. The pattern of responses was similar to that before instruction. One exception to this, however, was an increase in responses to Question 1, What is reading?, that were scored 0. Three of the twelve students showed a movement toward focus on meaning, as exemplified by Sharon:

> Sharon before instruction: When you read an interesting book. People like to read.
>
> Sharon after instruction: It's, you have to use your imagination when you read and you

have to use a strategy to remember what you already read.

However, five students who had scores indicating decoding or meaning focus before instruction gave more vague responses after instruction, as exemplified by Karen:

Karen before instruction: I think maybe it's to help you understand pictures better than looking at pictures and think what it is.

Karen after instruction: Where you read some words and sometimes in paragraphs, or story, or sentence.

Sharon was the one student who made a substantial gain. Prior to instruction, all of her responses were too vague to be scored. Following instruction, two of the five were vague but three were rated as indicating meaning above the word level or focusing on strategies.

Question #6

What was the students' level of performance in comprehension prior to participation in Mediated Collaborative Problem Solving and how did this level change over the course of instruction?

This question was addressed through examining the students' performance on the Think-Aloud measure as well as on the criterion-referenced assessments. The Think-Aloud focused on the students' on-line processing of the story as they read successive

amount of the text while the criterion-referenced measure was a more global measure of their comprehension and recall of the stories they read. The students' performance on each of these measure, both prior to and following instruction, will be discussed separately.

The students' scores on the Think-Aloud measure prior to and following instruction are presented in Figure 6. Reliability for this measure was determined to be .93 (Pearson r). The range of scores before instruction was 42-138. The students with the lowest scores were Alicia (SE) and David (ChI), both third graders. Karen, a ChI fourth grader, had the highest score. The NA students, as a group, had a larger proportion of high scores than did the other two groups.

The proportion of responses receiving each rating:

0: Repetitions of sentence, close paraphrase, no response

2: Monitoring as indicated by expressions of confusion, doubt or understanding

4: Paraphrasing indicating understanding

6: Elaboration and reasoning on the sentence level

12: Elaboration and reasoning across sentences by group is presented in Figure 7.

The SE and the NA students made more elaboration and reasoning statements on the sentence level than any other type of statement (42% of the SE students' responses and 60% of the NA students' responses). Thirty-one percent of the ChI students' responses reflected elaboration and reasoning on the sentence level. The largest proportion of this group's responses (33%) were rated 0. The proportion of statements

Figure 6

Think-Aloud Scores

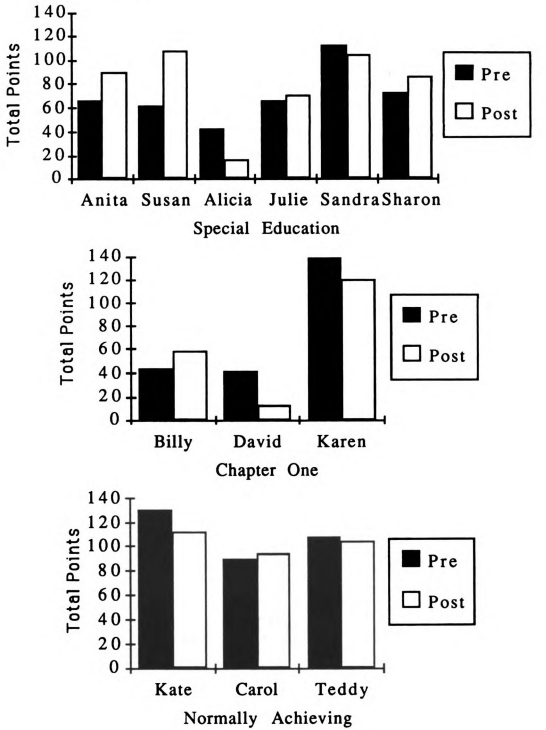
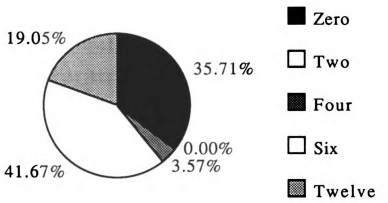


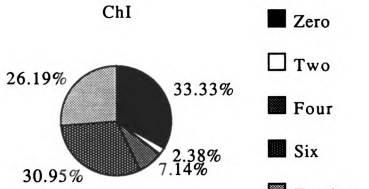
Figure 7

Percentages of Responses to Think-Aloud by Category: Pretest

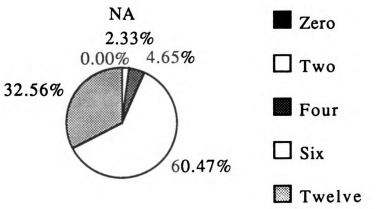
SE



ChI



NA



made by the NA students that were rated 0 (14%) was smaller than in the other two groups (36% SE, 33% ChI)

Elaboration and reasoning across sentences seemed difficult for students in all of the groups, especially the SE students. Nineteen percent of the SE students' statements were categorized as being on this level in contrast to 33% of those made by the NA students and 26% of those made by the ChI students. The highest proportion of these statements made by any student was 64% (Karen, ChI). Her responses indicated she was working to make sense of the story.

The floor of the Aerodium is different from most floors

I think it's tv and turn it on and lay down and watch it. They have all kinds of movies there. Most of the movies and concerts.

It springs up and down, and you can see through it.

Now I know what it is. I think it's a big jumping bean and can jump up and down on it and stuff, a trampoline.

Under the floor you can see a machine

It's machine powered and you just jump up and down on it and it goes for you.

The machine has a very large fan on it

And the fan cools you off when you're jumping up and down. When you get hot, it sprays water and it gets really cool. It cools you down.

This kind of linking was not prevalent in statements made by the group as a whole. Except for one other student (Sandra, SE), the largest

proportion of statements rated as representing elaboration and reasoning across sentences was 29%.

There was not a consistent change in performance on this measure after instruction. The four students with the highest initial scores before instruction remained high afterwards but all had slightly lower scores. In contrast, three of the five students with the lowest initial scores made gains on this measure, two (Anita and Susan, both SE students) making substantially more gains than any other participant. Both of these students had fewer responses rated 0 and a higher number rated 12 than they did prior to instruction.

The patterns of responses were similar to before instruction, as seen in Figure 8. In each group, the highest proportion of responses was rated as reflecting elaboration and reasoning on the sentence level. This did represent a change for the ChI students who had a larger proportion of sentences (45%) on this level than they did prior to instruction (31%). As before instruction, the student with the highest score was Karen (ChI).

The students' scores on the criterion-referenced comprehension assessments prior to, during, and following instruction are presented in Figure 9. Reliability on this measure was determined to be .899 (Pearson r). Refer to Table 1 in Chapter Two for information about the passage level and type of comprehension assessed (reading or listening). Karen's graph includes her performance on multiple assessments given prior to and following instruction. Her decoding performance was below criteria (80 words per minute/ 0 errors) but

Figure 8

Percentages of Responses to Think-Aloud by Category: Posttest

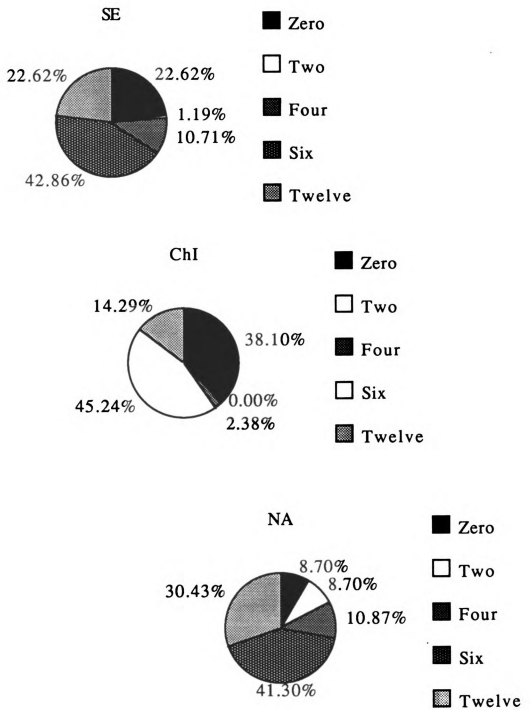


Figure 9

Criterion-Referenced Comprehension Assessment

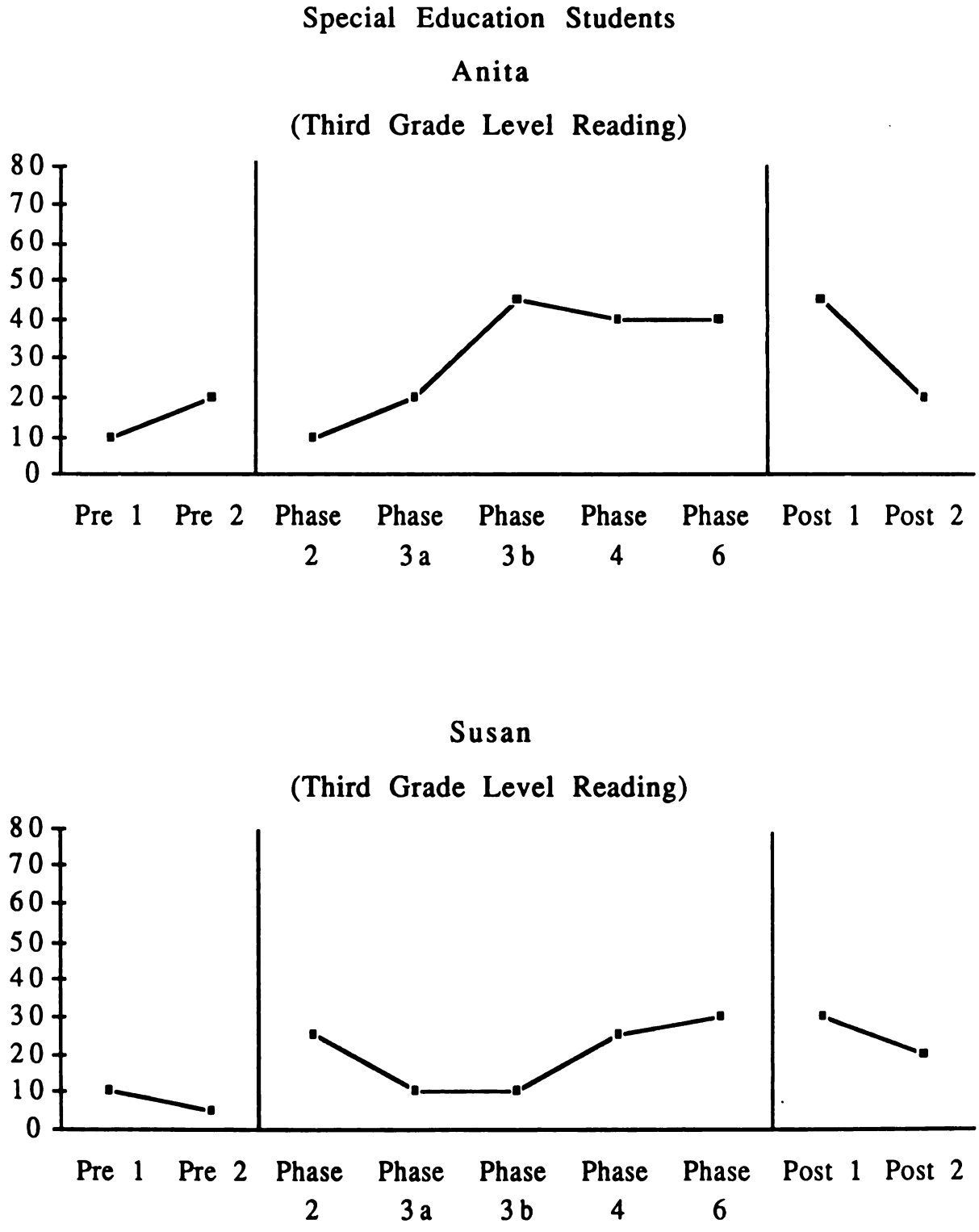
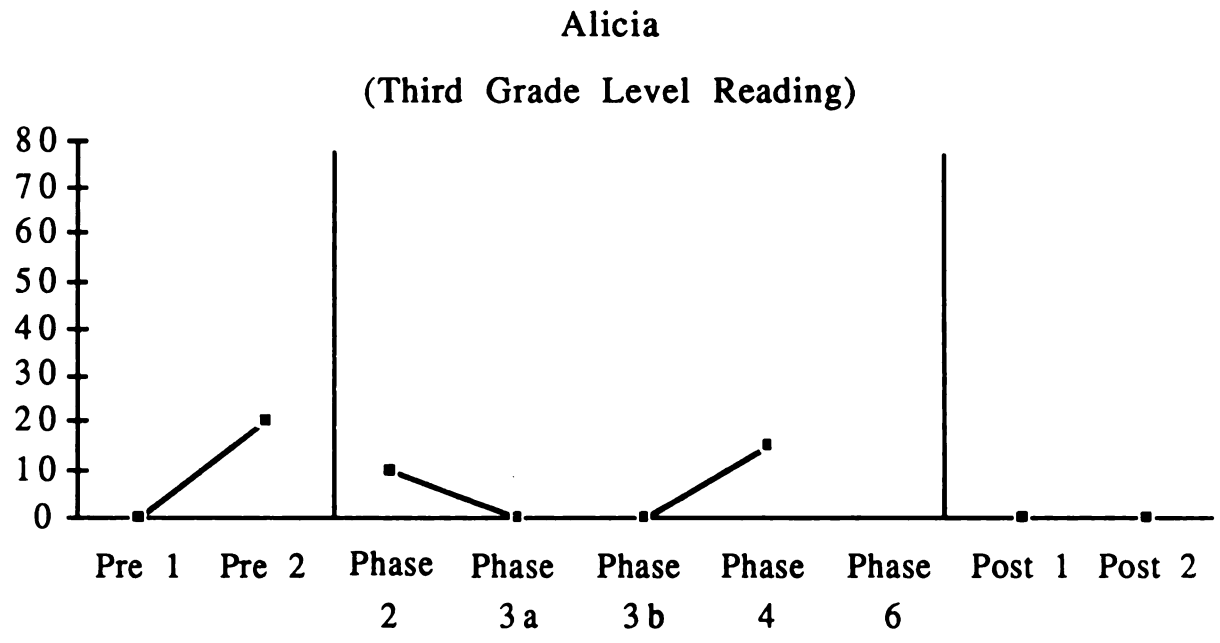


Figure 9 (Cont'd.)



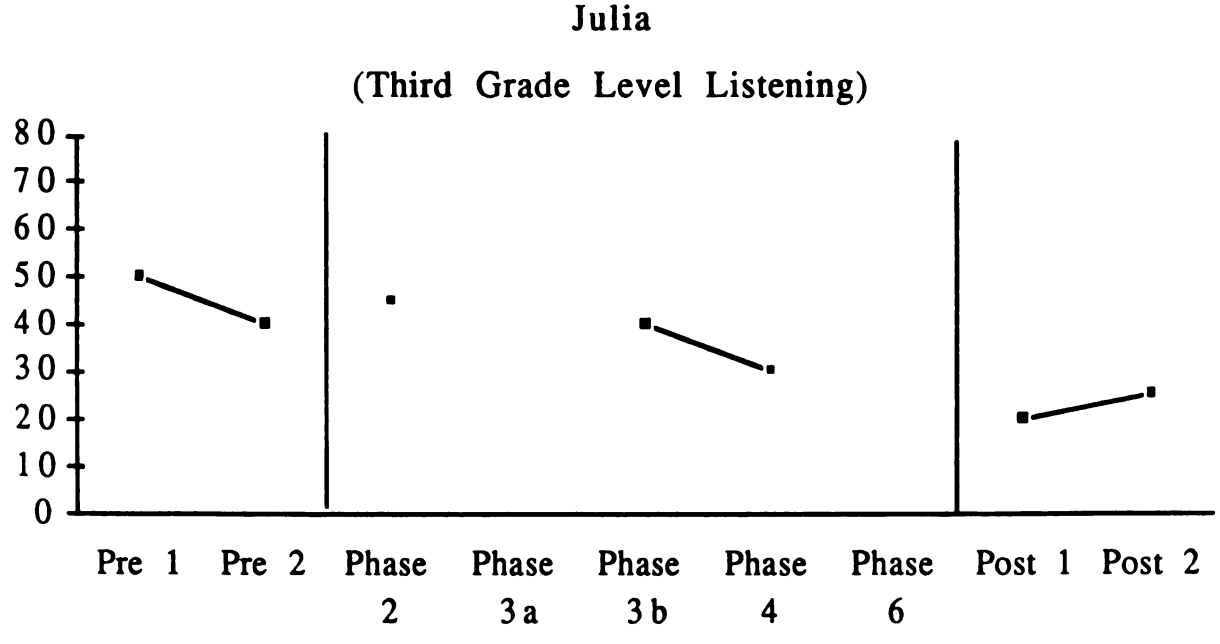
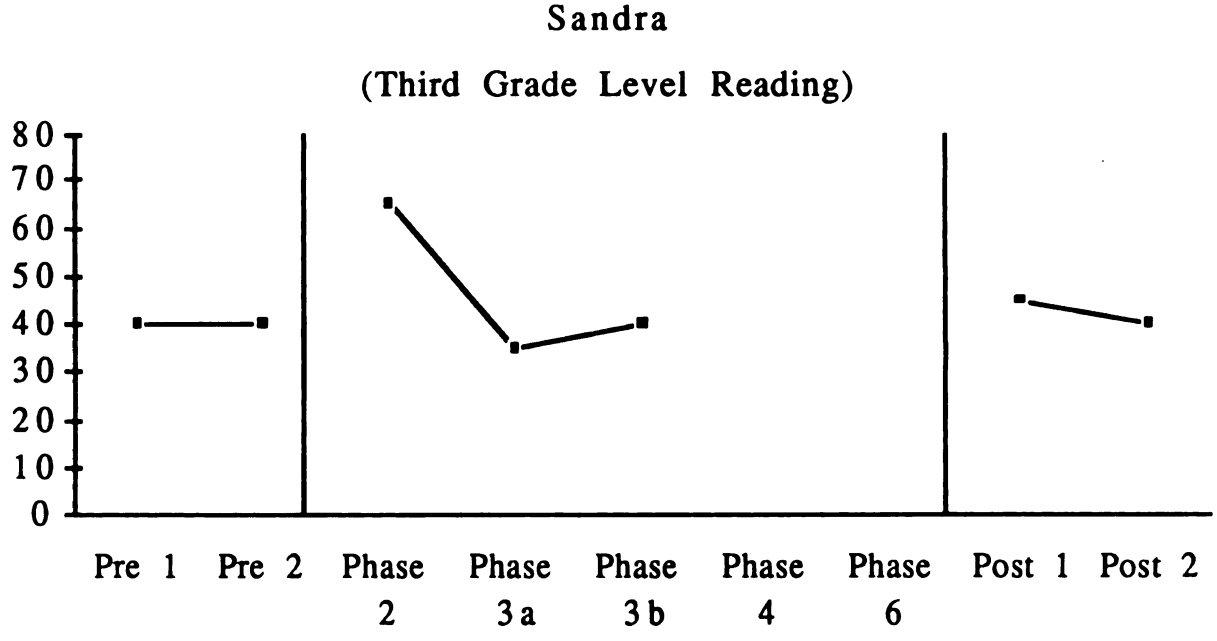


Figure 9 (Cont'd)



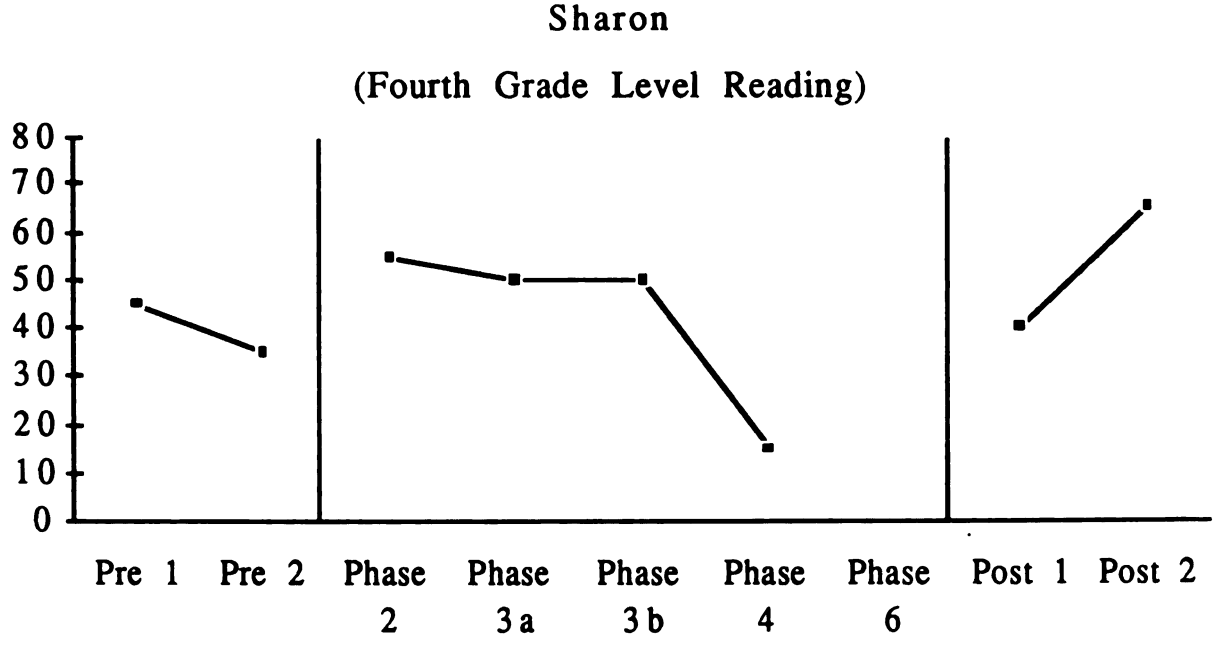
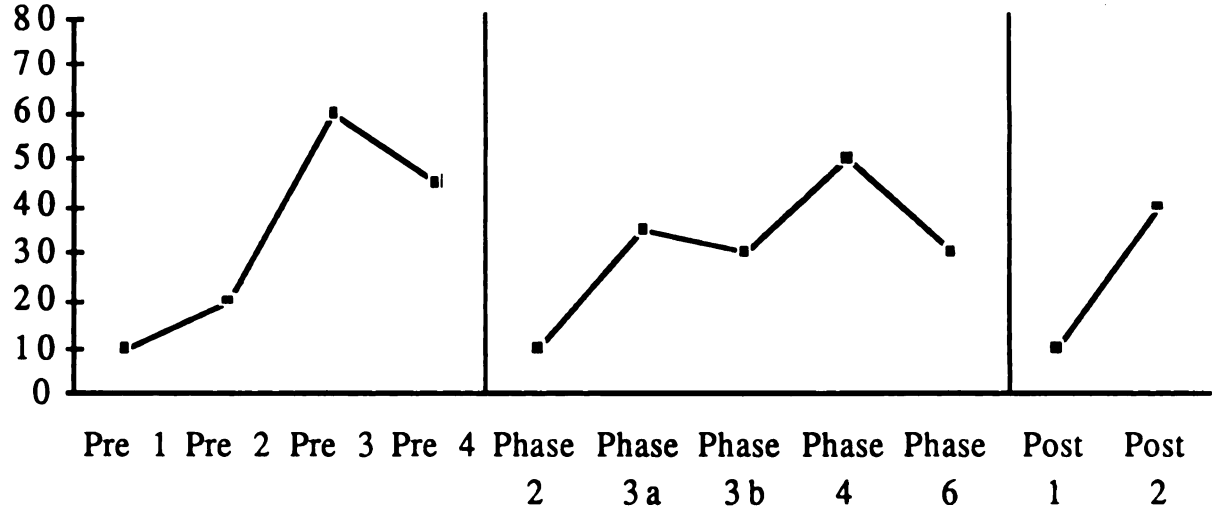


Figure 9 (Cont'd)

Chapter One Students

Billy

(Third Grade Level Reading)



David

(Third Grade Level Reading)

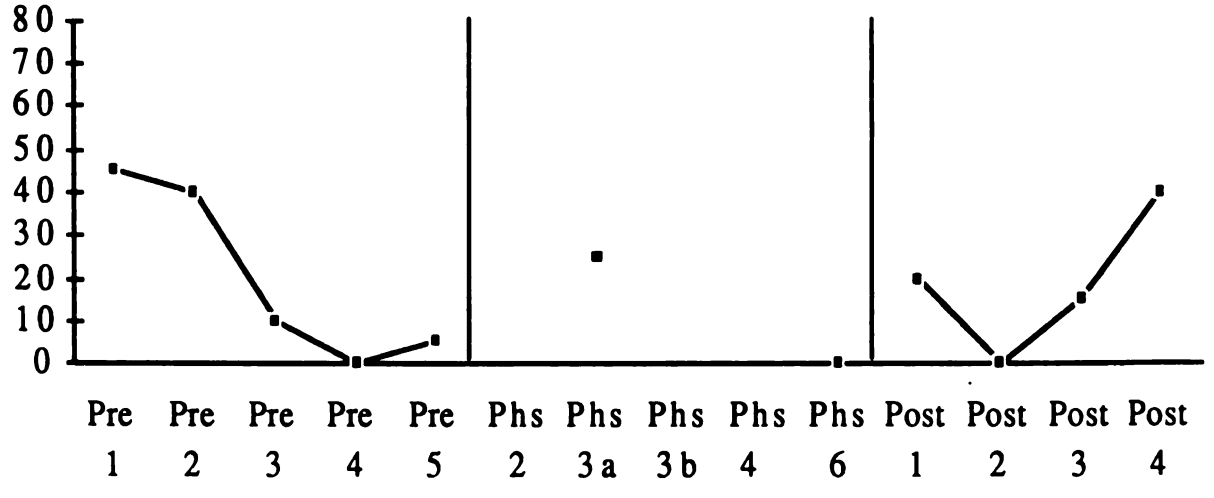
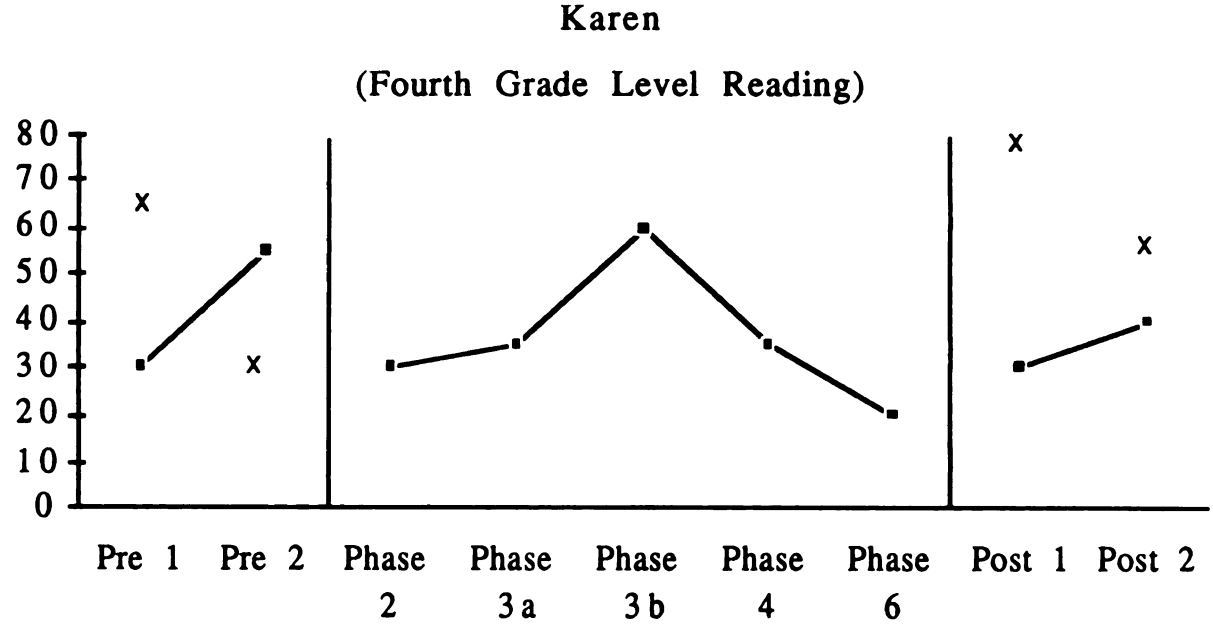


Figure 9 (Cont'd)



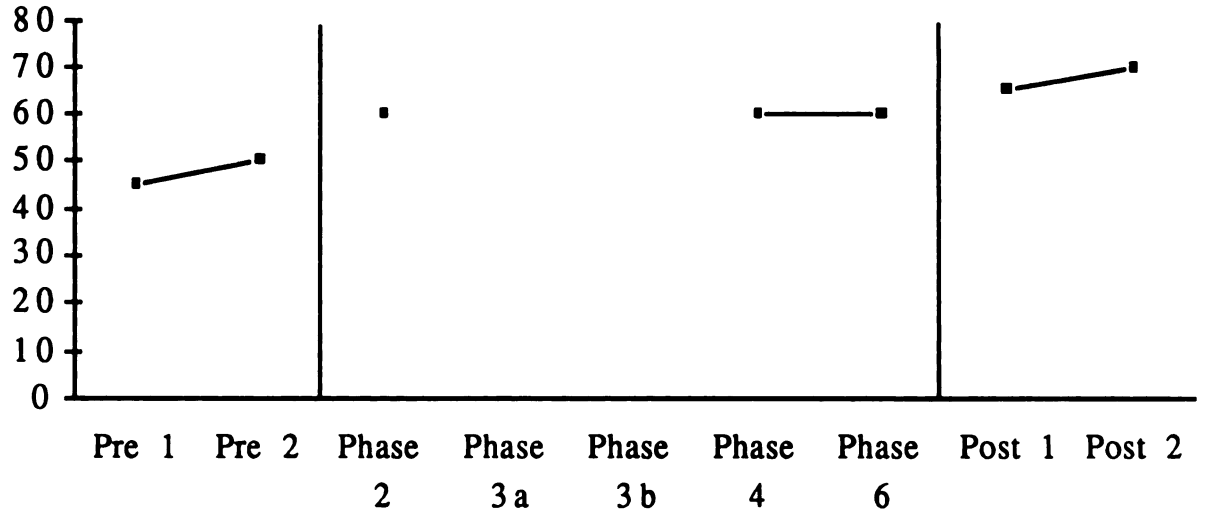
Note. "x" represents performance on third grade level reading.

Figure 9 (Cont'd)

Normally Achieving Students

Kate

(Fourth Grade Level Reading)



Carol

(Fifth Grade Level Reading)

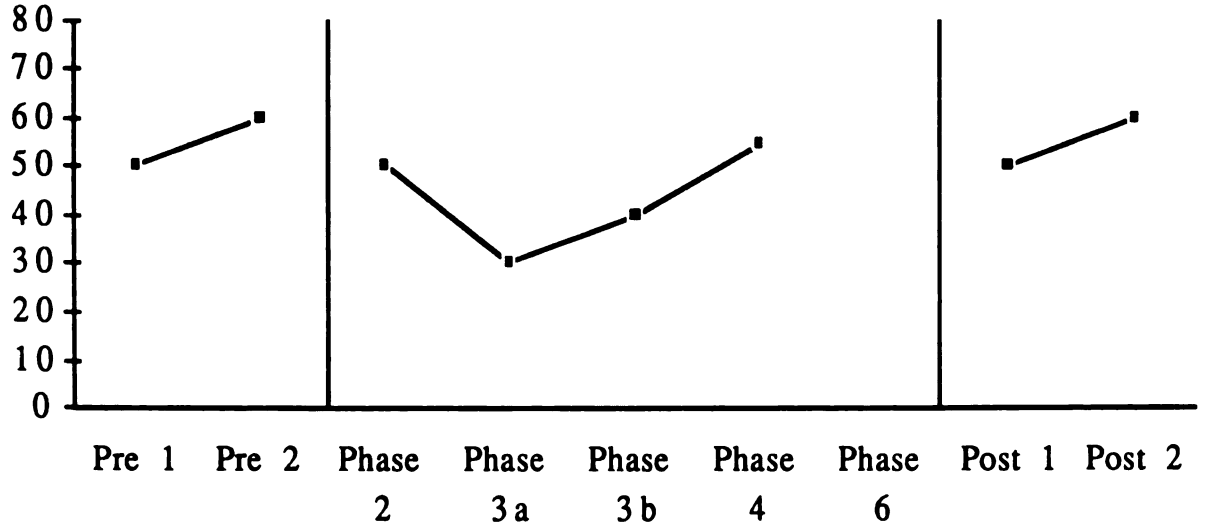
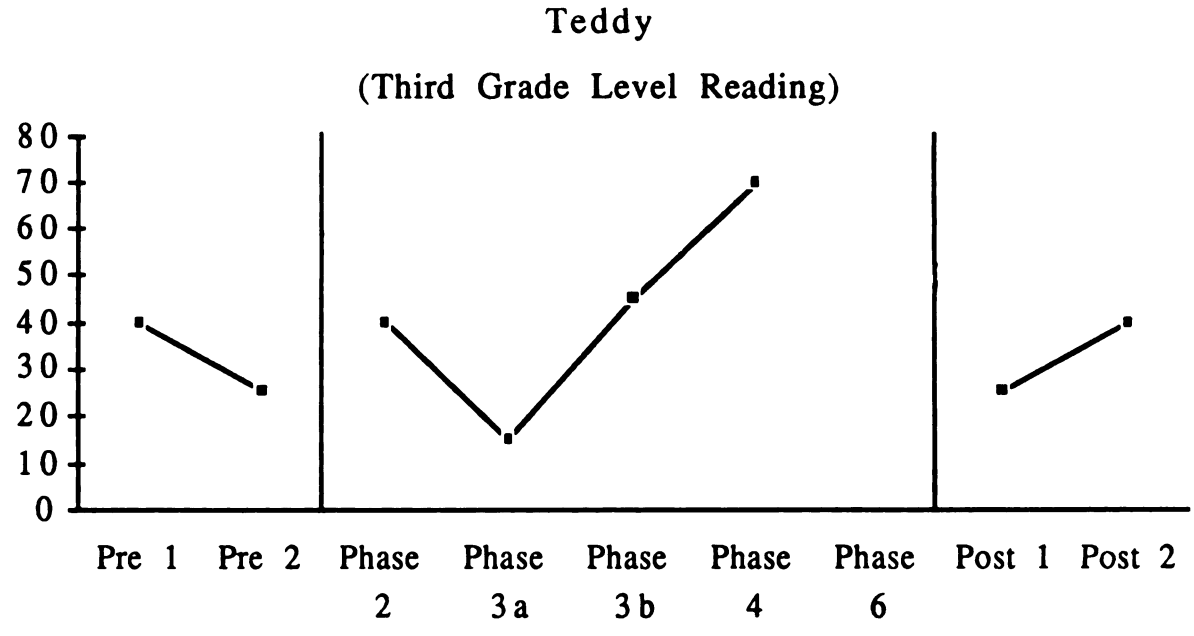


Figure 9 (Cont'd)



almost identical on third and fourth grade level passages. She was given comprehension assessments on both levels before and after instruction but only on fourth grade level passages during instruction.

The direction of the trend lines for the students' performance was calculated by averaging the first three scores and the last three scores. A trend line was not calculated for Teddy as the last measure given to him during instruction was misplaced.

For all but two of the remaining eleven students (Billy and David), the first three scores represent performance on two measures administered prior to instruction and the first measure given to them during instruction. David and Billy's first three scores all represent performance on measures administered before instruction. A larger number of measures was given to these two as their performance was inconsistent. For all of the students except David, the last three scores represent performance on the last measure given to them during instruction as well as on the two measures administered following instruction. David's last three scores represent his performance on measures administered after instruction. He was given four assessment passages rather than two as it was felt he was not putting forth maximum effort.

The students, overall, made minimal changes on these measures. Four of them (Anita, Susan, Kate, Carol) had trend lines with positive slopes. Two of these students were in the SE group and two in the NA group. Anita, one of the SE students, will be discussed in detail in the next chapter. Even with these four students, the differences

between the mean of the first three scores and the last three did not exceed 22 points (range 2-22 points). The maximum difference for students with negative trend lines was 20 points (range 3-20). No students consistently met the criterion-level of 80% accuracy on the comprehension questions.

There seemed to be some parallels between performance on the Think-Aloud measure and the criterion-referenced comprehension assessments. Both of the SE students with positive trend lines also made substantial gains on the Think-Aloud measure (46 and 26 points). Kate, one of the fourth grade NA students, was the second highest scoring student on the Think-Aloud measure prior to instruction. Although her score after instruction was lower than before instruction, it was still the second highest score. Carol, the other NA fourth grader, made very minimal changes in her comprehension performance, as indicated by her trend line. Similarly, her Think-Aloud performance after instruction was only four points different from her performance before instruction. Finally, Karen, one of the ChI participant students, made gains in her performance on the third grade level passages administered prior to and following instruction. Her initial score on the Think-Aloud was the highest of all of the students. Although her score after instruction was lower than before instruction, she continued to have the highest score of the group.

Conceptions of and Feeling about Instructional Activities (Affective Assessment)

Although not the focus of a formal research question, the students' conceptions and feelings about what occurred during instruction was assessed periodically through the use of the Affective Measure described in Chapter Two. This measure was administered five times with this occurring during Phases Two, Three, and Five. The students' responses to this measure were not formally analyzed. It was not always felt that their responses were valid indicators of their feelings about the lessons. Answering the questions, on at least one occasion, seemed to be treated as "something to get done." Also, the measures were not given a sufficient number of times. Although a formal analysis of the students' responses was not conducted, some interesting information about their conceptions and feelings about what the group was doing was gleaned from them.

Most of time, the students indicated their performance had been "great," associating this with their behavior:

Teddy (Phase Two): I tried my hardest.

Sharon (Phase Six): I asked questions

their mood, or their enjoyment of the day:

Billy (Phase Four): Because I had a good day

Karen (Phase Two): Because it was fun and interesting

The occasions when they did not feel they were not "doing great," although few in number, tended to be those in which they found the lessons to be boring. Generally, the students responded that they had

tried hard in the lessons, focusing on both reading the story (including the hard words) and, although not as frequently, using the strategies.

The last two parts of the measure involved the students circling the face (smiling, neutral, sad) describing how they felt and then writing why they felt this way. Most often, the students circled the smiling faces. Their reasons varied; the lesson being "fun" and their having a good day were mentioned fairly often. Neutral faces were circled infrequently; when they were, the main reason given was lack of excitement in the lesson. There were two sad faces, one because the student missed most of the lesson, and one because of trouble at home that morning.

The students' conceptions of what the lessons were about and their feelings about them can provide the teacher with much information about the rationale for the ways in which students participate during instruction as well as their development of skill and will (Paris and Oka, 1986) to transfer what has been learned to other situations. Affective assessment such as was done in this study can also provide the important reminder that what has gone on in the students' lives outside of the group influences what occurs in the classroom context. Factors such as having trouble at home, having a substitute teacher in the classroom, and "having a good day," all mentioned in responses to this measure, no doubt had an impact on what occurred during sessions of MCPS.

CHAPTER FOUR: DESCRIPTIVE ANALYSES OF THE PERFORMANCE OF TWO STUDENT PARTICIPANTS

In this chapter, descriptive analyses of the performance of two students who participated in Mediated Collaborative Problem Solving CPS (MCPS) will be presented. The purpose of these anlyses is threefold. First, they provide an opportunity to examine in depth the students' knowledge about and use of strategies both prior to and following instruction. Second, the analyses illustrate issues that either were a focus of or emerged during instruction. And third, they suggest ways in which individual students may have mediated the instruction. The students to be discussed are Anita and Billy, both members of Group One.

Anita, a fourth grader with learning disabilities, was chosen as a the first focal student because she was a student who actively participated in the discussions during instruction, conceptualizing the tasks as problems and working hard as a group member to solve them. Anita made substantial changes over the course of instruction in terms of her knowledge about and use of strategies, and showed evidence of internalizing these changes. The changes in her knowledge and performance, it is proposed, were related to her interest and involvement as a collaborative group member in identifying, employing, and evaluating strategies. Anita's attitude, her ability to disagree with others and support her positions in discussions, as well as her abstract reasoning and ability to express herself, seemed to work together to make her able to participate in and benefit from MCPS within a heterogenous instructional group.

Billy, a fourth grader receiving Chapter One services, also evidenced changes on the student outcome measures after participation in MCPS. His changes were more limited than Anita's, and he showed little evidence of internalizing newly developed knowledge about strategies. He was selected as the second focal student because he did not seen as able to profit from participation in MCPS as was Anita. Billy had lower verbal reasoning and expressive ability; in addition, he seemed to be much more tense and to have difficulty focusing on the discussions. Overall, he seemed to require much more adult support than did Anita. In the discussion of Billy, the issue of the strengthened role of the teacher will be discussed in terms of its potential to aid him in becoming more in control of his reading through participation in MCPS.

Anita

Anita had a learning profile that met the school district's criteria for learning disabilities; she evidenced a discrepancy between ability and achievement in the areas of basic reading and spelling/written expression. Although Anita's IQ was in the normal range (WISC Full Scale: 105; Verbal: 108; Performance: 100), her reading level, as measured by the 1989 California Achievement Test (CAT) was over one year below grade level expectations. In her last psychological evaluation (Spring, 1988), she had been found to have relative verbal strengths in information and reasoning. Overall, listening comprehension and math were identified as relative strengths.

Anita received 90 minutes of daily resource room services for reading along with four of the other students involved in the study. Her school reports indicated that she had regressed, in terms of academics and effort, during the semester in which the study occurred.

She was a rather unkempt child who seemed quick to enter into arguments with others. She was cooperative during her initial interviews, but behaved in a rather silly manner on the first day of instruction, asking to get a drink and calling attention to an open cabinet door. Although it cannot be said that her silliness disappeared over the course of instruction, she quickly became involved in the group discussions and generally was a very valuable contributor to them.

The manner in which Anita was able to participate in the group discussions seems critical to her growth in knowledge about and application of strategies. During the discussions, she made spontaneous comments, challenged others' positions and defended her own ideas, referred to the text to resolve disagreements, and generally showed interest in and a sense of ownership of the activities and discussions.

From the start, Anita was quick to challenge other group members if she disagreed with them. On Day Two, as the group was writing the story about the creature it had drawn, Anita made comments such as "We already know what it can eat." "There's no pears on Pluto." "Yeah but Sarah, you didn't put that in the story," seeming to want to push the group to write a story that made sense. She continued to pose

challenges as the group became more involved in using the strategies. For example, on Day 18, she defended her answer to Karen's question about what glowworms' lights do when it is calm:

Karen: What do the lights do when it all calms down?

....

Karen: Anita

Teacher: Good, Anita

Anita: Dark once more

Karen: Nope

Anita: Yuh huh

Teacher: How does it, ok, let's ask another question.

Anita: It says dark once more

Teacher: Ok, what were you going to say?

Karen: Their lights blink out

Teacher: Ok, and that makes it dark once more.

Anita: Same thing

Although Anita sometimes engaged in rather silly arguments with the others (e.g., "But you guys read it. You didn't ask a question"), she also added suggestions that were helpful to the group as occurred on Day 29:

Karen: They already explored. They've already explored the north

Teacher: Already explored the, could we just say a lot?

Karen: South, east and west

Teacher: Ok, they've already explored a lot.

Karen: (Inaudible)

Teacher: but they're all (inaudible)

Anita: I know a shorter way to say it.

Teacher: Ok

Anita: They sailed all, they swimmed in all directions instead of saying east and

Teacher: Ok, how does that sound, Karen? They've explored in all directions? Ok, now say it again, using that

Anita's involvement level was high. She, more than many of the other students, suggested words that needed clarification. She was quite involved as the group worked to figure out what "prey" meant. Sarah wanted to get the dictionary; Anita worked hard to use the text:

Sarah: Should I go get it?

Teacher: I wonder if we should

Sarah: Because you said it was the

Teacher: Well, wait a minute. Let me see if I can figure it out by the words around it. Ok, the prey is something that gets poison shot into it.

Sarah: (Inaudible)

Teacher: Now the poison turns the creature's insides to liquid. If, I'm wondering if it's something that it eats. The larvae sucks out the prey or sucks out the poison.

Anita: These sound like flies.

Teacher: Well, we are reading about fireflies. Let's look at that word <u>prey</u> again.

Anita: It could be..baby fireflies...baby fireflies

Teacher: Ok, the baby fireflies are fierce hunters. So this tells us it's hunting, right?

Anita: Yeah

Teacher: (Reads): At night, they creep beneath the loose dirt and dead leaves in search of snails and worms." So they're looking for snails and worms, right?

Anita: Here you go. It's going to be, it's going to be

Teacher: What do you think, Anita?

Anita: Snails and worms

On this and other occasions, Anita's excitement level was high, with her almost "sputtering out" the responses. Paris and Oka (1986) note the importance of skill and will to use strategies. Anita had both.

As evidence of her motivation to use the strategies, Anita put effort into trying out the strategies on her own. After the group had begun to focus on picturing, Anita was observed closing her eyes while working on the criterion-referenced assessment, appearing to be working to form a picture of the story. One day after class, she explained to the teacher that she had continued to make the same prediction during instruction because the group was still reading a section under the same heading, appearing proud of herself for doing this and eager to share her strategy with the teacher. Finally, she was quick to raise questions about what the group was doing, questions that sometimes revealed misconceptions in such a manner that they could be focused on. She was the student who, on Day 17, asked "What if there is no

meaning?" when reminded that summaries involve thinking about meaning and then, when the teacher raised the question about the possibility of a text not having meaning, suggested that this occurs with fiction.

Anita's performance on the knowledge measures provided evidence that she had internalized, at least to some extent, the reasoning and behaviors focused on in MCPS. Following is a discussion of the changes that occurred in her knowledge about and use of strategies as well as in her ideas about reading, her on-line processing, and her comprehension of expository text.

Prior to instruction, Anita's knowledge of strategies was rather limited, especially in comparison to that of Kate and Carol, the normally achieving (NA) fourth grade girls. She identified the following strategies in response to questions from the second metacognitive interview:

Read questions (before reading story)

Memorize

Look back

Ask parents

Glance through

None of the strategies she mentioned were among those that have been identified as being particularly beneficial for learning from and remembering text (Pressley, Johnson, Symons, McGoldrick, & Kurita, 1989). Anita provided justifications for two of the strategies she identified. When asked why she would read questions before she read the story, she said:

So I could find what the questions are inside the story so I wouldn't have to go back and find the questions. If I couldn't find the questions, I would have to look back in the book

This indicated she would focus on the questions as she read to save time later. She also said she would read a story about rocks "like a flash" if she knew about rocks because she would not have to go back and ask what things meant, indicating her knowledge of the value of background knowledge. Although Anita's score for elaborations was higher than that of three of the other four students with reading difficulties in her group, it was lower than that of the two normally achieving fourth graders.

Anita did not show evidence of knowledge of flexibility in strategy use in her responses. As she said she did not know how she would read the story about rocks if she knew little about the topic, she could not be scored on flexibility due to different levels of prior knowledge. This was also true for the questions involving different tasks. Anita said she did not know how she would read to learn and remember information to tell a friend. When asked whether she would read the story about rocks the same or differently from the way she would read a comic, she said she would read them the same.

Over the course of instruction, Anita increased her awareness of strategies as well as flexible ways of employing them. Her total score on the strategy knowledge measure represented a gain of 59 points, more than was made by any other student in the study.

While before instruction Anita identified five different strategies, after instruction she identified nine. These were:

Read paragraph and ask myself questions

Guess from title

Picture in my mind

Reread anything difficult

Use experience

Think about what a new word is about

Ask for help

Read slowly

Skim

These include more of the strategies that have been identified as effective in increasing reading comprehension than Anita identified prior to instruction. The range of strategies she identified after instruction was similar to that identified by the NA girls. In comparison to them, however, Anita was less able to elaborate on the strategies she identified. She provided four elaborations, two more than before instruction. In her first elaboration, she focused on the importance of background knowledge, as she had done prior to instruction. Anita said she would guess from the title "to see if we knew anything else about pulley (the topic)." She also said she would ask herself questions after every paragraph, would skim to find the most important information, and would read the science story slower than the comic because she might have a test. Although her elaborations were not as plentiful or sophisticated as Kate and

Carol's, they represented more reasoning about the behaviors she could engage in to monitor and regulate her reading than she had shown initially.

Anita showed increased knowledge about using strategies flexibly. Her response to the questions assessing knowledge of different strategies for different levels of prior knowledge was rather vague. Anita said that if she knew about rocks, she would use some of her experience with the story while she would "read it regular" if she did not know much about rocks. She was more specific in talking about strategies she would use for different tasks, saying she would picture the story in preparation to tell a friend about it and would ask herself questions after every paragraph in preparation for a test. As stated, she said she would read the story about rocks more slowly than the comic because she might have a test on the rocks story.

Anita's use of the strategies assessed in the strategy measure changed over the course of instruction. In several instances, she made gains comparable to or above those made by the NA fourth graders and exhibited competence quite similar to theirs. Before instruction, Anita's summarizing skills were limited in comparison to those of Kate and Carol. Her summary of "The Story of Bread Baking" focused on the topic:

It is about the bake and ha (how) he makes bread.

She included none of the main ideas. After instruction, her summary included one sentence from each of the paragraphs, either copied directly or a close paraphrase. This was not a procedure for writing

summaries focused on during instruction; it may have been one she extracted from what was talked about or, more likely, it was one focused on in her classroom reading group. She used this procedure fairly effectively as her summary included three of the four main ideas in the story. Anita's total summary score after instruction was the same as Kate's; however, this represented more of a gain for Anita.

Anita also showed improvement in question asking, with her performance in this area after instruction comparable to that of the normally achieving students.

Prior to instruction, Anita wrote ten questions to check understanding of the story, as directed. Of these, two focused on main ideas. Four were scored "generic questions," or those not relating to this story in particular: (e.g., Did you like it?). One could not be answered from the information in the story. Only one of Anita's questions involved integrating information across sentences. Anita's questions were generally well-formed although included unclear referents.

Anita continued her high productivity in question-asking after instruction. Four of her ten questions focused on main ideas. Only one question generic; two could not be answered with information in the text. Generic questions were not discouraged during instruction although questions that could not be answered in the text were. Anita's questions, similar to those of the NA students, were generally based on information contained in one sentence. Only one involved

integrated information across sentences. This one also focused on the topic of the story:

How are cars put together?

Eight of Anita's questions were well-formed and grammatically correct.

Prior to instruction, Anita showed ability to make predictions from the title, listing the following as information she thought would be included in "The Story of Bread Baking":

Prediction before instruction:

to make bread, what to put in it, and wat not to put in it and what to put on it

She continued to be proficient in doing this after instruction. In addition, she showed increased ability to make predictions about the story's ending. While before instruction, Anita had not made a prediction about the ending of the story (being one of only two students in the study who did not), she made a logical, although rather unelaborated one after instruction for the ending of "The Story of Car Manufacturing":

Prediction after instruction:

tat it will be about jobs

The one area in which Anita did not show change was her focus on reading as a meaning-seeking rather than a decoding process. Based on her responses to the first metacognitive interview, she entered the group with a rather vague and inconsistent conception of reading. Two of her responses focused on decoding. When asked **What would you teach a younger student to do (when reading)?** Anita responded she'd teach

him "how to read without talking and pointing, without asking teacher questions so he knew every word." When asked **How is reading thinking?** she answered "Got to think what word is, use DIP (phonics program used at the school) and that's it." Yet she was also aware of at least one meaning-oriented purpose of reading, saying that reading is "where you learn something from a book." Her score on this interview, 5/20, was the lowest in her instructional group.

As noted, Anita did not shift towards a more meaning-seeking orientation towards reading. In her responses to the interview questions after instruction, she focused on both decoding and meaning at the word level. Her focus on decoding was seen in her response to the question **How do you know if someone is a good reader?** Anita said a good reader doesn't make mistakes

> ...like, 'Oops, I accidentally said wrong,' have to read the paragraph again.

Her focus on meaning at the word level was seen in her responses to the question **How would you teach a younger student to read?** Anita said:

> Like if he misses word, help on vocabulary on that word.

Three of her responses in this interview could not be scored as they were too vague (e.g., Reading is like read a book, like read words and stuff.) but none indicated a focus on comprehension beyond the word level. Mainly due to her three vague responses, Anita's total score on the interview after instruction was lower than her total score before instruction.

Her continued focus on the word level in her responses to the Concept of Reading metacognitive interview questions after instruction may, in part, reflect the emphasis during instruction on the strategy "Ask for help" which was generally discussed in terms of "ask for help on hard words." As the students did not readily identify words they were unsure of, seeming to be doing little monitoring, the teacher had emphasized both identifying unclear words as well as employing "Ask for help" to "figure them out" (i.e., "Is there anything in this paragraph we need help with?) Anita, more often than the others, asked for clarification about words she was unsure of.

Even though her focus on meaning-seeking aspects of reading did not increase over the course of instruction, Anita's elaboration and reasoning, as well as her comprehension and recall, showed substantial change. This was evidenced in her performance on the "Think Aloud" measure as well as the criterion-referenced comprehension assessments. On the first measure, her performance placed her at a level similar to that of the NA fourth graders, although her performance was at a lower level than theirs prior to instruction. Although her comprehension was still at a lower level than that of Kate and Carol after instruction, her gains were greater than or comparable to theirs.

Based on her performance on the "Think Aloud" measure, Anita showed less elaboration and reasoning while reading ambiguous text when she entered the group than was shown by Kate and Carol. Fifty percent of Anita's responses involved elaboration and reasoning on the sentence level, for example:

The floor of the Aerodium [read "rodeo"] **is different from most floors.** Must have cement).

Only 12% involved elaboration and reasoning across sentences, for example:

Under the floor you can see a machine. Machine, must be somewhere where you could see glass, you could see through glass [The previous sentence had talked about a different kind of floor that you could see through])

Her performance on the Think-Aloud after instruction indicated much improvement in reasoning and elaborating about and across sentences. She made the second highest gain on this measure of all of the students in the study. Thirty-six percent of Anita's responses after instruction indicated elaboration and reasoning on the sentence level. Forty-two percent of her responses involved elaboration and reasoning across sentences compared to 12% before instruction.

Anita's initial comprehension of the passages on the criterion-referenced assessment was low; her mean score on two third grade level passages was 15% correct. She may have been quick to give up in trying to answer the questions: Anita responded to eight of the 20 with answers such as "I don't know" or "I forgot." She showed improvement in the criterion-referenced comprehension measure; her trend line was positive with the last five scores (three during instruction, two following instruction) all higher than those on her assessments prior to instruction. Her mean score on the assessments given after instruction was 20 points higher than her mean score prior

to instruction although this was still below criterion level. Anita's gain, however, along with Karen's, was the second highest of all the participants, exceeded only by that made by Kate (26%).

Anita's decoding rate (89 words per minute, five errors) was close to criteria (80 words per minute, one error). Decoding did not seem to be interfering with her performance on the initial criterion-referenced tests. In sum, Anita, a fourth grade student with learning disabilities, entered the instructional group with an idea of reading as learning but also a with a focus on reading as decoding. In comparison to the normally achieving fourth graders, she had limited knowledge of strategies and their use in monitoring and regulating her reading. Her level of competence in employing the strategies that were assessed, especially summarizing and predicting the story ending, was overall lower than that of the NA fourth graders. Anita's comprehension performance on two third grade level passages was low; she averaged 15% correct on questions asked about the passages.

With the exception of her ideas about reading, Anita made gains in all areas assessed over the course of instruction; these gains were equal to or greater than the other students in several areas. She showed awareness of a broader range of strategies as well as more reasoning about these strategies and awareness of flexible use of them. Anita's total gain for the strategy knowledge measure was the highest of any student in the study. Her competency in using strategies after instruction was comparable to that of the NA fourth graders although her performance before instruction was lower than theirs. Anita's

comprehension was still below criterion level; however, she made a 20% gain, the second highest of the students in the study.

Anita's verbal skills as well as her rather "argumentative" nature seemed to have served her well. She was able to respond to the opportunities provided in instruction to identify and define strategies. Her level of involvement in many of the discussions, in terms of raising questions, defending her position, and challenging others, allowed her to play several roles of a problem solver. Anita seemed to view the tasks as "problems" to be solved and became involved in many aspects of collaboration with the group members as well as the teacher. Her degree of participation, while not consistently high, was such that she was provided more opportunities than some of the other students to practice the strategies, opportunities that most likely contributed to progress in employing them.

Billy

Billy was a fourth grade student receiving ChI services for reading. This was the first school year in which he had not been involved in special education. Initially, Billy had been identified as speech and language impaired; later, he was identified as emotionally impaired. Billy had received resource room services from grade one through three. As his achievement was found to be commensurate with his ability expectations, Billy was dropped from special education for the 1989-90 school year.

In the fall of 1989, Billy was given a school psychological evaluation. His WISC Full Scale IQ score was 78 with a Verbal IQ of 87 and a Performance IQ of 71. Strengths identified in the evaluation were mechanics of reading and writing as well as effort and attitude while weaknesses included difficulties with inferential and abstract thinking, peer relationships, and dependence. The report noted that Billy had difficulty offering responses he was unsure of, seemed most comfortable in tight structure (situations in which he knew what was expected of him), and did not appear to be a risk-taker. Billy's comprehension and total reading 1989 CAT grade equivalent scores were both 2.7, over one year below grade level (3.8 at time of testing). His reading teacher had expressed concern about Billy's comprehension.

Billy was a cooperative student. He was tense, however; on occasion, he was observed rather frantically searching the text to find the answer to a question. He also had a tendency to worry which may have made it difficult for him to focus on his work. During the study, Billy accidentally stepped on a kitten at home. The kitten lived but apparently there had been some concern about Billy's having hurt it. Billy talked about this for several days, seeming to have difficulty coping with his feelings, wanting to share them, and most likely experiencing difficulty concentrating on the discussions and activities in class.

While Anita may have been able to internalize strategy use, at least to some extent, Billy had more difficulty applying the content and process of the group discussions to his reading. Examination of

the transcripts suggests some factors that may have accounted for this difficulty including: 1) his apparent misconceptions of some of the tasks; 2) insufficient opportunities for him to participate in problem solving; and 3) insufficient opportunities for him to practice using the strategies. Billy's misconceptions of the tasks may have been related to his difficulty with abstract reasoning as well as to his tenseness. In addition, these misconceptions, along with the insufficient opportunities to engage in problem solving and practice the strategies, seemed related to the teacher's difficulties in scaffolding, particularly in the context of attempting to foster maximum student responsibility for task completion.

Billy's responses to some of the questions in the outcome measures before instruction indicated difficulty understanding the tasks. This was also seen on several occasions throughout instruction. One example of this was his response to the letter from the fictitious student who was having difficulty in social studies even though she read the text slowly. While other students suggested strategies such as asking herself questions, Billy advised her to read slowly: the strategy that had been unsuccessful for her. It is unclear whether Billy realized he was to suggest an alternative. He periodically was confused about what the different strategies were or how they could be used.

Throughout instruction, the teacher found herself concerned about how to provide the most appropriate support for Billy, as exemplified in her fieldnotes:

Day 16: I was discouraged that Billy did not know what strategies were. I am really worried about him in this instruction. He seems so tense and not to be following. Madly searches the text for answers without planning. I am not sure I am helping him in the planning.

Day 30: I feel this group is continuing to go well this week. I am, however, worried about Billy and feel I have not afforded him sufficient chance to participate in the dialogues and thus to practice the strategies. Both of his questions were vocabulary and he did not change after I modelled and suggested. This was done in a confusing manner.

Quite frequently, the teacher worried that her attempts to support Billy were poorly carried out. Two aspects of the support provided may have inhibited Billy's being able to participate in the discussions in a productive manner. One was support through questioning rather than through providing more direction. The second involved turning to the group to help Billy in a manner that, too often, actually served to exclude him.

Support through questioning can become "leading through questioning" that does not result in the shared understanding. Such was the case in this exchange with Billy during Phase Two:

Teacher: Ok, what if there aren't any questions (in the text)? How would you remember a story, Billy? What is a strategy (that you could use to remember the story?)

Billy: I'd like, um, read a story and then there'd be questions and I'd answer them.

Teacher: What if there weren't questions? How would you remember the story? Is there anything you could do?

Billy: Like look back in the story?

Teacher: Oh, you might look back in the story. What would you look for?

Billy: Like think what questions might be like.

Teacher: Oh, you mean make up questions?

Billy: Yeah.

Teacher: Think what questions might be like. You might make up your own questions. Would you try to answer your own?

Billy: Yeah

This kind of support was not sufficient to help Billy identify alternative strategies. With more support from the teacher through modeling her thinking about what she would do to remember the story, Billy might not have been able to add his own strategies but would have been exposed to the kinds of problem solving he may later have become able to engage in.

When given much direction, Billy was able to participate. For him, the high level of direction may have been appropriate.

Teacher: Remember the paragraph above. We read about how they use their lights. Do you remember how the fireflies use their lights? Just for a review.

Billy: Um, so they can see better?

Teacher: Let's see. Do they do it so they can see better? Why don't you read that paragraph and see if you can find the answer to my question. I'm checking Billy for understanding? Why do they use those lights?

Billy: They use them as signals

Teacher: As signals. And we read that the males were signalling females. Billy, you didn't know the answer. So what did you do to find the answer?

Billy: I looked back in the story.

Teacher: Very good. You went back and reread. Isn't that one of our strategies?

Perhaps more modeling, along with more directiveness such as the above, would have allowed Billy to participate in problem solving at his level. It may have helped him to more clearly understand the tasks as well as reduced some of his confusion and tension.

The teacher's tension between wanting to maximally involve the students yet also provide support was discussed in Chapter Three. This tension was particularly evident in interacting with Billy. Too often, when the decision was made to open the discussion to the group, Billy was excluded, as occurred on Day 30 when he was summarizing:

Billy: This is about, um, how to explore underwater. It tells us, it tells the two vocabulary words, skim and craft.

Teacher: Well, how about it tells us two kinds of crafts that they use?

Billy: Two kinds of crafts

Teacher: And should he describe each kind of craft in the summary?

Karen: Nah

Teacher: Ok, this is about exploring underwater. What do you think? Should he tell us what those crafts are or is it enough to say there are two crafts? Anita, what do you think?

Anita: Um, that's enough.

Teacher: Enough to tell us there are just two crafts. If you thought there was a test coming up that would ask you to describe those crafts

Karen: Yeah (inaudible)

Teacher: Ok, then maybe your summary would include. Ok, Billy, what are you going to picture?

Billy was not given the opportunity to join in this discussion. This continued as he used his next strategy, with the teacher and other students describing their pictures in response to his picture rather than guiding him to think about its helpfulness. As the discussion was turned to the group, Billy was again excluded.

The use of external criteria may have taken away responsibility for problem solving from some students. However, it may have given Billy a structure for thinking about the strategies that he needed. For example, when asked why he did not select one particular sample summary as the best, he responded:

Billy: It didn't talk about ears in the story.

Teacher: Yeah, it didn't stick to the story (one of the criteria on the chart). There was nothing about ears...

Billy had difficulty following the discussions. He seemed to need a great deal of support and structure. With more of both of these, he may have been afforded more opportunities to reason about the strategies as well as to practice using them. Maximum responsibility for Billy was quite different from maximum responsibility for Anita, or for Kate. Hence, the role of "more knowledgeable other" needed to involve different behaviors on the teacher's part. Providing more directiveness and more modeling would not necessarily have involved a violation of the tenets of MCPS. More teacher modeling, more concrete examples, and more supported demands for elaborations and justifications would most likely have allowed Billy to be more involved in the discussions and thus to become a more active participant in the kinds of dialogue it was hoped the students would internalize.

Billy's psychological testing indicated that he had a less ability to reason abstractly and to express himself than did Anita. He also seemed more tense and unsure of himself than she did. These characteristics made participation in the dialogue much more difficult for Billy. In addition, in this chapter, he most likely did not receive the optimal level of adult support within the discussions to enable him to engage in the dialogues in the role of a problem solver. Despite these factors, Billy's knowledge about and competence in using strategies changed over the course of instruction. In addition, his ideas about reading began to reflect more of a focus on meaning-seeking

beyond the word level. These changes, as well as his performance in the other areas assessed, are discussed below.

Prior to instruction, Billy identified a narrow range of strategies, those being:

Look back in the story

Read the title and think about what it (the story) might be about

Try to think of a definition

Ask somebody

Think about what the ending might be like

Two of his strategies involved making predictions. The strategies he identified were similar to those identified by Anita. Billy provided one elaboration about strategy use; he linked reading the title to thinking what the story might be about, indicating that he understood why reading the title is important.

Consistent with his limited knowledge about strategies, Billy did not show evidence of knowledge about flexibly employing them. He did not identify a strategy for reading about rocks if he had little knowledge of that topic so could not be scored for flexibility based on levels of prior knowledge. Similarly, he did not identify a strategy for reading to prepare to tell someone about the rock story, seeming to misinterpret the question as what he would tell someone about the story. Billy said he would read the rock story and the comic the same way.

Billy's knowledge of strategies expanded over the course of instruction. After instruction, he identified the following strategies:

Know what words are and their definitions

Think about what the story might be about

Ask questions what the story might be about

Ask questions after the first paragraph

Go on to the second paragraph and guess what that's going to be like

Proofread (Read over)

Write down what page the answer is on

Read slowly

Say to myself, "This would probably be on the test."

Ask someone

Skim

He continued to focus on predicting but also included asking questions, one of the more powerful strategies that he had not initially mentioned.

Billy was more able to elaborate on strategies he identified although this still was difficult for him, as it had been during instruction. He noted that he would ask questions after every paragraph. When asked why he would say to himself that vocabulary words would probably be on the test, Billy said that they were words in dark print, indicating he understood that boldfaced words signalled

importance. Finally, he said he would skim so he would know important parts.

As before instruction, Billy did not indicate knowledge of flexible employment of strategies. His response when asked about how he would read if he knew a lot about rocks did not include a strategy so he could not be scored for knowledge of flexible strategy use with different levels of prior knowledge. Similarly, Billy did not identify a strategy for reading in preparation to tell a friend about the story so he could not be scored for knowledge of use of different strategies for different tasks. He, as before instruction, said he would read the story about rocks and a comic the same way. Billy, as before instruction, may not always have conceptualized the tasks in the interview in the manner intended by the questions. For example, when asked **How would you read this story if you were going to tell a friend about it?**, he again focused on what he would tell another student to do rather than what he would do himself.

Billy showed improvement in summarizing and questioning over the course of instruction. His was initially fairly competent in making predictions and remained so. Billy's change in summarizing was more limited than Anita's; although he made gains, he did not become sufficiently skilled to use this strategy productively. His initial summary included two ideas, one an erroneous interpretation of a sentence in the story and one an idea not in the story:

> I think that yeast is important because it means "magic." (The text said: "Yeast is the magic ingredient.") And I think that

getting the bread warm and puting stuff on it like sugar, salt, spice.

The nature of his summary indicated that Billy may not have understood this task. Both of these sentences were written as opinions. Billy's summary after instruction was three sentences, each one taken directly from different paragraphs in the text. One sentence was a main idea and two were details. He seemed to better understand the task of summarizing, although he still had difficulty with it and did not seem to have developed the competence for it to be a useful strategy for him.

Billy showed greater change in question-asking. Prior to instruction, he only wrote four questions. One of these focused on a main idea and two on details. The fourth, "I smell something. What is that smell?" was rated as not being from the text because he had personalized it (Text: What is that wonderful smell?). He made gains in productivity as well as focus on main ideas. After instruction, he wrote nine questions with four of them focused on main ideas. His word level emphasis, seen in the initial interviews, was apparent in his questions; five focused on vocabulary:

What is a assembly line?

What is a car (describe it).

What is a factory?

What is a conveyor belt?

What is an over conveyor belt?

Two of these (assembly line and conveyor belt) were main concepts in the story; the others were not. Three of Billy's questions (including "What is a car?") could not be answered with information in the story. Billy's focus on main ideas was commensurate with that of the NA students. However, he wrote more vocabulary questions than they did, as well as a higher percentage of questions that could not be answered from information in the text. Overall, however, Billy's performance indicated that his level of proficiency in questioning was sufficient to enable him to use this strategy to monitor and regulate his reading.

Billy's initial prediction from the story title was rated "highly likely." Reading the title and thinking what the story was about was a strategy he had mentioned in the metacognitive interview and appeared to be one he could use. Following is his prediction the ending of "The Story of Bread Baking":

I'd say bread baking in the morning. The smell tastes good

This prediction seemed to be based on repetitions of what was in the story. Here, as with summarizing, Billy did not seem to understand the task. After instruction, his prediction from the title was also reasonable and indicated some use of background knowledge. His story was "The Story of Car Manufacturing" and he predicted it would be about:

> Cars that might be made or cars that might be repaired or fixed at a car station. And people might be working or repairing or fixing.

His prediction for the story ending was:

> More people might make the future car. More people might make a total new color and put it on the car and put stripes on it.

This was rated "fairly likely to follow story so far, " a higher rating than his prediction before instruction.

Billy's entering ideas about reading, like those of the other fourth graders, were rather inconsistent and reflected a focus on both meaning and decoding. Two of his responses to questions on the metacognitive interview emphasized meaning at the word level, for example:

> What is reading? Reading is when you do papers and all these things and words that you don't know what they mean. (More) And this words they tell you what they mean or what they're like or something.

One response focused on decoding and one at a meaning level beyond the word:

> How is reading thinking? Your memory and all that; your memory, your knowledge, your experiences and all that stuff.

His total score on this interview was commensurate with those of the NA fourth graders.

Billy's conception of reading after instruction, as reflected in his responses to the metacognitive interview questions, focused more on meaning beyond the word level than it did before instruction. One of his responses was too vague to be scored; the other four were scored as indicating a focus on meaning beyond the word level. Over the course of instruction, Billy appeared to have become more aware of thinking

about larger segments of text. Compare his responses before and after instruction to the question How do you know if someone is a good reader?

Before instruction:

They can read fast and they know what words mean and they know what words are, like hard words, what they mean.

After instruction:

Cause they can read fast and they can comprehend things. What does that mean, they can comprehend things? They can comprehend things pretty good and know what they story's about.

This change was interesting and a bit puzzling because Billy, in the group activities, often focused on meaning at the word level. For example, on Day 30, two of his three questions were vocabulary questions. His summary also focused on vocabulary:

This is about, um, how to explore underwater. It tells us, it tells the two vocabulary words, craft and skim

This was also the focus of his mind pictures that day. Perhaps, over the course of instruction, Billy had become aware of a broader focus on meaning but had not yet been able to apply this.

His difficulty applying knowledge about strategies and the reading process was evidenced in his performance on the "Think Aloud" as well as the criterion-referenced comprehension assessments. Four of his 14 responses (33% of the total) on the "Think Aloud" measure before instruction indicated elaboration and reasoning on the sentence level and only one indicated elaboration and reasoning across sentences:

The Aerodium is a place where people can fly in the air. **Might be on airplane or something. (elaborating and reasoning on the sentence level)**

But how can you fly on your own? **By practice on plane (elaboration and reasoning across sentences)**

Although his gain of 14 points was the third highest gain of any participant, Billy's total score which was well below the mean for the NA fourth grade students.

Billy was the only student in his instructional group to show no gain in reading comprehension. His mean scores after instruction were actually lower than before instruction. His performance then was inconsistent; his scores on the four third grade passages administered before instruction were 10%, 60%, 20%, and 45% correct (mean: 31%). It was difficult to determine why the scores were so scattered. His highest score was on a story about porcupines which may have been a topic about which he had special interest or knowledge. Billy's scores on the passages given during the instructional phases were also inconsistent. After instruction, Billy was given two third grade passages; his scores were 10% and 40% with a mean of 25% correct.

In sum, Billy's knowledge and use of strategies changed over the course of instruction; in addition, his interview responses indicated his ideas about reading focused more on meaning beyond the word level. He identified a wider range of strategies and elaborated on the strategies he identified more than he had prior to instruction. Billy showed improvement in summarizing although his level of competence was

still below that of the NA fourth graders. His question-asking productivity was higher and he focused more on main ideas than he had before instruction, a focus similar to that shown by the NA students. His predictions were fairly reasonable. There was little evidence that Billy had become a more strategic reader over the course of instruction. On the "Think Aloud," he showed more elaboration and reasoning at the sentence level than he had before instruction; however, he did not show evidence of this across sentences. He also did not evidence gains in passage comprehension with his mean score six points lower than before instruction.

Even with his limitations in the area of verbal abstract reasoning, as well as his high level of tension, Billy was able to develop greater declarative, conditional, and procedural knowledge about strategies. As with Anita, these changes may have been greater with more time. Also, as has been emphasized, Billy was most able to participate in the discussions when a high degree of structure and adult directiveness was provided. The demands and confusion of scaffolding within this model perhaps too often interfered with his receiving this support.

As stated, the descriptive analyses of Anita and Billy were presented for three purposes. The first was to examine the knowledge and proficiency of these two students prior to and following instruction. This examination not only illustrated ways in which these students changed over the course of instruction and the ways in which their performance compared to the NA students. It also illustrated the

kinds of information that could be obtained from the outcome measures used in this study.

The second purpose of the descriptive analyses was to illustrate issues focused on in this study. Anita's knowledge about and use of strategies changed over the course of instruction. This was related to her participation in the dialogues, especially as she assumed the roles of a problem solver. She was able to engage in posing challenges, justifying her position, and checking the text for confirmation in the context of "talking about" strategies as well as utilizing them. After instruction, she was aware of more strategies and somewhat more able to reason about them. In addition, she was more proficient in employing strategies. Her performance on the Think-Aloud and the criterion-referenced comprehension assessments indicated that she had begun to internalize her knowledge about and use of strategies. With more time and opportunities to practice employing the strategies, it is felt she would have been likely to make greater comprehension gains.

Billy gained in knowledge about strategies as well as proficiency in using them. The changes in his knowledge gains were more limited than Anita's and he did not show evidence of internalizing strategy use. This was related to his difficulties in abstract reasoning as well as the limited opportunities he had to participate in problem solving and practice using the strategies. It was argued that these opportunities were limited in part due to the lack of sufficient support, given his characteristics, to allow Billy to assume the role of problem solver.

The third purpose of presenting the descriptive analyses was to suggest student characteristics that may have mediated instruction. It was suggested that Anita's relatively high reasoning skills allowed her to engage in the dialogues in a manner that fostered problem solving within MCPS. Conversely, Billy's difficulty with abstract reasoning, and his relatively lower verbal skills, seemed to have made participation much more difficult for him.

Both of these students exhibited affective factors that also mediated instruction, factors that are too often overlooked. Anita showed enthusiasm in the discussions; she was argumentative, seeming to enjoy the challenges inherent in debate. These factors most likely made her amenable to the high level of ambiguity and uncertainty involved in MCPS. Billy's affective characteristics were quite different from Anita's and most likely added to his difficulties in participating in the discussions. He was tense and seemed to become even more so when confused; he also seemed to become distracted by worries and concerns. The high level of ambiguity and resulting confusion about how to participate in the discussions may have been too demanding, especially when support was not sufficient.

CHAPTER FIVE: DISCUSSION

This study was an examination of the implementation of Mediated Collaborative Problem Solving, a model of strategy instruction utilizing social constructivist principles. MCPS was developed to provide special education and remedial reading students the opportunity to work collaboratively with each other, the teacher, and their more capable peers to identify, define, and evaluate strategies to be used in monitoring and regulating their reading. This model was designed to address several issues raised in the Palincsar et al. (1989, 1990, in press a, in press b) study of the differential effects of three models of strategy instruction. These issues were: 1) the level and focus of assessment; 2) the role of the teacher and, related to this, 3) the ease of implementation. The focus of the study was implementation of the model as well as student outcomes. The student participants were two groups of six third and fourth graders, the majority of whom were experiencing reading difficulties and were receiving reading services through either the special education resource or the Chapter One program.

The students who participated in MCPS showed increased declarative as well as conditional knowledge about strategies they could use to help themselves meet the demands of reading tasks they were likely to encounter in school. In comparison to their performance before instruction, these students identified a wider range of strategies; in addition, they provided more elaborations about the strategies that they identified. The students showed evidence of increased knowledge

of flexibility of strategy use when presented with differences in reader characteristics, text characteristics, and task demands.

The students made more modest changes in their procedural knowledge about strategies, as evidenced by their performance on the Strategy Measure. Following instruction, they focused somewhat more on main ideas in their summaries. The SE students, prior to instruction, tended to include information not in the story in their summaries; following instruction, their summaries were more text-based. The summaries of all three groups of students (SE, ChI, and NA) were rated more similarly after instruction than they were beforehand. The students were more productive in question-asking after instruction, again focusing more on main ideas than they did initially. A larger proportion of their questions were grammatically correct; however changes were not seen in the level of sophistication. As with summarizing, the question-asking performance of the three groups of students was more similar following instruction. The students entered instruction fairly proficient in making predictions, especially for the ending of the story, and remained so.

As reflected by their performance on the Think-Aloud measure as well as on the criterion-referenced comprehension assessments, the students' knowledge about strategies after instruction did not seem to be aiding them in their comprehension of text. Overall, there were minimal changes on these measures, suggesting that the students had not developed sufficient knowledge about the strategies, and that they had

not internalized the knowledge that they had developed to the point at which it could be applied to independent reading tasks.

Finally, the students, as a group, did not change their ideas about reading over the course of instruction, as reflected by their responses to the questions in the Concept of Reading metacognitive interview. Most of the students continued to focus on both decoding and meaning-seeking to the same extent as they had before instruction. Both times, they emphasized decoding over meaning-seeking.

In sum, over the course of instruction, the students developed increased declarative and conditional knowledge about strategies they could use to regulate their reading. They showed modest increases in their procedural knowledge of the strategies targeted on the Strategy Use measure. After instruction, the SE and ChI students' use of the strategies was more similar to that of the NA students than it was before instruction. Four of the twelve students in the study (two SE students, two NA students) showed a positive trend in their performance on the criterion-referenced comprehension assessments; however, overall, there was marginal change in the students' comprehension performance. Similarly, there was little change in the students' concepts about reading; they continued to focus on decoding as well as meaning seeking.

What occurred over the course of instruction that may account for the increase in the students' declarative and conditional knowledge about strategies, along with their less substantial gains in procedural knowledge? In addition, what may have accounted for their limited

progress in comprehension? Was it a reflection of insubstantial procedural knowledge about strategy use, or were there other factors that may have inhibited their ability to use strategies to better understand and remember text? And finally, why did the students continue to emphasize decoding aspects of reading to the same extent as they had before instruction, when the focus of instruction was on using strategies to learn and remember text? In the next section of this chapter, the instruction will be discussed in terms of its effects on: 1) the students' knowledge about strategies; 2) their comprehension; and 3) their concept of reading. Following this, the issues that were raised in the Palincsar et al. study and discussed in the last chapter, as well as several additional ones that have emerged from this study, will be addressed.

Students' Declarative and Conditional Knowledge about Strategies

The students' declarative and conditional knowledge about strategies was formally assessed during the metacognitive interview in which they were asked to talk about the strategies they would use in given situations. The majority of the students showed increases in the number of strategies they talked about as well as somewhat increased elaborations. These changes reflect the content of many of the group discussions. In these discussions, occurring in the context of planned activities as well as student-initiated sharing of strategy use outside of class, the students focused on the wide range of strategies that

could be used in given situations. They also had the opportunity to consider reader, task, and text variables that influence strategy effectiveness. All of these are critical to declarative and conditional knowledge about strategies (Paris, Lipson, & Wixon, 1983; Palincsar & Brown, 1990).

Over the course of instruction, the students identified many strategies. They brainstormed about strategies that could be used to help them understand what they were reading. In addition, they identified strategies from the chart, as well as added strategies to it, that could be used for particular reading tasks such as telling a student who had been absent about the story and preparing to answer review questions. The students spontaneously shared strategies they had used outside of class; these strategies were not always germane to understanding texts (e.g., Sandra's reading book covers seemed more of a strategy to help her decide whether or not to select a book rather than to help her understand it) but did provide evidence that the students were thinking about different activities they could do to help themselves accomplish tasks.

The students' initial brainstorming about things they could do to help them understand what they read indicated they were aware of a rather limited range of strategies. For example, Group One identified only the following:

Ask someone for help on hard words

Think if this ever happened to you

Ask the teacher if you don't understand hard words

Read the story over

Read questions

Read the best you can

At the end of instruction, this group had 14 strategies on its chart. Group Two identified a somewhat wider range of strategies initially, naming nine things they could do to help themselves read. At the end of instruction, this group's chart had 25 strategies on it. (See Appendix D).

Discussions that focused on the influence of reader characteristics on strategy selection and use occurred primarily in two contexts: 1) the students commenting on their own use of strategies during independent reading tasks; and 2) the students attempting to use the strategies, especially picturing, as they initially explored them. In the first context, the discussions centered on ways in which the strategies were influenced by the students' knowledge about and interest in the text. In the second context, the discussions centered on their "personalized uses" of the strategies.

In commenting on their own use of strategies, the students showed attention to reader characteristics such as background knowledge and interest. For example, Kate said she had done particularly well on a criterion-referenced assessment because the story was about gymnasts and that was something she knew a lot about. Both she and Karen talked in the final interview about the strategy "Using your experience", being one that not always "work" because sometimes they did not know about the topic.

Carol shared the way in which she used a strategy to sustain her interest in what she was reading:

> Carol: And then I look for what's going, and then when I'm reading the story I look for that thing that's going to happen and that's what makes me interested in the book. Because when I read the back, I know that something. It normally has a question like "What's go, I wonder what's going to happen to Maryanne? Will she get rid of the ..." and then...

Other students also focused on interest in talking about strategies. As noted, the strategies the students in Group Two spontaneously mentioned were often ones they used to select a book, or to see if they would like to read it. Several times, Kate, in Group One, focused on interest, seeming to realize the way in which high interest in a topic can help with understanding and remembering a story about it. When asked in Phase Two about how she would remember a story, Kate said:

> Kate: I'd remember the words better if they're fun or if they're not boring...just think about it.

The second context in which the students focused on reader characteristics was in initially using the strategies in the group. Although criteria were frequently used for evaluating strategies and the investigator sometimes modeled the way she employed them, no exact procedures were given for how to carry them out. The students, from the beginning, shared their own methods or personalized ways of using the strategies. This particularly occurred with picturing. Picturing,

from the start, was discussed in terms of the personal ways in which it was employed. This was exemplified in a discussion about picturing time concepts, a discussion that was referred to by the students several times during the study. Anita had read a section beginning with the sentence "Baby turtles hatch in about 60 days." The investigator stopped and asked her if a picture would "work" for that, hoping that the students would come to see that picturing is not a strategy that is appropriate with all texts. Karen disagreed:

Researcher/teacher: I just wonder if picturing maybe isn't

Karen: I put a

Researcher/teacher: Good one for 60 days

Karen: I put a calendar in my mind

An interesting discussion which focused on reader characteristics occurred in the context of Group One's planning for the videotape they were making to inform others about what they had been learning. The students were trying to decide the order in which to present the strategies. Although not addressing their own characteristics, they definitely considered those of their audience in this discussion:

Researcher/teacher: Shouldn't we ask their experiences now?

Anita: We could

Researcher/teacher: What do they know about chimps?

Karen: We didn't even summarize yet so they'll know what the story's about.

Anita: Yeah, but we got to know their experiences before we tell them the summary.

Researcher/teacher: Why?

Kate: Because if they already know what it's going to be

Anita: Then we don't have to ask questions about it.

Researcher/teacher: Why do you want to know their experience? I think we need to know their experience. Why is it important to know?

Anita: Because why would we tell them the, why would we tell them the, what a summary, tell them the summary if they already know what it is?

The students here may have been confused about the purpose of summarizing; however, they were quite firm about the importance of thinking about background knowledge, an important reader characteristic which has been shown to impact strategy use (Pressley, Goodchild, Fleet, Zajchowski, & Evans, 1989).

Many of the activities provided opportunities for the students to consider task demands. This was sometimes the purpose of the activities but also occurred spontaneously. In both contexts, the students focused on why they were using the strategies.

In the discussions based on the vignettes, the students selected which of two strategies was the most appropriate for the given tasks. They were led to focus on what the task required and to make their selections accordingly. Several of the students were initially able to consider task variables (The vignettes were introduced on Day 4):

Excerpt #1

Carol: I think Sally now because Susan reads, if she reads it two times, sometimes she might not get it or she might not understand what they mean. And she doesn't ask herself questions...she could just read it like for fun and not realize that she get, that she needs to get information for her test instead of reading it really quick...

Excerpt #2

Sandra: Susan, Susan, if she didn't have time, may only have five minutes, and they had pages in the book, and she could just look at the pages, and then she'd find information about. And if she did have more time, she could come back and read the page.

Excerpt #3

Kate: I would pick Joe because you don't need to copy down every word, it'd take too long. By the time it was your turn, you wouldn't be done. And they don't want to hear the whole paragraph, just the important parts, cause maybe they were gonna' take a test after that or something.

Not all of the students were able to justify their selections in terms of task demands at this point; however, they were all part of discussions in which this focus was being modelled.

Other activities planned to focus attention on task demands included: choosing strategies to use to prepare for review questions and to tell a student who had been absent about what had been read; and discussing strategies they could use to complete the various reading activities identified on the cards in Phase Six. Some of the richest discussions about task demands, however, occurred in discussions that were not designed to particularly focus on task demands such as when Group Two was trying to decide which of three sample summaries was the best. The samples were:

1. Sea turtles eat.
2. Sea turtles eat different kinds of food from the sea.
3. Sea turtles eat different kinds of food from the sea like fish, sea plants, crabs, and oysters.

Teddy selected #3, saying the story said that (content of #3), so it should be included. Carol, with Anita agreeing, argued that they don't need to know what kinds of food they eat. The group seemed at an impasse until Sandra gave her reason for #3:

Sandra: Because some people might not know about any of the fish or about turtles. And they might want to know the summary. And people might not know what they eat and they might want to know what they eat. They might want to know what, cause in a report the

Here Sandra was focusing on person variables but also task demands.

The students had the opportunity to focus on strategies in terms of text variables in the context of planned activities as well as more

spontaneous discussions in which they shared observations they had made about the stories being read in the group or in other situations (e.g., reading in their class, taking tests, reading at home). Both specific text features, as well as more general observations about the text, were considered.

In each group, the chart of strategies was divided into two sections; one was for strategies that could always be used, and one was for strategies that could only be used sometimes. The second list included strategies that depended on the presence of text features such as titles and pictures. When the students were discussion leaders, they were sometimes asked to select the strategies to be used for their particular sections. If they selected strategies from the second list, they told the group why they made this selection; most often the selections were on the basis of the nature of the text.

On several occasions, the students spontaneously mentioned text features when talking about their use of strategies. For example, Anita told the researcher/teacher after class that she had continued to make the same prediction several times because the text was under the same heading. Carol, in explaining how her group studied for review questions, said:

> Carol: We started with skimming and then since we found that there were some questions in the story too, and they were ones they were asking that you should need, you probably should need to know those questions.

The students commented on more general aspects of the text, both when talking about the strategies as well as in the context of using them. On one of the first days of exploring summaries in Group Two, the group worked in partners to identify the most important topic of the paragraph they had read. Carol and Teddy selected one sentence they felt contained the main idea, certainly a feasible approach to summarizing with some paragraphs. In discussing this approach, Carol modeled the need for attention to the way a paragraph is written in determining how to use a strategy:

Carol: ...Normally, good paragraphs, good written paragraphs, they have a sentence that tells about all the sentences, gives you the main idea, and all the other sentences support it

Researcher/teacher: And if we can find that one sentence, that's all we have to remember

Carol: Yeah, but not all paragraphs do

Researcher/teacher: Exactly

Carol: Some, they just want, they just want you to figure it out

Kate, in sharing her disappointing use of a strategy, reminded the group that, with some texts, they "don't work:"

Kate: Sometimes I look at pictures and it doesn't work. Because on this one book I read, it was called <u>The red ribbon rose</u>

Researcher/teacher: Uh huh.

Kate And in it, the title, I thought he would go in second place because the red ribbon is in second place. And in the picture, she had second place ribbon and so I, I still thought that, but in the end she won first place.

In sum, it has been suggested that the kinds of experiences the students had during MCPS gave them the opportunity to increase their declarative and conditional knowledge about strategies they could use in many different reading situations. During instruction, the students were exposed to a wide range of strategies; in addition, they had many and varied opportunities to consider the effectiveness as well as the ineffectiveness of these strategies in terms of reader, task, and text variables. These opportunities occurred as part of planned activities but also frequently presented themselves in student-initiated discussions. Thus they were a function of the tasks within MCPS as well as the structure of the lessons themselves.

Procedural Knowledge about Strategies/Strategy Use

Although some (e.g., Tierney & Cunningham, 1984) raise questions about strategy instruction as a means for self-regulation, those who advocate it (e.g., Duffy & Roehler, 1989; Palincsar & Brown, 1990; Paris, Lipson, Wixon, 1983) discuss the need for students to develop three types of knowledge--declarative, conditional, and procedural--about the strategies. The instructional models dominant in special education--Direct Instruction, Cognitive Behavior Modification, and the Strategies Intervention Model--focus most heavily on procedural

knowledge and document progress about the students learning how to use the strategies. In this study, the students showed only modest change in their procedural knowledge, in comparison with their gains in declarative and conditional knowledge about the strategies.

The lack of more substantial progress in the students' procedural knowledge about the strategies reflects two aspects of MCPS, as it was carried out in this study. These aspects are: 1) the limited opportunity to practice using the strategies; and 2) the high degree of ambiguity about how to employ the strategies. Each of these factors will be discussed below.

If the students had had more opportunities to practice the strategies, they may have developed more automaticity The opportunities for practicing the strategies were limited in terms of amount of time spent, lack of consistent procedures or routines for practice, and unequal opportunities for participation. Students in Group Two (before it was split) only practiced summarizing for nine of the 29 days of instruction; similarly, they practiced questioning for 12. The number of days spent on practicing these strategies in Group One was similar. This limited time was due in part to the focus in both groups on "talking about" the strategies--identifying them, discussing which ones would be more effective in given situations, sharing accounts of strategy use, planning how to share them on the video, etc. Also, as the strategies were being initially defined by the students, they were focused on singly rather than in concert; thus summarizing was practiced on Day 9 in Group One and not again until Day 16.

In addition to the limited time spent practicing each strategy, the structure for practice varied both within and among the lessons. Sometimes the students used the strategies when they served as group leaders with the researcher/teacher scaffolding their attempts. Sometimes they used them as above but without researcher/teacher scaffolding--rather the group would discuss the strategy use in response to researcher/teacher questions; sometimes the students practiced the strategies in pairs.

Within these different structures, the students were not always given equal opportunities to practice. In the partner groups, often one of the partners would take on more of the responsibility for employing the strategy, or "do all of the work." Also, when the group members responded to questions raised about the strategy use of a particular student, too often the discussions did not move back to include the original student (An example of this is included in the discussion of Billy in Chapter Five.)

The unequal opportunities for all of the students to practice were, in part, a function of the design of the instructional model as well as the difficulty of providing scaffolded instruction within it. As has been discussed, deciding when and how to provide support within this model was quite difficult. On several occasions, more directive support from the researcher/teacher--modeling, questioning or prompting--may have allowed for more equal opportunities for practice.

Along with the limited opportunities for practice, the high degree of ambiguity about employing the strategies may have contributed to the

students' lack of substantial gains in procedural knowledge. Learning the procedures for employing strategies in the context of using them while reading naturalistic text involved talking about and employing the strategies flexibly from the start; reader, task, and text characteristics needed to be considered as the strategies were being learned. This flexibility involved ambiguity; for example, a procedure that is effective for composing a summary with one type of paragraph may not be so with another.

In addition to learning the strategies in the context of reading naturalistic text, there were other factors contributing to ambiguity. The students talked about and periodically referred to criteria for "good summaries, questions, and pictures." However, even these criteria were rather ill-defined (e.g., What is an "important part?") and not consistently used. In addition, the tolerance for and periodic encouragement of personalized uses of the strategies created a context in which the level of ambiguity about how to use the strategies was high.

The ambiguity involved in personalization of strategies was evident in Group One's exploration of picturing. The students and researcher/teacher disagreed about whether a picture would even be a good strategy. Even before this, actually on the first day the group focused on picturing, Karen had shared a picture that did not seem to make sense to the researcher/teacher; however, Karen argued that it would be helpful to her. The text was about sea turtles laying eggs the size of golf balls.

Researcher/teacher: (after Karen had described her picture) Oh, so you put a golfer in it. But there wasn't a golfer in the story. Do you think that might confuse you?

Karen: No

Researcher/teacher: When I say, "What was the story about?", might you think that was a golfer?

Karen: ...about the sea turtle (the topic of the story)

Researcher/teacher: Okay, by your having the golfer in there, did that help? Sometimes that can tell you, remind you of....Sometimes we put extra things in our pictures but we need to be careful that we don't forget what the story is about and what our extra thing is...

Conversations like this may have been too confusing when they occurred in the initial exploration of picturing.

Similar concerns arose when considering the way in which Group Two initially explored summarizing. The strategy had been introduced on Day Seven with the students discussing which of three samples was the best summary for a given paragraph in their story. The next day, the group divided into partners to compose their own summaries. Teddy and Carol used a procedure they had probably learned in their classrooms, selecting one sentence in the paragraph that they thought was the most important. This was not the procedure used by all of the partner groups, including the investigator's. On the next paragraph, students

continued to use different approaches: Teddy selected one sentence; Sandra combined two. Carol was able to discuss the different approaches in terms of text characteristics ("...Some they just want, they want you to figure it out.") The others who were not as familiar with this strategy may have benefitted from practicing a more "set procedure" when first learning to summarize and then considering the effect of variables on this procedure.

MCPS was designed to enable the students to develop procedural knowledge in the context of discussing effectiveness of strategies. The question arises whether it would it have been more advantageous to establish a more common base of knowledge before exploring effectiveness in terms of reader, text, and task variables. This is related to a larger question regarding whether the initial emphasis on conditional knowledge was too heavy.

In sum, the changes in the students' procedural knowledge were more modest than the changes in their declarative and conditional knowledge about strategies. It has been suggested that this was a result of two factors in the instruction. The first was the lack of opportunities to practice the strategies. The second factor was the high degree of ambiguity about strategy use.

Comprehension Performance

If the students had become more proficient in using the strategies, they might have been able to more successfully employ them during independent reading. Karen, when asked if she had used one of

the strategies when working on her criterion-referenced assessment, said she had not because using the strategy was "too hard." Lack of proficiency most likely contributed to the students' limited comprehension gains. But if Karen, and the others, had become more proficient in using the strategies, would they have in fact used them to monitor and regulate their reading?

The students needed to view the strategies as integral to reading, rather than apart from it, to apply them independently. Was the nature of their declarative and conditional knowledge such that they were likely to do so? Perhaps the emphasis on "talking about" the strategies, rather than actually using them, interfered with independent application. Deciding which strategies were more effective to reach particular goals, discussing which strategies could be used sometimes and which all of the time, and sharing strategy use outside of class all involved reflecting on the strategies in terms of their applicability to reading. However, these did not occur in the context of actual use of the strategies and therefore may have fostered the students viewing them as separate from the process rather than integral to it.

The high level of ambiguity in many of the discussions about what strategies to use, how to use them, and how to tell if they were being used effectively may also have interfered with application of the strategies to independent reading. If the students had developed more of a common base of knowledge about the strategies before the ambiguity was introduced, they would have been able to make more productive

decisions about using them. This may have occurred if the researcher/teacher had assumed more initial responsibility for the strategies. For example, she could have engaged in more initial modeling of question asking, focusing on how this helped her to monitor understanding and remembering of text as well as her thinking processes as she formulated and answered questions. Then the students could have talked about the helpfulness of questioning as well as practiced using this strategy and evaluating its effectiveness, using the researcher/teacher's modeling as a base.

Another factor that may account for the students' comprehension performance was their limited opportunity to read. The positive effect of opportunity to read on comprehension has been well-documented (Anderson, Wilson, & Fielding, 1988). It has been suggested that comprehension is best improved through extended reading in purposeful contexts (Anderson, Heibert, Scott, & Wilkinson, 1985; Stanovich, 1986). During the 35 days of instruction, only four 5-7 page stories were read. As noted above, many of the discussions about strategies occurred when the students were not actually reading text. Although the strategies were always practiced in the context of reading connected text, the discussions about the strategies limited the amount of reading that was done.

Reading comprehension is affected by factors other than strategy use, all of which must also be considered in thinking about the students' comprehension performance before, during, and after instruction. Decoding proficiency, background knowledge, receptive

language, interest, and purpose for reading all contribute to performance (Idol, 19xx; Wixon & Lipson, 1986; Stanovich, 1980). Many of the students in this study had difficulties in decoding; they were given assessment texts on a level at which it was felt that decoding would not interfere with comprehension but they were not all able to read these fluently. Several students, especially Alicia, Sandra, and Julia, evidenced language deficits (WISC verbal IQ scores of 70, 80, and 82, respectively) that may have interfered with their comprehension of text. Germane to this study, these deficits may also have interfered with their ability to participate in and profit from the group discussions.

In this section, it has been suggested that aspects of the instruction itself may have interfered with the students' ability to apply their declarative and conditional knowledge about strategies to their reading. The discussions "about" strategies may have been too abstract to effect transfer to reading. In addition, the students' limited procedural knowledge, the lack of opportunity to engage in extended reading, as well as factors other than strategy use (e.g., decoding, background knowledge, language proficiency) most likely also contributed to the students' comprehension performance.

Conceptions of Reading

The students maintained a view of reading that focused on meaning-seeking as well as decoding; little movement was shown towards more attention to understanding. The students seemed to have

difficulty integrating what had been discussed during instruction with the issues addressed in the interview--what reading is, what makes a good reader, and how to teach a younger student to read. This seems further evidence that there may have been too heavy an emphasis on abstract discussions about the strategies and that the students were not relating these discussions to their own reading. Several other aspects of instruction may also have contributed to the interview responses. These include attention to monitoring for words that were not understood ("hard words") as well as "missed opportunities" to capitalize on the student's discussing their ideas about reading.

One of the strategies that was emphasized during instruction was monitoring for words that were unclear. The researcher/teacher and students identified words they did not understand and then either used the strategies "Ask for help on hard words;" "Use the words around hard words;" or "Use the dictionary." (This was generally done in combination with other strategies that could be used more consistently.) Perhaps this emphasis on monitoring accounted for what appeared to be a word level focus on the interviews.

A second factor contributing to the students' limited change in conceptions of reading may have been the lack of sufficient explicit discussion, during instruction, of the various purposes for reading. Sometimes, especially in the beginning phases, the discussions revealed the students' ideas about reading. These discussions, in retrospect, could have been expanded to allow the students' assumptions to be more closely examined and challenged. For example, on Day 8, Group One was

talking about the different strategies they had identified and the uses of these. Two students' responses provided a wonderful opportunity to expand on purposes for reading, an opportunity that could have been further pursued:

Researcher/teacher: Now what kind of jobs do we have to do in reading that we need strategies for? What do we have to do in reading? Karen?

Karen: Remember the hard words

Researcher/teacher: You've got to remember the hard words. Do you have to remember the important parts for tests? What are other jobs in reading?

Anita: To remember what the vocabulary words are

Researcher/teacher: You have to remember the vocabulary words, what they mean. What are other jobs that we have to do in reading? What about the pinata people (from the vignette)? What was their job, after they finished reading? Sarah? What was their job? They were reading and what were they going to do after they finished reading?

Susan: Picture it in their minds.

Researcher/teacher: Ok, but that was their strategy. What did they have to do, after they read about the pinata?

Anita: (inaudible)

Researcher/teacher: Good, Anita. They had to, you guys have got strategies for remembering something. They could put the pinata together. Okay, sometimes you have to read because you have to tell other people what you're reading. (Discussion then moved to summarizing)

Karen and Anita, above, at first expressed rather limited ideas about reading. With prompts, Anita then identified (it appears) a more purpose-oriented reason for reading. If this discussion, and others like it, had been continued even further, perhaps by more references to the vignettes and to their own experiences, the students may have begun to develop more of a focus on reading as purposeful meaning-seeking.

Along with the above factors, several others should be considered in thinking about the students' responses to the interview questions. For one, decoding seemed very important to many of the students. Several of them were not fluent readers and seemed concerned about this. Julia was not a fluent reader; two of her responses to the interview questions were focused on decoding and her other responses focused on "hard words" which could have referred to decoding or vocabulary. Other students who were quite fluent readers also focused on decoding, however, perhaps indicating an emphasis on this in their classrooms.

The students showed little change in their conceptions of reading, based on their responses to the interview questions. In this section, factors that may account for this were suggested. These factors were:

the focus on monitoring for unclear words; missed opportunities for expanding discussions about the reading process; and the importance of decoding to these students.

Discussion of Measures

The outcome measures used in this study provided a broad range of information about the students' knowledge of strategies, competence in using them, on-line processing of ambiguous text, and reading comprehension of expository text. Their declarative and conditional knowledge about strategies as well as ideas about reading were assessed through metacognitive interviews, one of which involved the use of actual texts. Procedural knowledge about, or competency in using, selected strategies was assessed by asking the students to employ these strategies before and after reading connected text. On-line processing of ambiguous text was assessed through a "Think-Aloud;" the students stopped after each sentence of an expository passage and relayed what they were thinking about. Finally, reading comprehension was assessed through textually explicit, textually implicit, and scriptally implicit questions asked after the students read 350 word expository passages. In evaluating what was learned about the students from their performance on these measures, it is important to consider the nature of the measures themselves and the ways in which they were administered.

Metacognitive interviews have been used to gain information about students' knowledge about reader, task, and text variables that cannot

be gleaned from their performance alone (Garner, 1987; Englert & articles; Duffy et al., 1987; Palincsar et al., 1990). The students' responses to questions provides insight into how they conceptualize, plan, monitor, and regulate their reading as well as their conceptions and misconceptions of tasks. The interviews responses, however, must be interpreted carefully; the following factors are among those that must be considered (Duffy et al., 1987; Garner 1987); students' lack of awareness of their mental processing; memory failure; differences between reported and actual behavior; differences between students' true metacognitive understanding and more rote memory of what was discussed in class; inadvertent cuing by the examiner; and interference from the students' limited language skills. The use of real reading materials (e.g., science book, comic) and familiar reading scenarios in the Strategy Knowledge interview made the questions less abstract and more familiar to the students, thus reducing some of the problems associated with the above factors. However, the factors still may have interfered to some degree with obtaining complete information about the students' metacognitive knowledge and should be considered in thinking about their responses. Billy, along with other language impaired students, seemed to have particular difficulties understanding some of the interview questions as well as the discussions that occurred during instruction. For example, Billy and Alicia seemed to interpret the question about what they would do to learn and remember a story so she could tell a friend as asking what information they would tell to the friend. Factors such as the students' receptive and expressive

language problems, as well as possible discomfort with the open-ended nature of the interview questions, may have interfered with obtaining a totally accurate assessment of their knowledge of strategies and conceptions of reading.

More probing of the students' interview responses may have been warranted, particularly on the Concept of Reading interview. As noted, many of the responses to this interview assigned a score of 0 as they were too vague to interpret, especially those focused on "hard words." It is suspected that the students were generally referring to words that were difficult to decode but, during instruction, this term was used by the researcher/teacher to refer to difficulties determining meaning so the students may have been focusing on vocabulary. Further questioning would most likely have clarified their use of "hard words." However, probing potentially interferes with comparing responses across students and may also serve to "lead" responses (Duffy et al., 1987)

A related issue is that of reliability of scoring of interview responses. This was particularly problematic in the Strategy Knowledge interview. Acceptable inter-rater reliability was not achieved; the examiner and a second rater then discussed all responses until consensus was achieved. The difficulty in obtaining reliability on this measure, along with the cautions identified by Dufffy et al. (1987) and Garner (1987), raise questions about whether there may be more effective and informative means of assessing conditional knowledge.

While the metacognitive interviews focus on past performance or hypothetical situations, the Think-Aloud focused on concurrent processing (Garner, 1987). This method has been used to study on-line processing in reading with students as young as third grade through college age (Alvermann, 1984; Lytle, 1985; Palincsar et al., 1989, 1990, in press a, in press b). Garner noted the following advantages of Think-Alouds: 1) they are relatively free from memory problems; 2) knowledge-use discrepancies are not a problem; 3) the tasks can be highly specific; 4) inter-rater reliability is collected often; and 5) the tasks can be arranged to provide consistent output over time. She also noted the following disadvantages: 1) inadvertent cuing of responses; 2) students' difficulty expressing themselves verbally; 3) students' being unaware of their processing (especially that which is automated); and 4) the disruptiveness of interrupting processing. All of these factors need to be considered in interpreting the Think-Aloud scores of the students.

Thinking aloud was demonstrated to the students both with a non-reading and a reading task; all of them seemed to clearly understand what was expected of them. As with the interviews, the students with expressive language difficulties may have had particular difficulties. Alicia, Julia and Billy, students with low verbal IQ's, had fairly depressed scores on the Think-Aloud both prior to and following instruction. Stopping after every sentence may have been disruptive for the students, although it decreased interference from memory problems. It would have been interesting to examine the

students' responses to longer segments of similarly ambiguous texts. Perhaps the less frequent disruption of reading would have led to more attention to sense-making.

The students' performance on the criterion-referenced assessments needs to be interpreted with a caution about administration, especially during instruction. These assessments were given during the group meeting times. To prevent losing an entire period of instruction, they were administered in the last 10-15 minutes. Several of the students required more time and went into the next period. For some, this involved missing recess and may have caused carelessness.

In sum, the outcome measures provided a breadth of information about the students' reading knowledge and proficiency. The students evidenced changes in knowledge about strategies and, to some extent, proficiency in using them, both precursors to becoming more strategic readers. Some students showed movement toward internalizing this strategy knowledge and proficiency. If the study had continued, further use of all of the assessment measures may have provided much evidence about the processes of internalization of strategy use to monitor and regulate reading.

Perhaps more information about the process of internalizing may have been gained through utilizing the measures during instruction on a group level or with dyads of students. Forman (1989) found that students were able to solve problems in dyads before they were able to do so independently. The student participants in MCPS may have shown

change in their knowledge about and competence in using strategies on a group level that had not yet been internalized.

In the above sections, changes in the students' knowledge about strategies, knowledge about the reading process, and comprehension of expository text, as indicated by their performance on the student outcome measures, were discussed. Another focus of this study was to examine issues of assessment and the researcher/teacher's ability to provide scaffolded instruction within Mediated Collaborative Problem Solving. The implementation questions developed from issues raised in the Palincsar et al. (1989, 1990, in press a, in press b) study of the differential effects of three models of strategy instruction. In that study, it was found that individual assessment was most difficult within Collaborative Problem Solving (CPS) although, in comparison to the other models, there were more areas that were open to assessment. It was also found that, within CPS, the role of the teacher was most undefined and implementation the most difficult. MCPS was designed to address assessment, as well as the teacher's role and ease of implementation, by incorporating the structured dialogues and teacher scaffolding of Reciprocal Teaching (RT) with the maximum opportunities for student responsibility involved in CPS.

Assessment on the individual level was possible in MCPS when the structured dialogues were used. The information available for assessment included the students' declarative, conditional, and procedural knowledge about strategies, their ideas about the influences on reading performance, their concepts of reading, their comprehension

of text, and their ability to collaborate. The information was particularly valuable as it could be obtained as part of instruction and used immediately to inform scaffolding decisions.
The teacher's role was still quite ambiguous and thus the ease of implementation as problematic as within CPS. In the following section, the role of the scaffolder, or more knowledgeable other, will be considered.

The Provision of Scaffolded Instruction within MCPS

The provision of scaffolded instruction within MCPS was a difficult endeavor. Factors identified in Chapter Three as contributing to the difficulty were: 1) the nature of scaffolding; 2) the nature of the tasks utilized in instruction; 3) the lack of a metascript; 4) the lack of a gradual release of responsibility; and 4) the difficulties inherent in implementing instruction that differed from what the researcher/teacher was familiar with, particularly in terms of its assumptions about students and teacher's roles. All of these factors contributed to confusion on the researcher/teacher's part about how to participate in the dialogues. Common to these factors was the need for the researcher/teacher to carefully define her role within the context of this model of instruction.

As scaffolded instruction involved on-the-spot decision making based on the students' contributions, little planning could (or should) have been done in advance in terms of defining the nature of the support to be given to the students. The use of scripts or decision

rules would have violated the tenants of scaffolding. Scripts are not interactive; decision rules must be made in a decontextualized manner and, as such, would have inhibited the researcher/teacher's closely attending to the nature of the students' contributions to the discussions. However, more emphasis on planning in terms of: 1) clarifying for herself the nature of the shared understanding involved in particular tasks; and 2) presenting tasks in such a way that the roles of the researcher/teacher and student were clear, may have made provided more guidance to the researcher/teacher about how to participate in the discussions.

Defining the nature of the shared understanding within tasks refers to consideration of how closely the teacher and students' conceptions of the task, and approaches to it, need to be in order for shared understanding to be developed. The shared understanding of, for example, how to ask questions to check understanding of a given paragraph is more constrained than that involved in identifying factors that influence selecting strategies to use when reading to prepare for a test. Some of the confusion the researcher/teacher felt in trying to support the students within MCPS could have been alleviated if she had been clearer in advance about the degree of variation from her definition of the task that would still have allowed for the students and herself to share understanding of it.

Presentation of tasks in such a manner that the students and teacher's roles were more defined refers to consideration of whether tasks are open-ended, and truly "open for discussion," or more defined.

The students and the teacher's roles are different within these two types of tasks as is the end-goal. As discussed in Chapter Four, scaffolding decisions became especially unwieldy within tasks that were presented as open-ended when, in reality, there was a certain response that the researcher/teacher wanted. More planning focused on ensuring consistency between the degree of open-endedness in the task and the degree of open-endedness in the way it was presented would have provided less confusion about scaffolding.

In attempting to provide maximum opportunities for student involvement, the researcher/teacher did not consistently assume maximum responsibility for task completion. As discussed in the discussion of Billy in Chapter 4, this sometimes served to disempower the students by creating situations in which they were not able to participate. More initial researcher/teacher responsibility, especially in terms of modeling the ways in which she planned, employed, and evaluated strategy use, may have helped the students develop the competence to participate more fully in the discussions. This may be particularly relevant to students with learning problems.

Defining shared understanding, presenting tasks in a manner in which the students and teacher's roles are clear, and assuming initial responsibility for task completion are all part of a larger issue that was both a focus of and emerged from this study. That issue concerns the need for the teacher to define and become comfortable with what it means to be the "More Knowledgeable Other" in the context of providing each student maximum ownership of the knowledge involved in becoming a

self-regulated reader. Scaffolding decisions will continue to be fraught with tension until the teacher can come to terms with this role.

Edwards and Mercer (1987) address the dilemma of "balancing the conflicting demands of, on the one hand, a child-centered ideology of learning and, on the other hand, an essentially socializing role of society's agents of cultural transmission..."(p.168). This dilemma is also addressed in a broad sense in the literature on literacy. Dyson (1990) and others have pointed to tensions that occur within a scaffolding model when the teacher and student do not share intentions. Too much defining of shared understanding and task approaches, as well as too much assumption of responsibility on the teacher's part, can override students' assuming ownership, in the case of this study, of the knowledge and attitudes facilitating self-regulation in reading. Yet, as Delpit (1988) argues, too little guidance from the teacher, too little sharing of her knowledge, can serve to disempower and disenfranchise students.

The tension about the teacher's role felt by the researcher/teacher may also be felt by teachers as they implement whole language in their classrooms. Literature on whole language has pointed to the need to clarify the role of the teacher (Pearson, 1989; Staab, 1990). Teachers are encouraged to guide based on the students' developing interest and competence in print; questions must arise about how provide this type of mediation in the context of empowering students.

Assessment opportunities, as well as the nature of scaffolding within MCPS, influenced both the implementation and student outcomes of this model. Several other influences on implementation and outcomes emerged over the course of the study. The first of these was the heterogeneity of the students, especially in Group Two. One of the purposes of this study was to examine MCPS in terms of its feasibility for implementation with students with reading difficulties working with more capable peers. By design, the students in the study were a heterogenous group with the majority of them functioning a year below grade level expectations in reading comprehension. As implementation progressed, the researcher/teacher began to feel that there were limits to the range of heterogeneity that could be beneficial to the participant students, limits that may have been exceeded in Group Two.

The second factor that influenced both implementation as well as student outcomes was the high level of risk-taking involved in participating in the discussions in MCPS. Student participants were frequently asked to discuss and justify their contributions, activities that could have been threatening, particularly in the context of the high degree of ambiguity in terms of correct and incorrect responses, structure, and evaluation. Participation for those who were most comfortable with structure and a clear sense of correct and incorrect may have been more risk-laden than it was for those who were more comfortable with ambiguity.

A third influence on implementation and student outcomes was that of the context within which instruction occurred and the effect of this

context on the establishment of a classroom culture or participation structure facilitative of collaborative problem solving. Classroom participation structure (Florio, 1978; Erickson & Schultz, 1981) refers to the rights and obligations of participants in classrooms as well as the participants' awareness of these, their notions of what the tasks are and the acceptable behaviors to accomplish these tasks. Establishment of a classroom culture is affected by time as well as familiarity of the participants. In MCPS, the students were asked to engage in activities involving a participation structure and norms that were quite different from those they were most likely accustomed to. The duration of the study, as well as the unfamiliarity of the student and adult participants, raise questions about the success at which a classroom culture conducive to problem solving was feasible.

In the following sections, heterogeneity, risk-taking and context will be discussed in terms of the way in which they seemed to affect implementation as well as student outcomes.

Limits of Heterogenous Grouping

Students who were normally achieving, as well as those who were experiencing reading difficulties, showed changes in their knowledge about and use of strategies over the course of instruction. It has been argued that argued that both more and less capable students can benefit from working together to solve problems, the less capable students learning from the modeling of the more capable ones who in turn profit from the opportunity to provide explanations and

justifications (Webb, 1989). In this study, the members of Group One seemed to benefit from being in a heterogenous group; for those in Group Two, the level of heterogeneity seemed to be too great for the students to be as helpful to each other.

Students were assigned to the instructional groups based on similarities in their standardized test scores, their performance on the criterion-referenced comprehension assessments, global scoring of their strategy measures, and whether or not they were receiving reading instruction outside of their regular classroom. The group assignment was done to make the groups as equivalent as possible; however, the members of Group Two were, even within this assignment procedure, more diverse than those of Group One.

In total, Group One had five fourth graders, two with fairly low tested verbal abilities and three who seemed quite able to reason and express themselves verbally. David was the only third grader in the group. His WISC scores indicated strong verbal abilities although, as will be discussed in the next section, David was not an active participant in the group, seeming to be uncomfortable with many of the tasks.

In contrast to Group One, Group Two had three third graders. Teddy was an NA student, Sharon a student with Turner's Syndrome (who was repeating third grade) with a normal verbal IQ and lower performance IQ, and Alicia a student with language impairments. Julia was in the self-contained special education class but was fourth grade age. There were two fourth graders--Sandra, a student with learning

disabilities who had good verbal ability (cognitive functioning found to be "near upper limits on high average range," according to her psychological report) and Carol, a NA fourth grader whose scores on the criterion-referenced passages placed her above grade level. This group had more third graders and more students with language difficulties. Carol, the highest functioning student in Group Two, performed similarly to Kate (the NA fourth grader in Group One) on the standardized achievement test; however, her performance on the criterion-referenced achievement test was higher than Kate's.

The heterogeneity, especially in terms of language ability and age, was less in Group One than in Group One. In addition, Group One had more students who were able to work together to solve problems. Karen, Kate, Anita, and Susan (although not as frequently as the other three) joined in the discussions, and seemed to be able to respond to and build on each other's ideas. David and Billy were less able to join in, David perhaps due to his discomfort with the tasks and Billy due to his difficulty with abstract reasoning. Nonetheless, there seemed a spirit of collaboration in this group that was not as strong in Group Two.

In the first few days of instruction, Group Two seemed to be more interested in the discussions and to more readily participate in them than did Group One. However, the discussions in this and successive phases were dominated by Sandra, Carol, and Teddy, the more verbal students. Especially in discussing the merits of the strategies used by the students in the vignettes, they stated their ideas clearly,

attended to those of the other students, and then changed their positions based on what others had said. Alicia and Julia rarely volunteered to participate and, when called on, seemed to have difficulty understanding the tasks, especially when they involved "talking about" strategy use.

Carol and Sandra's participation and interest level seemed to lessen over the course of instruction. This was especially true for Carol; she began to be late for class and at times acted rather sullen and disinterested. She said she was concerned about the work she was missing in her classroom but Carol also appeared to have become rather bored, especially as the discussions centered more on using the strategies to read the stories. Sandra did not seem as openly frustrated with the discussions but did indicate on several of her affective measures that she was bored.

Julia and Alicia had particular difficulties participating in the discussions from the start of instruction; discussing and using the strategies seemed very confusing for them as did the content of some of the stories. On two quite poignant occasions, Julia expressed disappointment with the study, saying she thought she was going to learn to read better. In these comments and in her individual interviews, Julia showed concern about the decoding aspects of reading and her difficulties in mastering these. She sometimes worried about her turn to read aloud in the group, wanting to do it but concerned that she would not be able to pronounce the words. Julia was absent from Days 5-9 of instruction which was when the concept of strategies

was introduced. Missing this introduction, along with her concern about decoding and her difficulty with some of the story content, was detrimental to her developing more strategic reading behaviors in the context of Group Two.

Carol served as a model and a guide for the others, as exemplified by her guiding Julia to summarize on Day 25:

Researcher/teacher: It looks to me like Julia's stuck. I wonder if we should reread.

Students: No

Researcher/teacher: What should we do to help her?

Carol: I'll help her.

Researcher/teacher: What?

Carol: I'll help her.

Researcher/teacher: Ok, Carol's going to help her. Notice she was helping with asking questions.

Carol: Do you know the monkey's (inaudible)

Julia: Uh huh (inaudible). Wait. Yeah

Researcher/teacher: Her name was Lana, right? And ask her (inaudible)

Carol: And what did Lana learn to do?

Julia: Push buttons on the

Researcher/teacher: Push buttons on the machine. That was a very nice question, Carol. Right to the heart of it.

Carol: And she learned how many words by the time she was three and one half?

Researcher/teacher: Do you remember how many buttons could she push to make different words?

Julia(?): Yeah

Researcher/teacher: Ok, maybe we should tell her what paragraph that's in.

Carol: That's in the third paragraph.

Julia: She learned (inaudible)

Carol: Yes, because you put that together

Julia: She learned 71 words.

Carol: Well, could you put all the things you said together

Researcher/teacher: Please

Carol: Into one answer

These two girls also worked together in the partner activities. As above, Carol usually led Julia, with little collaboration between the two. It is questionable whether, in these situations, the leading Carol did actually benefitted her learning; the way in which she approached tasks with Julia may not have involved the same type of reasoning she would have used herself, or at least did not challenge this reasoning. Julia may also not have been able to benefit from Carol's help as the tasks may have been too difficult for her to understand.

Carol, Teddy, and Sandra were excused from the group for the last four days of instruction, primarily due to concerns about difficulties

Alicia and Julia had in participating in the discussions but also because of concerns about the inappropriateness of the group composition for the first three. The instruction for Alica, Julia, and Sharon was more teacher-directed, with emphasis on using the strategies while reading. The girls were still asked to use the strategies holistically; however, more support for doing so was given by the researcher/teacher rather than by peers. In addition, a text written on a lower grade level was used. These students seemed more able to participate and thus were afforded more opportunities to use the strategies. Alicia, especially, had been very hesitant to participate (or had had much difficulty doing so) in the group of six. She was quite dominant in the small group, often volunteering. Her classroom teacher explained that Alicia was generally much more active in smaller groups. In this instance, her level of comfort was greater in the group of three; in addition, the tasks and text were more appropriate to her needs.

It appeared that the degree of heterogeneity was too great to be an asset to the students in Group Two. The variations in the students' ages, language abilities, conceptions of reading, and perhaps feelings about themselves as readers, were such that, within most of the structure and tasks of MCPS, they had difficulty supporting each other through collaboration. The variation in Group One seemed to be within a more beneficial range. Although the gains on the outcome measures were not dramatic in that group, especially for Billy and David, the students seemed to make more progress towards becoming strategic

readers than was made by the students in Group One. This was especially the case in their performance on the Think-Aloud and criterion-referenced measures, indicators of application of the content of the discussions.

It was hoped that MCPS would involve challenging the students to identify, define, and evaluate strategies they could use to monitor and regulate their reading. The challenges, especially when the strategies were being "talked about," were given to the group as a whole. For some, such as Alicia and Julia, the challenges may have been out of the range of their zones of proximal development (Vygotsky, 1978). Perhaps with the students in Group Two, there was not enough commonality within their individual's ZPD's to permit challenges that were appropriate to the entire group.

Defining the limits of heterogeneity for MCPS must be viewed within the context of other issues raised in this study, especially the difficulties of scaffolding without a gradual release of responsibility. Perhaps with more initial assumption of responsibility by the researcher/teacher, students such as Alicia and Julia, as well as Billy and David in Group One, would have been more able to participate in collaboration. Perhaps they could have benefitted from initial instruction in which the researcher/teacher took more of a role in defining the strategies, modeling their use, as well as modeling problem-solving strategies. Then perhaps they could have participated more in the larger group for at least some of the discussions.

To summarize, the issue of range of heterogeneity refers to the limits of diversity that will enable a group of students to profit from group collaboration. From this study, it appears that, if there is too much variation in factors such as age, language ability, and content understanding, the students may not be able to benefit from collaboration, especially in the context of instruction focused on maximum student responsibility for identifying, defining, and evaluating strategies. The critical variability in this study, seemed to be factors such as the above, rather than whether or not the students were labeled as needing services for reading.

Risk-Taking

Participation in MCPS involved risk-taking. The group members were frequently asked to elaborate and justify their contributions, and to do so in a context in which there was much ambiguity. There were several aspects of this type of participation that were potentially rather threatening for the participants. The first was the expectation of "defending" a position when peers and others might disagree with it, and the second was the lack of a clear notion of correct or incorrect. Some students, such as Anita and Karen, seemed comfortable with and to appear to benefit from the degree of risk-taking involved in MCPS. Others seemed much more uncomfortable. David, the third grade ChI student, seemed to be particularly hesitant about taking risks during the group discussions.

Although David had a learning profile consistent with the state criteria for specific learning disabilities, he was not receiving resource services as his grades did not warrant this. He was, however, enrolled in the school's Chapter One reading program. David's Full Scale WISC IQ was 121 (Verbal: 124 and Performance: 114). Both his local and national percentile ranks on the reading comprehension subtest of the CAT were 1%, lower than his scores in the previous year. David had difficulty in situations he perceived as evaluative. Prior to the initial interviews with David, his classroom teacher told the investigator not to even use the word "test."

During the initial assessment for this study, David seemed to be uncomfortable with the ambiguity of the open-ended questions as well as to quickly become discouraged when he sensed he was not providing correct responses on the criterion-referenced comprehension assessment. His response to three of the five questions on the Concept of Reading interview and many of the questions on the Strategy Knowledge interview was "I don't know."

He did not elaborate on any of his responses to questions in that interview. David's scores on the first two criterion-referenced assessments were 45% and 40% correct. He later said he had not seen the second page of the second assessment so was given additional passages. His scores on the second day were 10%, 0%, and 5%. It appeared to the examiner that, once David perceived he was not doing well, he gave up and stopped putting forth effort.

David was the only third grader in Group One which may have made him nervous about participation. His discomfort with ambiguity and his fear of being evaluated was evident in the group. From the start, he was generally hesitant to participate and often would not elaborate on his contributions when asked. For example, David took little part in naming the creature the group drew or in writing the story about it. At first he refused to be in the group video but finally agreed to take a minor role.

Generally, David was a quiet group member. On some occasions, however, he was a more active participant. One example is the activity in which the students used selected strategies with their partners to prepare to answer review questions about the story they had read; they then returned to the group to answer the questions. David volunteered several times, participating as much if not more than the other students. Although this activity involved evaluation, he still took part in it, perhaps due to his confidence that he knew the answers as well as to the relatively low level of ambiguity. Another occasion on which David played a more active role was when he showed particular interest in one of the stories, "Exploring the Sea." He showed the group a related story that he had read in his class and raised questions about the content of the story the group was reading. In this instance, there was no pressure on David.

A final example of an occasion when David was more able to participate in the group activities was the group's sharing their mind pictures of a section of text about sea turtles having been in

existence for millions of years. David described quite an imaginative picture that was almost like a timeline of events throughout history. He generally was willing to share his pictures, apparently comfortable with the idea that different readers find different pictures helpful.

David appeared to be most uncomfortable participating in the group discussions when this involved a high degree of ambiguity and was in the context of evaluation. He seemed more comfortable when these two factors were not involved. His participation was uneven; he was more active when the tasks were fairly closed or when there was little perceived evaluation. It must be noted that, during they study, David missed at least seven days of instruction. This contributed to his lack of change on the outcome measures. However, his difficulties with ambiguities and evaluation, both in the group and during the post-instructional assessment, also affected his lack of growth in knowledge about and use of strategies. David showed minimal change on any of the measures.

Billy, like David, had difficulties with risk-taking. This also may have been an issue for Alica as she was a much more active participant when she was only working with Julia and Sharon rather than the whole group. Risk-taking difficulties seemed to inhibit these students' participation in the discussions. If children like these are to become more able to take the necessary risks to benefit from this type of instruction, they most likely will need much support, support that perhaps should be in the form of more initial structure along with

explicit modeling of the ways in which to elaborate and justify positions and to participate in discussions about them.

Context

The third factor that influenced implementation and outcomes of MCPS was the context within which instruction occurred. The classroom culture or classroom participation structure (FLorio, 1979; Erickson & Schultz, 1981) in MCPS involved teachers and students in different roles than they hold in more typical recitation (Cazden, 1988) lessons. The sense of correct and incorrect was much more ambiguous and thus the goal was not always to reach consensus or "get the right answer". There was a "mitigation" of the teacher's authority (Florio-Ruane, 1989); it was acceptable (and encouraged) for students to challenge each other and the teacher. The context for instruction (students from a variety of classes working for 30 minutes in the resource room for 35 days with an adult relatively unfamiliar to them) was not the most facilitative of the development of and comfort with a classroom culture conducive to problem-solving. This in turn may have limited the students' internalization of what was discussed during MCPS.

The time constraints interfered with the groups' ability to develop problem-solving discourse patterns. Although the students in MCPS did show evidence of comfort in disagreeing with the teacher (e.g., Statements such as Susan's statement that "You can't vote. You're not a teacher" were rarely heard after the first two phases of instruction; several of the students offered challenges such as Susan

and Karen's disagreeing with the researcher/teacher's ideas about the use of picturing), they did not have sufficient time to develop the ability to maintain arguments and discussions. This was influenced by the lack of consistently used metascript, the limited focus on procedural knowledge, and the difficulties the researcher/teacher had in scaffolding, but also was a function of the limited time period of instruction.

Compounding the time constraints was the lack of familiarity of the participants. The students in each group were from four different classrooms. Although some of them had worked together in the resource room, this was not true of the entire group. The question arises whether, within the time limits of the study, these students were able to develop a sufficient level of comfort with each other to fully participate in the "give and take" involved in problem solving.

Both the problem-solving structure and norms, as well as generalization of strategy use, could have been further enhanced if they had been focused on beyond the instructional time. The time constraints of instruction, as well as the relative unfamiliarity of the researcher/teacher with the students in MCPS, accounted for "missed opportunities" to foster both of these. Many of the students, especially those in Group Two, eagerly shared their strategy use outside of class (e.g., selecting books, doing homework, taking tests). If the researcher/teacher had been with the students for the entire school day, and if they had been together, there would have been many more occasions for sharing and for highlighting the use of strategies

for different tasks. Greater familiarity with the students, such as the classroom teachers had, would have also enabled the researcher/teacher to ulitize more information about the children in the lessons themselves, especially to help the children understand how person variables affect strategy use.

SUMMARY

To attain the goals of high or critical literacy (Bereiter & Scardamalia, 1987; McGinley & Tierney, 1989), students need to become self-regulated readers, aware of variables that are important to reading and able to control their own reading behaviors. Students with reading difficulties have been identified as lacking much of the knowledge, beliefs, and behaviors that characterize self-regulated readers (August, Flavell, & Clift, 1984; Baker, 1982; Baker & Brown, 1984; Butkowsky & Willows, 1980; Garner, 1980, 1987; Garner, Wagoner, & Smith, 1983; Meyers & Paris, 1978). One approach to facilitate the development of the ability to self-regulate during reading is strategy instruction.

Currently, there are several models of strategy instruction utilized in both regular and special education, models which can be seen as differing in terms of the conceptions of teaching and learning embodied within them. These conceptions are manifested in the roles of the teachers and students, the nature of the tasks (Anderson, 1989) and the nature of the discourse that occurs during instruction. The conceptions of teaching and learning that have informed strategy instruction, and instruction in general within special education, have most often involved a reductioninstic perspective on teaching and learning (Gavelek & Palincsar, 1988; Poplin, 1988a, Stone, 1989a, 1989b).

There has been a growing interest within the field of special education in the application of social constructivist views on teaching and learning to instruction (Gavelek & Palincsar, 1988; Heshusius, 1991; Poplin, 1988a; Stone, 1989a, 1989b). Within social constructivism, students are seen as knowledge constructors who learn through collaboration with more knowledgeable other(s) in the context of holistic, purposeful tasks; the teacher is seen as a facilitator or mediator of the students' learning. The focus of this study was the implementation and student outcomes of Mediated Collaborative Problem Solving (MCPS), a model of strategy instruction informed by social constructivist principles.

MCPS was developed to provide special education and remedial reading students the opportunity to work collaboratively with each other, their teacher, and more capable peers to identify, define, and evaluate strategies that could be used to monitor and regulate their reading. Twelve third and fourth grade students, the majority of whom were experiencing reading difficulties, participated in MCPS. Instruction was carried out for 35 days.

Within MCPS, the students had multiple opportunities to reflect on and discuss the planful use of strategies, as well as to consider the effect of differences in reader, text, and task characteristics on strategy use and effectiveness. These opportunities were reflected in their responses after instruction to interview questions assessing declarative and conditional knowledge about strategies. Following instruction, the students identified a wider range of strategies,

elaborated more on the strategies they identified, and showed evidence of increased knowledge of flexible strategy use. The students also showed changes in their procedural knowledge about strategies although these were more modest than the changes in their declarative and conditional knowledge. Four of the twelve students showed a positive trend in their comprehension performance, evidence of internalization of what was learned within MCPS.

The changes in knowledge about and use of strategies were evidenced by students in special education and Chapter One programs as well as by the normally achieving students. Especially on the strategy use measure, the performance of all three groups of students was much more similar following instruction than prior to it; students in all groups made substantial gains in declarative and conditional knowledge about strategies. Two of the four students with positive trends in comprehension performance were special education students. Although this study raised concerns about the range of heterogeneity most beneficial to students, it also gave support for students with reading problems being given the opportunity to collaborate with normally achieving peers.

The participation and performance of the students in MCPS indicated that instruction in which students are viewed as knowledge constructors and teachers as knowledge mediators (Anderson, 1990) has potential for helping students develop a sense of themselves as able to actively monitor and regulate their reading as well as proficiency in doing so. Implementation and outcome issues raised in this study

suggest that strategy instruction informed by social constructivism, while challenging to implement, should be further explored. Critical to implementation is the establishment of a classroom culture in which students are encouraged to assume responsibility for what and how they are learning as well as the provision of the degree and type of support that enables this.

The first question raised in this paper was "What does strategy instruction informed by a social constructivist model of instruction look like?" MCPS, as described and implemented in this study, provided one look at an instructional model in which strategies are learned through students and teachers jointly identifying, defining and evaluating them. The issues explored and raised in this study suggested ways in which this instruction also might "look somewhat different," or be modified to better challenge and provide support for students experiencing reading difficulties.

Modifications of MCPS, to be explored in future research, will involve the provision of more opportunities for guided practice in using strategies in the context of reading connected and unified texts; a lessening of ambiguity, especially as the strategies are initially explored; and the provision of more support through teacher scaffolding, particularly for those students with language difficulties.

The researcher/teacher in the present study was the investigator. As such, she was provided the opportunity to focus on the intersection of practical and theoretical issues involved in guiding students to

explore strategies, and to do this from the perspective of a teacher working to change her practice. This perspective could not have been as fully understood if another person, such as the resource teacher or one of the school's classroom teachers, had implemented instruction. However, while the assumption of the researcher/teacher role by the investigator added to the richness of the data, it also placed limits on what occurred during instruction. The researcher/teacher did not have extensive knowledge of the students to enable her to consistently lead them to connect the discussions during instruction to other activities/aspects of their school and out-of-school lives. Similarly, she was not able to fully establish a classroom culture in which the participant structure, comfort with risk-taking, and comfort with ambiguity enhanced participation of all students in problem solving. Finally, she was not able to explicitly foster the students' generalization of what was discussed during MCPS to situations that occurred throughout the day.

Future research on strategy instruction through mediated collaborative problem solving will involve the investigator working jointly with a classroom teacher(s) in the context of the students' classroom. In this context, more emphasis can be placed on establishing a culture in which heterogenous groups of students are expected and encouraged to assume the roles of knowledge constructors throughout the school day. Through collaboration between a classroom teacher and the researcher prior to and during instruction, many other modifications of the model can be made so as to maximize opportunities

for the particular student participants to identify, define, and evaluate strategies.

The role of the teacher within instruction informed by social constructivism is intriguing indeed. This study indicated that, to effectively scaffold students within problem solving tasks, the teacher must come to truly understand and be comfortable with what it means to be a more knowledgeable other in the context of maximizing students' responsibility for control of their learning. One further area of future research will involve exploration of the kinds of teacher education experiences that will foster pre- and inservice teacher's becoming comfortable with, and able to provide, scaffolding that facilitates students' developing the ability and desire to be self-regulated readers.

LIST OF REFERENCES

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Adams, A., Carnine, D., & Gersten, R. (1982). Instructional strategies for studying content area texts in the middle grades. Reading Research Quarterly, 18, 27-55.

Allington, R. L. (1980). Teacher interruption behaviors during primary grade oral reading. Journal of Educational Psychology, 72, 371-377.

Allington, R. L. (1983). The reading instruction provided to readers of different abilities. Elementary School Journal,83, 255-265.

Allington, R. L., McGill-Franzen, A. (1989). School response to reading failure: Instruction for Chapter 1 and special education students in grades two, four, and eight. Elementary School Journal, 89, 529-542.

Allington, R. L., Stuetzel, H., Shake, M., & Lamarche, S. (1986). What is remedial reading? A descriptive study. Reading Research and Instruction, 26, 15-30.

Alvermann, D. E. (1984). Second graders' strategic preferences while reading basal stories. Journal of Educational Research, 77, 184-189.

Anderson, L. M. (1989). Implementing instructional programs to promote meaningful, self-regulated learning. In J. E. Brophy (Ed.), Advances in research on teaching: Vol. 1. Teaching for meaningful learning and self-regulation (pp. 311-343). Greenwich, CT: JAI Press.

Anderson, R. C., Heibert, E. H., Scott, J. A., & Wilkinson, I. A. (1985). Becoming a nation of readers: The report on the Commission on Reading. Washington, DC: National Institute on Education.

Anderson, R. C., Wilson, P. T., & Fielding, L. G. (1988). Growth in reading and how children spend their time outside of school. Reading Research Quarterly, 23, 285-303.

August, D. L., Flavell, J. H., & Clift, R. (1984). Comparison of comprehension monitoring of skilled and less skilled readers. Reading Research Quarterly, 20, 39-53.

Baker, L., & Brown, A. L. (1984). Metacognitive skills and reading. In P. D. Pearson (Ed.), Handbook of reading research (pp. 353-394). New York: Longman.

Baumann, J. F. (1984). The effectiveness of a direct instruction paradigm for teaching main idea comprehension. Reading Research Quarterly, 20, 93-115.

Baumann, J. F. (1986). Teaching third-grade students to comprehend anaphoric relationships: The application of a direct instruction model. Reading Research Quarterly, 21, 70-90.

Baumann, J. F. (1988). Direct instruction reconsidered. Journal of Reading Behavior, 31, 712-718.

Bellack, A. (1966). The language of the classroom. New York: Teachers College Press.

Belmont, J. M. (1989). Cognitive strategies and strategic learning. American Psychologist, 44, 142-148.

Bereiter, C. (1986). The reading comprehension lesson: A commentary on Heap's ethnomethodological analysis. Curriculum Inquiry, 16, 65-72.

Bereiter, C., & Scardamalia, M. (1987). An attainable version of high literacy: Approaches to teaching higher-order skills in reading and writing. Curriculum Inquiry, 17, 9-30.

Bogdan, R. C., & Biklin, S. K. (1982). Qualitative research for education: An introduction to theory and methods. Boston: Allyn and Bacon.

Borkowski, J. G., Carr, M., & Rellinger, E. (1990). Self-regulated cognition: Interdependence of metacognition, attributions, and self-esteem. In B. Jones & L. Idol (Eds.), The dimensions of thinking and cognitive instruction (pp. 53-92). Hillsdale, NJ: Erlbaum.

Bransford, J. D., Stein, B. S., Shelton, T. S., & Owings, R. A. (1980). Cognition and adaptation: The importance of learning to learn. In J. Harvey (Ed.), Cognition, social behavior, and the environment. Hillsdale, NJ: Erlbaum.

Brown A. L. (1978). Knowing when, where, and how to remember: A problem of metacognition. In R. Glaser (Ed.), Advances in instructional psychology (Vol. 1, pp.77-165.) Hillsdale, NJ: Erlbaum.

Brown, A. L., Bransford, J. D., Ferrara, R. A., & Campionne, J. C. (1983). Learning, remembering, and understanding. In J. H. Flavell & E. M. Markman (Eds.), Handbook of child psychology: Cognitive development (Vol. III, pp.77-166). New York: Wiley.

Brown, A. L., Day, J. D., & Jones, R. (1983). The development of plans for summarizing texts. Child Development, 48, 1-8.

Brown, A. L., & Palincsar, A. S. (1985). Reciprocal teaching of comprehension: A natural history of a program for enhancing learning (Technical Report #334) Champaign-Urbanna: University of Illinois, Center for the Study of Reading.

Brown, A. L., & Palincsar, A. S. (1989). Guided cooperative learning and individual knowledge acquisition. In L. Resnick (Ed.), Essays in honor of Robert Glaser (pp. 393-451). Hillsdale, NJ: Erlbaum.

Brown, A. L., & Smiley, S. S. (1977). Rating the importance of structural units of prose passages: A problem of metacognitive development. Child Development, 48, 1-8.

Butkowsky, I. S., & Willows, D. M. (1980). Cognitive-motivational characteristics of children varying in reading ability: Evidence for learned helplessness in poor readers. Journal of f Educational Psychology, 72, 408-422.

Campione, J. (1983). In Pearson, P. D., & Gallagher, M. Instruction of reading comprehension. Contemporary Educational Psychology, 8, 317-344.

Cazden, C. (1988). Classroom discourse. Portsmouth, NH: Heinneman.

Cherkes-Julkowski, M., Gernter, N., & Norlander, K. (1986). Differences in cognitive processes among handicapped and average children: A group learning approach. Journal of Learning Disabilities, 19, 438-445.

Collins, J. (1982). Discourse style, classroom interaction and differential treatment. Journal of Reading Behavior, 14, 429-437.

Dansereau, D. F., Collins, K. W., McDonald, B. A., Holley, C. D., Garland, J., Diedkoff, G., & Evans, S. H. (1979). Development and evaluation of a learning strategy training program. Journal of Educational Psychology, 71, 64-73.

Darch, C., & Kameenui, E. J. (1987). Teaching LD students critical reading skills: A systematic replication. Learning Disability Quarterly, 10, 82-91.

Delpit, L. (1988). The silenced dialogue: Power and pedagogy in educating other people's children. Harvard Educational Review, 38, 280-298.

Deshler, D. D., & Lenz, B. K. (1989). The strategies instructional approach. Unpublished manuscript. University of Kansas, Lawrence, KS.

Deshler, D. D., & Shumaker, J. B. (1986). Learning strategies: An instructional alternative for low-achieving adolescents. Exceptional Children, 52, 583-590.

Downing, J. (1969). How children think about reading. Reading Teacher, 217-230.

Doyle, W. (1986). Classroom organization and management. In M. C. Wittrock (Ed.), Handbook of Research on Teaching (pp. 392-431).

Duffy, G. G. & Roehler, L. R. (1989). The tension between information-giving and mediation: Perspectives on instructional mediation and teacher change. In J. E. Brophy (Ed.), Advances in Research on Teaching: Vol.1: Teaching for meaningful learning and self-regulation (pp. 1-33). New York: JAI.

Duffy, G. G., Roehler, L. R., Meloth, M. S., Polin, R., Rackliffe, G., Tracy. A., & Vavrus, L. (1987). Developing nad evaluating measures associated with strategic reading. Journal of Reading Behavior, 19 (3), 223-246.

Duffy, G. G., Roehler, L. R., Meloth, M. S., Vavrus, L. G., Book, C., Putnam, J., & Wesselman, R. (1986). The relationship between explicit verbal explanations during reading skill instruction and student awareness and achievement: A study of reading teacher effects. Reading Research Quarterly, 21, 237-252.

Duffy, G. G., Roehler, L. R., Sivan, E., Rackliffe, G., Book, C., Meloth, M., Vavrus, L. G., Wesselman, R., Putnam, J., & Bassiri, D. (1987). Effects of explaining the reasoning associated with using reading strategies. Reading Research Quarterly, 22, 347-368.

Dweck, C. (1975). The role of expectations and attributions in the alleviation of Learned Helplessness. Journal of Personality and Social Psychology, 31, 674-685.

Dyson, A. H. (1990). Weaving possibilities: Rethinking metaphors for early literacy development. Reading Teacher, 44, 202-213.

Edwards, D., & Mercer, N. (1987). Common knowledge. London: Metheum.

Ellis, E. S., Lenz, B. K., & Sanbornie (1987a). Generalization and adaptation of learning strategies to natural environments: Part 1: Critical agents. Remedial and Special Education, 8, (1), 6-20.

Ellis, W., S., Lenz, B. K., & Sanbornie (1987b). Generalization and adaptation of learning strategies to natural environments: Part 2: Research into practice. Remedial and Special Education, 8, (2), 6-23.

Englert, C. S., Raphael, T. E., Fear, K. L., & Anderson, L. M. (1988). Students' metacognitive knowledge about how to write informational texts. Learning Disability Quarterly, 11, 18-46.

Erickon, F., & Schultz, J. (1981). When is a context? Some issues and methods in the analysis of social competence. In J. Green & C. Wallet (Eds.), Ethnography and language in educational settings (pp. 147-160). Norwood, NJ: Ablex.

Fuererstein, R. (1979). The dynamic assessment of retarded performers: The learning potential assessment device, theory, instruments, and techniques. Baltimore: University Press.

Flanders, N. (1970). Analyzing teacher behavior. Reading, MA: Addison-Wesley.

Florio, S. (1978of). Learning how to go to school: An ethnography of interaction in a kindergarten/first grade classroom. Unpublished doctoral dissertation, Harvard University.

Forman, E. (1989). The role of peer interaction in the social construction of mathematical knowledge. In N. Webb (Ed.), Peer interaction, problem-solving, and cognition [Special issue]. International Journal of Research in Education, 13, 55-70.

Forman, E. A., & Cazden, C. B. (1985). Exploring Vygotskian perspectives in education: The cognitive value of peer interaction. In J. V. Wertsch (Ed.), Culture, communication, and cognition: Vygotskian perspectives (pp. 323-347). Cambridge: Cambridge University Press.

Fry, E. B. (1977). Fry's readability graph: Clarifications, validity, and extensions to level 17. Journal of Reading, 21, 242-252.

Gallimore, R., & Tharp, R. G. (1983). The regulatory functions of teacher questions: A microanalysis of reading comprehension lessons (Tech Report # 109). Honolulu: Kamehameha Educational Research Institute, The Kamehameha School.

Garner, R. (1980). Monitoring of understanding: An investigation of good and poor readers' awareness of induced miscomprehensions of text. Journal of Reading Behavior, 12, 55-63.

Garner, R. (1987). Metacognition and reading comprehension. Norwood, NJ: Ablex.

Garner, R., & Reis, R. (1981). Monitoring and resolving comprehension obstacles: An investigation of spontaneous lookbacks among upper-grade good and poor comprehenders. Reading Research Quarterly, 16, 569-582.

Garner, R., Wagoner, S., & Smith, T. (1983). Externalizing question-answering strategies of good and poor comprehenders. Reading Research Quarterly, 18, 439-447.

Gavelek, J., & Palincsar, A. S. (1988). Contextualism as an alternative worldview of learning disabilities: A response to Swanson's "Toward a metatheory of learning disabilities." Journal of Learning Disabilities, 21, 278-281.

Gersten, R., & Carnine, D. (1986). Direct instruction in reading comprehension. Educational Leadership, 43 (7), 70-78.

Gersten, R., Woodward, J., & Darch, C. (1986). Direct instruction: A research-based approach to curriculum design and teaching. Exceptional Children, 53, 17-31.

Haynes, M, & Jenkins, J. R. (1986). Reading instruction in special education resource rooms. American Educational Research Journal, 23, 161-190.

Heshusis, L. (1989). Holistic principles: Not enhancing the old but seeing a-new: A rejoinder. Journal of Learning Disabilities, 22, 595-602.

Jacobs, J. E., & Paris, S. G. (1987). Children's metacognition about reading: issues in definition, measurement, and instruction. Educational Psychologist, 22, 255-278.

Kierstead, J. (1985). Direct instruction and experiential approaches: Are they really mutually exclusive? Educational Leadership, 42 (8), 25-30.

Leinhardt, G., & Greeno, (1986). The cognitive skill of teaching. Journal of Educational Psychology,78, 75-95.

Leinhardt, G., Zigmond, N., & Cooley, W. (1981). Reading instruction and its effects. American Educational Research Journal, 18, 343-361.

Lenz, B. K. (1989, January). In the spirit of strategies instruction: Cognitive and metacognitive aspects of the Strategies Intervention Model. Paper presented for the Second annual Conference of the National Institute of Dyslexia.

Lovitt, T. C., & Hansen, C. L. (1976). Round one--Placing the child in the right reader. Journal of Learning Disabilities, 6, 347-353.

Lytle, S. (1985). What can we learn with the use of think-alouds? Paper presented at the annual meeting of the International Reading Association.

Luria, A. R. (1976). Cognitive development: Its cultural and social foundations. Cambridge: Harvard University Press.

McGinley, W., Cox, D, & Hall, C. (1989). Teaching and the ways of knowing: Children as researchers. Unpublished manuscript, University of Michigan, Ann Arbor

McGinley, W., & Tierney, R. J. (1989). Traversing the topical landscape. Written Communication, 6, 243-269.

Meichenbaum, D. (1985). Teaching thinking: A cognitive-behavioral perspective. In S. F. Chipman, J. W. Segal, & R. Glaser (Eds.), Thinking and learning skills: Vol. 2: Research and open questions (pp. 407-426). Hillsdale, NJ: Erlbaum.

Meichenbaum, D., & Asarnow, J. (1979). Cognitive behavior modification and metacognitive development: Implications for the classroom. In P. C. Kendall & S. D. Hollan (Eds.), Cognitive-behavioral interventions: Theory, research, and practice (pp. 11-35). New York: Academic Press.

Meyers, M., & Paris, S. G. (1978). Children's metacognitive knowledge about reading. Journal of Educational Psychology, 70, 680-690.

Miller, G. E. (1985). The effects of general and specific self-instruction on children's comprehension monitoring performance during reading. Reading Research Quarterly, 20, 616-628.

Miller, G. E. (1987). The influence of self-instruction on the comprehension monitoring performance of average and above average readers. Journal of Reading Behavior, 19, 379-393.

Morine-Deschner, G. (1987). Can we talk? In D. E. Berliner and B. U. Rosenshine (Eds.), Talks to teachers (pp. 37-53). New York: Random House.

Mirriman, S. B. (1988). Case study research in education. San Francisco: Jossey-Bass.

Palincsar, A. S. (1985, April). The unpacking of a multi-component, multiple training package. Paper presented at the annual meeting of the American Educational Research Association, Chicago.

Palincsar, A. S. (1986). The role of dialogue in promoting scaffolded instruction. Educational Psychologist, 21, 73-98.

Palincsar, A. S. (1987, April). Collaborating for collaborative learning of text comprehension. Paper presented at the annual meeting of the American Educational Research Association, Washington, DC.

Palincsar, A. S., & Brown, A. L. (1984). Reciprocal teaching of comprehension-fostering and comprehension-monitoring activities. Cognition and Instruction, 1, 117-175.

Palincsar, A. S., & Brown, A. L. (1989). Instruction for self-regulated reading. In L. B. Resnick, & Klopfer, L. E. (Eds.), Toward the thinking curriculum: Current cognitive research. Alexandria, VA: ASCD.

Palincsar, A. S., & Brown, A. L. (1989). Classroom dialouges to promote self-reulated comprehension. In J. E. Brophy (Ed.), Advances in research in teaching: Vol. 1: Teaching for meaningful learning and self-regulation (pp. 35-71). Greenwich, CT: JAI.

Palincsar, A. S., Brown, A. L. & Campione, J. C. (1991). Dynamic assessment. In H. L. Swanson (Ed.). Handbook on the assessment of learning disabilitie: Theory, research, and practice (pp. 75-93). Austin, TX: PRO-ED.

Palincsar, A. S., Brown, A. L., & Campionne, J. C. (1989, March). Structured dialogues among communities of first grade learners. In E. Forman (Chair), Extending Vygotskian theory: Discourse and interaction in the classroom. Symposium conducted at the annual meeting of the American Educational Research Association, San Francisco.

Palincsar, A. S., David, Y. M., Winn, J. A., Snyder, B. S., & Stevens, D. D. (1989, November). The differential effects of three reading procedures for teaching strategic reading. Paper presented at the annual meeting of the National Reading Conference, Austin.

Palincsar, A. S., David, Y., Winn, J., & Stevens, D. (1990, March). Examining the differential effects of teacher-versus student-controlled activity in comprehension instruction. Paper presented at the annual meeting of the American Educational Research Association, Boston.

Palincsar, A. S., David, Y. M., Winn, J. A., & Stevens, D. (in press). Examining the contexts of strategy instruction. To appear in Remedial and Special Education.

Palincsar, A. S., Winn, J., David, Y., Stevens, D. (in press). Approaches to strategy instruction reflecting different assumptions regarding teaching and learning. To appear in L. Meltzer (Ed.), Cognitive, linguistic, and developmental perspectives on learning disabilities. Boston: College-Hill Press.

Paris, S. G. (1986). Teaching children to guide their reading and learning. In T. Raphael (Ed.), Contexts of literacy (pp. 115-130). New York: Longman.

Paris, S. G., Cross, D. R., & Lipson, M. Y. (1984). Informed strategies for learning: A program to improve children's reading awareness and comprehension. Journal of Educational Psychology. 76, 1239-1252.

Paris, S. G., & Jacobs, J. E. (1984). The benefits of informed instruction for children's reading awareness and comprehension skills. Child Development, 55, 2083-2093.

Paris, S. G., Lipson, M. Y., & Wixon, K. K. (1983). Becoming a strategic reader. Contemporary Educational Psychology, 8, 293-316.

Paris, S. G., & Oka, E. R. (1986). Self-regulated learning among exceptional children. Exceptional Children, 53, 103-108.

Patching, W., Kameenui, E., Carnine, D., Gersten, R., & Colvin, G. (1983). Direct instruction in critical reading skills. Reading Research Quarterly, 18, 406-418.

Pearson, P. D., Hansen, J., & Gordon, C. (1979). The effect of background knowledge on young children's comprehension of explicit and implicit information. Journal of Reading Behavior, 11, 201-210.

Pearson, P. D., & Johnson, D. D. (1978). Teaching reading comprehension. New York: Holt, Rinehart, & Winston.

Poplin, M. S. (1988a). The reductionistic fallacy in learning disabilities: Replicating the past by reducing the present. Journal of Learning Disabilities, 21, 389-400.

Poplin, M. S. (1988b). Holistic/constructivist principles in the teaching/learning process: Implications for the field of learning disabilities. Journal of Learning Disabilities, 21, 401-416.

Pressley, M., Borkowski, J. G., & Schneider, W. (1987). Cognitive strategies: Good strategy users coordinate metacognition and knowledge. In R. Vasta & G. Whitehurst (Eds.), Annals of Child Development (Vol. 5, pp.89-129). Greenwich, CT: JAI Press.

Pressley, M., Johnson, C. J., Symons, S., McGoldrick, J. A., & Kurita, J. A. (1989). Strategies that improve children's memory and comprehension of text. Elementary School Journal, 90, 3-32.

Pressley, M., Snyder, B., Carigula-Bull, T. (1987). How can good strategy use be taught to children: Evaluation of six alternative approaches. In S. Cormier & J. Hagman (Eds.), Transfer of learning: Contemporary research and applications. Orlando, FL: Academic Press.

Raphael, T. E., & Pearson, P. D. (1985). Increasing students' awareness of sources of information for answering questions. American Educational Research Journal, 22, 217-236.

Resnick, D. P., & Resnick, L. B. (1977). The nature of literacy: An historical exploration. Harvard Educational Review, 47, 370-385.

Reynolds, M. C. (1989). Students with special needs. In M. C. Reynolds (Ed.), Knowledge base for the beginning teacher (pp. 129-142). Oxford: Pergaman Press.

Reynolds, M. C., Wang, M. C., & Walberg, H. J. (1987). The necessary restructuring of regular and special education. Exceptional Children, 53, 391-398.

Rosenshine, B. (1979). Content, time and direct instruction. In P. Peterson & H. Walberg (Eds.), Research on teaching: Concepts, findings, and implications (pp. 28-56). Berkeley, CA: McCutchan.

Ryan, E. B., Weed, K. A., & Short, J. (1986). Cognitive behavior modification: Promoting active, self-regulatory learning styles. In J. Torgenson & B. Wong (Eds.), Psychological and educational perspectives on learning disabilities (pp. 367-397). Orlando, FL: Academic Press.

Schumaker, J. B., Deshler, D. D., Alley, G. R., Warner, M. M., & Denton, P. H. (1982). Multipass: A learning strategy for improving reading comprehension. Learning Disability Quarterly, 5, 295-304.

Schumaker, J. B., Deshler, D. D., & Ellis, E. S. (1986). In J. Torgenson & B. Wong (Eds.), Intervention issues related to the education of LD adolescents. Psychological and educational perspectives on learning disabilities (pp. 329-365). Orlando, FL: Academic Press.

Stanovich, K. E. (1986). Matthew effects in reading: Some consequences of individual differences in the acquisition of reading. Reading Research Quarterly, 21, 360-407.

Stone, C. A. (1989a). Improving the effectiveness of strategy training for learning disabled students: The role of communication dynamics. Remedial and Special Education, 10, 35-42.

Stone, C. A. (1989b, April). The role of communication dynamics in strategy instruction. Paper presented at the annual meeting of the American Educational Research Association, San Francisco.

Swanson, H. L. (1984). Does theory guide teaching practice? Remedial and Special Education, 5, 7-16.

Swanson, H. L. (1989). Strategy instruction: Overview of principles and procedures for effective use. Learning Disability Quarterly, 12, 3-14.

Tierney, R. J., & Cunningham, J. W. (1984). Research on teaching reading comprehension. In P. D. Pearson (Ed.), Handbook of reading research (pp. 609-655), NY: Longman.

Vygotsky, L. S. (1987). Thinking and speech. In R. W. Reiber & A. S. Carton (Eds.), The collected works of L. S. Vygotsky: Vol.2. New York: Plenum Press (Translation of edited material written in 1924-1931).

Vygotsky, L. S. (1978). Mind in society: The development of higher order psychological processes. Cambridge, MA: Harvard University Press.

Webb, N. (1989). Peer interaction and learning in small groups. In N. Webb (Ed.), Peer interaction, problem-solving, and cognition in small groups [Special issue]. International Journal of Research in Education, 13, 21-39.

Wertsch, J. (1979). From social interaction to higher psychological functions: A clarification of Vygotsky's theory. Human Development, 22, 1-22.

Wertsch, J. (1980). The significance of dialogue in Vygotsky's account of social, egocentric, and inner speech. Contemporary Educational Psychology, 5, 150-162.

Will, M. C. (1986). Educating children with learning problems: A shared responsibility. Exceptional Children, 52, 411-415.

Wong, B. (1985). Metacognition and learning disabilities: A review of a view. Journal of Special Education, 20, 9-29.

Wood, P., Bruner, J., & Ross, G. (1976). The role of tutoring in problem solving. Journal of Child Psychology and Psychiatry, 17, 89-100.

Ysseldyke, J. E., Thurlow, M. L., O'Sullivan, P., & Christenson, S. L. (1989). Teaching structures and tasks in reading instruction for students with mild handicaps. Learning Disabilities Research, 4, 78-86.

APPENDICES

APPENDIX A: LETTERS OF PERMISSION

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January 31, 1990

Dear Parent,

I am conducting a dissertation study of a procedure for reading comprehension instruction. Specifically, the instruction is designed to increase students' abilities to independently manage their reading and learning from text. The students will be studying strategies such as summarizing what has been read, asking questions to check understanding of the material, and making predictions about what will be read next. They will be practicing and discussing the use of these strategies to help them meet their purposes for reading both in and out of school.

I am delighted that Mr. XXX, and the third and fourth grade teachers have permitted me to conduct this study in xxx Elementary School. In the study, two groups of six children of varying reading abilities will be instructed for 30-40 minutes daily for six weeks. Instruction will focus on defining and evaluating strategies that can be used to help them understand and learn from text. The students will practice using these strategies as they read and discuss stories covering a wide range of topics such as how animals protect themselves. They will discuss the content of the stories as well as how effective the strategies are in helping them learn and remember this content. I will conduct the instruction. Before entering the doctoral program at Michigan State University, I was a teacher for 14 years, including two as a reading master teacher.

To determine the effectiveness off the procedure, I will periodically ask the children to read stories and answer comprehension questions about them. In addition, I will be testing their reading knowledge, behaviors, and attitudes both before and after the study. To help me better understand and explain to others what occurs during instruction and assessment, I will audiotape each session. In addition, I will videotape selected sessions.

The results of all assessments will be compiled in such a manner that protects your child's identity; that is, at no time will your child be identified by name, as only a number will be used to identify each child. I have left a copy of all the assessment measures in the school office. Please feel free to examine them. Also, if you have any questions about the study, please contact me at (517) 694-1244. You could also leave a message for me at the school office or with your child's teacher and I will contact you.

I plan on presenting the results of the study at the school in the spring. At that time, each parent will have access to the results for his or her child. I will also discuss the study in general with both parents and teachers, sharing what I have learned.

Please sign either the Consent to Project Participation or the Refusal for Project Participation form that is attached to this letter. Please return this form to your child's teacher. If you agree to have your child participate in the research described here but later change your mind, you may withdraw your child by signing the Withdrawal from the Project Form, and returning the form promptly to your child's teacher.

I look forward to working with your child and to sharing my findings with you. Again, please contact me (or leave a message for me to contact you) if you have any questions.

Sincerely Yours,

Judith Winn
College of Education
Michigan State University

Consent to Project Participation

I hereby give my consent to the participation of

_____ in the research project, "An
(Child's name)

Examination of the Implementation and Student Outcomes of Instruction for Self-Regulation through Mediated Collaborative Problem Solving." I understand that neither the researcher and/or anyone else she works with on the project, nor any other group member or individual, will use the material gathered in any way that would invade the privacy of this child and/or his family. I understand that the rights of this child, with regards to confidentiality, will be paramount.

_____
(Parent/Legal Guardian's Signature)

_____
(Date)

May 29, 1990

Dear Parents,

The instructional part of the research project is over and the posttesting is just about complete. This summer, I will be studying the students' performance as well as the transcriptions of the lessons. To help me better understand the outcomes of the study, I would like to have access to your child's records, specifically any achievement, psychological, and language evaluations. I am writing to request your permission to read these records. As with all the work I have done, your child's identity will be kept confidential.

I will be sharing the results of the study, and what I learned, with the school next fall and will be glad to discuss your child's performance with you then.

Please complete the form below and return it to the school as soon as possible. If you have any questions, don't hesitate to call me at 964-1244.

Once again, I want to thank you for your permission to have your child participate in this study. Have a wonderful summer!

Sincerely,

Judith Winn

Date: _____

I give my permission for my child's records to be examined. I understand that her/his identity will be kept confidential in discussions/presentations of the research study.

Signed: _____

APPENDIX B: STUDENT OUTCOME MEASURES

APPENDIX B: STUDENT OUTCOME MEASURES

SPIN AROUND AND AROUND

Men and women spin around, jump and leap to the music. People clap and cheer for the dancers. This is a ballet. A ballet is a dance with special dance steps. The dance and music are put together for people to enjoy. Some ballets tell a story without saying words. The dancers show what the story is about by the way they move.

Most ballet dancers take lessons for about ten years. It takes a long time to learn ballet because there are so many steps. Many of the steps are very hard to do.

The first thing students learn is how to stand like a dancer. Most people stand with their toes and their knees pointing in front of them. Ballet dancers learn to stand with their toes and knees pointing out to the side. This helps them do the ballet steps the right way.

Ballet dancers must turn around and around without getting dizzy. They learn a little trick that helps them. First, they pick something to look at like a door. Then, they try to keep looking at it while they spin around.

To keep from getting hurt, dancers learn to do many things. They exercise to stretch their bodies. They also put special powder on their shoes so they won't slip. Also dancers try not to bump into each other.

When ballet students finish their lessons, good dancers join a ballet company. A ballet company is like a football team. The dancers get paid to practice and work together like football players.

Ballet dancers keep taking lessons even after they join a ballet company. The lessons help dancers keep their bodies strong. Also, even the best dancers know they can become better if they work hard in class.

For a long time, all the famous ballet stars were women. Men did not dance in ballets much because people didn't think they could do the steps. But, people found out that men were better at jumping and leaping than women. So men began to do ballet steps that were very hard. Now some of the most famous ballet stars in the world are men.

Name _____

QUESTIONS TO "SPIN AROUND AND AROUND"

1. What is a ballet? _____

2. How can a ballet dancer tell a story without using any words?

3. What are two important things ballet dancers must learn? _____

4. What is different about the way ballet dancers stand? _____

5. Explain how ballet dancers spin around without getting dizzy.

6. What is one way a ballet dancer can keep from getting hurt?

7. How is a ballet company like a football team? _____

8. Why do dancers keep taking lessons after they join a ballet company? _____

_____

_____

_____

_____

9. Why is it difficult to become a ballet dancer? _____

_____

_____

_____

_____

10. Before baseball season starts, team members to go "spring training." During training, they lift weights, run and do aerobics. Why do you suppose they do this? _____

_____

_____

_____

_____

GIANTS OF THE EARTH

The Sequoia is the tallest tree in the world. It may take 500 years for a Sequoia to reach its full height. After that, it can live hundreds of years without growing any taller.

Sequoias have been able to live so long because of their physical make-up. Their roots are shallow and can spread out as far as 40 feet. These roots keep the tree and the soil around it in place. The bark of the tree is soft and spongelike. Tannic acid in the bark gives it a red color and protects the tree from insects and fungi.

There were many different kinds of Sequoias millions of years ago. Changes in weather, including glaciers of the Ice Age, killed many of them. Two kinds of Sequoias that survived are the Coast Redwood and the Giant Sequoia, found only in Oregon and California.

Trees record their own history in the soft cells that form and harden into rings under the bark each year. If a tree were cut down, a person could count the rings to find out the age of the tree. The width of the rings can tell how fast or slowly the tree grew during a certain year. Large rings show that the weather was warm with plenty of rain. The differences in the tree's rings may tell of floods one year, a fire during another year, and a lack of rain during yet another year.

These trees have survived thousands of years of change. They are sturdy and can adapt to changes in their surroundings over the years. With care, these giants of our earth may last for many thousands of years to come.

Name _____

QUESTIONS FOR "GIANTS OF THE EARTH"

1. What would a narrow ring in a Sequoia trunk tell you about the weather that year? _____

_____

2. Why is the lumber of the Coast Redwoods so valuable?

_____

_____

3. Why are there only a few types of Sequoias left? _____

_____

_____

4. Why is tannic acid important to Sequoia trees? _____

_____

_____

5. Where can the Coast Redwood and the Giant Sequoia be found?

_____

_____

6. What caused people to become concerned about these trees?

_____

_____

7. What did people do to protect these giant trees from being destroyed? _____

_____

_____

8. Why have the Giant Sequoia and the Coast Redwood managed to survive over the course of so many years? _____

_____

_____

_____

_____

9. Compare the Giant Sequoia with the Coast Redwood. How are they alike and how are they different? _____

_____

_____

_____

_____

10. There was a tribe of Indians that lived hundreds of years ago. At one point, the members of the tribe seemed to have disappeared. How can historians figure out what might have happened to these people by studying where they lived? Use the information from the story you just read. _____

_____

_____

_____

_____

BIRDS IN DRESS SUITS

There are many interesting birds that live near the water, but there's one in particular that gets wet and stays wet for most of its lifetime. It spends many hours at sea and comes ashore only to breed and to molt its feathers.

This bird looks something like a seal or porpoise wearing a starched white shirt and a dress suit of shiny black. It is the penguin, of course, a truly remarkable creature in looks and habits.

In some types of birds, the male and female look quite different--at least in coloring. Both sexes of penguins, however, look exactly alike. Their bodies are round and solidly built. When penguins move around on land, they are clumsy. But they can dive into the sea and swim so fast that they seem to be flying through water.

Penguins cannot fly at all. Their wings are stiff flippers covered with scale-like feathers. In the water they use these stiff wings as paddles. When the birds are born, their wings can bend and fold as most birds' wings do. Once penguins are grown to adult size, however, they can move their wings only at the shoulder joint.

Penguins feed on fish and small forms of sea life. They watch carefully for every possible particle of food in the water. Their eyes are protected as they swim. Each eye has a third clear eyelid under the two regular ones.

Most people think that penguins live at the North Pole. Actually, all penguins live in the southern half of the globe. Some live in

sunny areas near the equator. Others live close to the South Pole where the weather is very cold.

The huge penguin found near the south pole is called the emperor. Cold does not bother the emperors, in fact, they choose midwinter as their breeding time. The female emperor lays a single egg, not in a nest sheltered from the wind, but right on the ice. Since all birds' eggs needs to be warmed before they hatch, it is amazing that penguin eggs do not freeze.

There is a special way in which the eggs are kept warm. Penguins have webbed feet like most sea birds. Their feet are well padded, so that they are protected when walking along the hard ice. Penguins also have an extra flap of skin that makes a pocket or pouch on the upper part of the leg. The male and female penguin take turns keeping the egg warm by placing it on top of the feet and covering it with this pouch. It takes almost two months before the egg is finally ready to hatch.

The newly hatched penguin is blind and naked except for a few feathers on its head. The baby is in quite a helpless state. It must be sheltered from the cold and wind and be fed regularly for about six months. In that time the penguin grows strong and large. It is then time for the penguin to plunge into the icy seas to find its own food.

Name _____

QUESTIONS TO "BIRDS IN DRESS SUITS"

1. Describe the way the adult penguin uses its wings. _____

_____

_____

2. How are penguins' eyelids different from a person's eyelids?

_____

_____

3. What do penguins feed on? _____

_____

_____

4. What does the padding on the feet of the penguin protect their feet from? _____

_____

_____

5. Where do penguins live? _____

_____

_____

6. What is different about the way male and female penguins look?

_____

_____

7. How many eggs does the female emperor penguin lay at one time?

_____

_____

8. Explain how the emperor penguins are able to keep their eggs warm.

_____

_____

_____

_____

9. Explain how the penguin is an unusual bird._____

_____

_____

_____

_____

10. The cormorant is a bird related to the pelican that swims underwater. What special body parts might help this bird swim?

_____

_____

_____

_____

THINK ALOUD ASSESSMENT

1. Explain purpose:

"I am interested in finding out about how you think as you read stories. One way I can do this is by giving you a story to read and asking you to tell me what you think as you read."

2. Model think aloud:

"Before I ask you to think out loud as you read, I am going to show you how I think out loud as I do another task. The task is putting pictures in order to tell a story. I could just put them in order without talking about what I am thinking. However, I want to show you how I think so you will have an idea of what I would like you to do."

Modeling Think Aloud

(Put cards in following order: c, a, b, d.)

Car Wash

"I have these pictures and I am supposed to put them in order so they tell a story.

(Card C) The first picture is a car that is all wet. It looks like it is coming out of a garage. I know that it is coming out since the sign says Exit. I wonder why it's all wet? My car looks like that when I come out of the car wash. I think I'll look at the next picture.

(Card A) Oh, here's the same car. I can tell it's the same car because it has the same license plate. This time the car is going into a car wash. The other picture shows the car coming out of the same car wash. So this picture must go before the first one.

(Card B) Okay, here's the same car again. I wonder what's happening. I think the car is getting washed because there's water spraying on it. These big rolls might be wiping the dirt off or drying the car. Since this picture shows the car inside the car wash I will put it between the other two pictures that show the car going into the car wash and the one showing it coming out. That looks right to me.

(Card D) The car looks shiny now and is going away from the car wash. That means this picture belongs at the end of the story. Does this make sense? A dirty car is going into the car wash, the car gets washed, it comes out of the car wash and drives away all shiny and clean. That seems right to me.

Modeling with Text

"I have shown you how I think aloud as I do a task that is different from reading. Now I would like to show you how I think aloud as I read two sentences. This will give you an idea of how I would like you to talk about how you are thinking and what you think about as you read."

Pretest Modeling:

"Stu looked out the window to see if the rain had stopped."

I have an uncle named Stu, which is a shorter name for Stewart. This story could be about a boy. I wonder if he was waiting for the rain to stop so he could go outside and play.

"As he looked, he saw a wonderful sight."

I wonder what he saw. I remember the last time it rained I saw a wonderful sight. I looked up in the sky and saw a beautiful rainbow.

Posttest Modeling

"Carolyn walked around the corner to find out what was making such an awful noise."

I had a friend named Carolyn. I wonder where she was when she heard this noise. I'm thinking that the noise was awful since it was loud and it hurt her ears.

"She was surprised by what she saw."

Now I wonder what she saw. I remember hearing an awful sound at the zoo. It was the sound of monkeys screeching. Maybe Carolyn was at the zoo and she saw monkeys who were making awful noises.

3. Explain think aloud in more detail.

"I have shown you how I think aloud when I try to arrange pictures in order and when I read. Now it is your turn.

4. Conduct think aloud w/either Aerodium or Stone Giant.

"I have a short story for you to read aloud. I would like you to stop when you come to the end of each sentence which will be marked by a blue dot (show example). When you stop I would like you to tell me what you were thinking or doing as you read the sentence. You should continue reading aloud and telling me what you were thinking or doing until you finish the story. I am going to tape record your voice so that I can remember what you said later. Remember, I am only interested in what you are thinking or doing as you read and not how you sound while reading."

Are there any questions? You may begin. (Point to the title.)

During the think aloud the examiner may prompt with the following questions:

- What do you remember about what you read?

- What did you think about when you read that?

- What were you doing and thinking as you read it?

- Anything else?

For students who paraphrase, say:

You are telling me what the sentence said. Can you tell me what you were thinking or doing when you read that sentence? (or any of the prompts above). Examiner should avoid expressing approval/disapproval (verbally and nonverbally).

Decoding probs.--do not provide unknown words since we want to see how student resolves prob. Provide word if student requests help or hesitates for 5 seconds.

Underline any text that student rereads aloud.

Make a note if it seems that student is silently rereading a portion of text.

ORAL RETELL: What was this story about?

Name _____ Date: _____

Interviewer: _____

1. The Aerodium

2. The building looks like a big soft drink can.

3. It's about five floors tall, and it's orange in color.

4. Around the top there is a black stripe.

5. On the stripe is painted the word Aerodium.

6. The Aerodium is a place where people can fly in the air.

7. But how can you fly on your own?

8. The answer to that can be found under your feet.

Name: Date:

9. The floor of the Aerodium is different from most floors.

10. It looks like a large wire screen.

11. It springs up and down, and you can see through it.

12. Under the floor you can see a machine.

13. The machine has a very large fan on it.

14. When the machine is turned on, the fan blows air up through the floor to the top of the building.

Name _____

Date _____

1. What is reading?

_____

_____

2. How do you know if someone is a good reader?
Prompt: How would you go about figuring out if someone is a good reader?

_____

_____

_____

3. If you were teaching a younger student to read, what would you teach him/her to do while reading?

_____

_____

_____

4. Sometimes people say that reading is thinking. What do they mean? How is reading thinking?

_____

_____

_____

6. I am going to ask you some questions and give you some choices for your answers. How do you feel about reading?

   Is reading easy for you? _____
   Is reading a little difficult for you? _____
   Is reading very difficult for you? _____

   Can you explain what is (easy, a little difficult, very difficult) about reading?

_____

_____

   Is reading (easy, a little difficult, very difficult) for you no matter what you are reading? Explain.

_____

_____

6. Some people cannot read. How might this be a problem for them? Prompt: Are there any other ways it might be a problem? Explain.

_____

_____

_____

Name: _____

Date: _____

Teacher: _____

Interviewer: _____ Time:_____ to _____

I. Text: Machines with Wheels

Explain, "The teacher has assigned you this story to read and shoe expects you to answer the questions at the end of the story."

A. What will you do to be sure you can answer the questions?

_____

_____

Prompt: What could you do before you read the story? Why?

_____

_____

Prompt: What could you do while you read the story? Why?

_____

_____

Prompt: What could you do after you finished reading the story? Why?

_____

_____

B. If you have difficulty answering some of the questions, what could you do?

_____

C. Why would you do _____?

_____

Name: _____ Date: _____

II. A. Look at the same story and tell me if you notice anything special about the way the story is printed.

_____

_____

B. Explain, "Some words in this story are printed in dark print (point to example). Why do you think these words are printed differently?"

_____

C. What kinds of information might be printed in dark print?

_____

D. How could the words in dark print help you as you read?

_____

III. Text: Kinds of Rocks

A. Here is a story about rocks. It has many vocabulary words that you might find difficult. Do you know very much about rocks?

_____

_____

B. If yes:
Since you do know about rocks, how might that help you as you read this story?

_____

Suppose you didn't know very much about rocks; how would you go about reading this story? (prompt: if you didn't know much about rocks would you read this differently than someone who knew a great deal about rocks? Why?)

_____

B: If no:
Since you do not know very much about rocks, how would you go about reading this story?

_____

Name: _____ Date: _____

Suppose you did know a great deal about rocks. How would you go about reading this story? (prompt: if you did know a great deal about rocks, would you read the story differently than someone who didn't know very much about rocks? Why?)

_____

C. If you were going to tell someone what the story was about, what would you do to help you learn and remember the information that you were reading?

_____

D. If you were going to take a test, how would you go about reading the same story?

_____

E. What would you do as you read this story and came across the new vocabulary words?

_____

Why?

_____

F. Again, use the same text as above and explain, "Suppose you were reading this story and you came across a sentence that you did not understand. What would you do?"

_____

Why?

_____

IV. Text: Kinds of Rocks and Comic Book:

A. Show both samples. If you could choose, which story would you read? Why?

_____

B. Would you read the stories in the same way or differently? Why/why not?

_____

Name: _____ Date: _____

C. How would you read them differently? (prompt: what would you do to help you remember the information for each story?)

_____

V. Text: (long expository selection)
Explain, "Your teacher has asked you to read this long story and she wants you to know the most important information so you can take a test on the information. However, you do not have enough time to read the whole story."

A. What could you do to find out about the most important information in the story?

_____

B. Why would you do this?

_____

C. How will you know when you are ready to take the test?

_____

Name _____

THE STORY OF BREAD BAKING

One of the best smells in the whole world is the smell that comes floating out the door of a bakery early in the morning. What is that smell? It's bread baking. Usually bread will smell early in the morning because the baker makes bread while people are sleeping at night. At dawn he takes the bread out of the oven, so his customers will have truly fresh bread.

Making bread takes time. First the baker mixes flour with some milk, butter and sugar, a bit of salt, and some yeast. The baker may use a big machine for mixing. The machine stirs and stretches the gooey dough, making it tough and rubbery. This stirring is called kneading.

Then the baker puts the dough aside, and the yeast begins to work. Yeast is the "magic" ingredient. A package of yeast is really many, many tiny plants all ready to grow if given the chance. In the wet, warm bread dough, the yeast plants begin to ferment. The bread dough begins to swell, getting bigger and bigger.

But before the dough rises too high, along comes the baker and wham! He punches it down. Then he kneads the dough again. After a while, he may punch the bread down again. Then at last he shapes the dough into loaves.

These small loaves are left to rise. When they are just the right size, the baker puts them into a large oven. As the loaves of bread heat up, they rise more quickly. Then, when they get very hot, they stop rising and start to brown.

Name _____

Now that you have read the story, we are going to do several jobs using the story. The first thing we would like you to do is to **summarize** the story you read. A summary is a short form of the story that tells the most important information. Write your summary on the lines below. Use as many lines as you think you need.

Now that you have written your summary of the story, we would like you to write 10 **questions** that your teacher might ask you if she wanted to know how well you understood the story. Use the lines below. You may use as many lines as you need.

Were there any words or ideas in the story that you thought were not clear? Write these words or ideas on the lines below. Use as many lines as you need.

The story that you read is not finished. What do you think the story is about next? What do you **predict** you would read in the next part of the story? Write your predictions on the lines below. Use as many lines as you need.

You are just about done! Before you turn in your booklet, can you write a sentence that tells what the word "ferment" means? Write your sentence on the lines below.

THANK YOU!

Name _____

This is how I think I did today:

GREAT OKAY NOT SO GOOD

This is why: _____

_____

_____

This is how hard I tried today:

HARD SORT OF HARD NOT VERY HARD

This is what I tried to do: _____

_____

_____

This is what I learned today: _____

_____

_____

This is how I feel about the lesson today:

This is why: _____

_____

_____

APPENDIX C: SAMPLES OF MATERIALS USED DURING INSTRUCTION

APPENDIX C: SAMPLES OF MATERIALS USED DURING INSTRUCTION

Living Lights in Our World

Tiny flashes of light are sprinkled through the summer evenings. These twinkling lights are made by living creatures called fireflies.

The firefly is not really a fly. It is a dark-colored beetle, about a half an inch long. Many fireflies have four large wings and can fly swiftly through the air.

Fireflies have something which most other beetles do not have. At the very end of its tail, each firefly carries a light that it can turn on and off whenever it wants. This is no ordinary light. It is a living light.

How does a firefly's light go on and off? A firefly has special chemicals in its body. When these chemicals mix with air, the firefly is able to make a light.

People love to watch the winking lights of the fireflies in the summer, nighttime sky. But did you know that fireflies really use their lights as signals? At twilight, the male fireflies begin to fly and flash their lights. The females flash their lights in answer. The flashing lights are a signal that helps male and female fireflies find each other.

Baby fireflies, or larvae, hatch from eggs. These babies, which look somewhat like caterpillars, are fierce hunters! At night they creep beneath loose earth and dead leaves in search of snails and

worms. A firefly larva shoots poison into its prey with its mouthparts. The poison turns the creature's insides to liquid, which the larva then sucks out.

A few kinds of adult fireflies are also hunters. But many kinds don't eat at all. They live for only two or three days. Then they die.

Another creature that lights up is the glowworm. Glowworms are female fireflies that don't have wings. They look like large caterpillars.

Some glowworms live in caves in New Zealand. They hang from the ceilings of the caves and spin sticky "fishing nets." These "nets" are like spider webs. Small insects that live in the caves see the bright lights and fly up to them. On the way, they are caught in the glowworms' "fishing lines." The successful glowworms pull in their sticky threads and gobble up the insects. Then they lower their "fishing lines" again to catch another insect.

The tiny glowworms, grouped together on the ceilings of caves, are a beautiful sight. Many tourists visit the great Glowworm Grotto in New Zealand. There they are treated to a wonderful show.

Visitors enter the Glowworm Grotto in boats. They are carried along by an underground river. The tunnel entrance opens up into a cave lighted by twinkling lights of tiny glowworms hanging from the ceiling. There are so many glowworms that their light is bright enough to read a book by. But if anyone should suddenly make a loud noise, every single light in the cave goes out. For a moment, there is darkness, then, one by one, they tiny lights wink on again.

Living Lights in the Sea

Some animals that live in the sea also glow.

A ship plowing through the sea on a warm summer night may seem to set the water on fire. The wake of the ship sparkles and flashes. Floating and swimming along in the ocean currents are many tiny creatures. Each is so small that you wouldn't be able to see it without a microscope. But together they make a dazzling show. When they are disturbed by a passing ship or a large fish, the animals begin to sparkle. Then when the water is quiet again, their lights wink out, and all around them it is dark once more.

There are also many larger sea animals that glow with living lights. Some jellyfish that float on the surface of the water may start to glow when the sea is disturbed at night by a passing ship. From the ship, the jellyfish look like round dinner plates shining in the water.

An even more exciting show of living lights can be seen only a few times a year. In the waters of the West Indies, strange glowing worms live in burrows at the bottom of the sea. They are fireworms. During the summer, just two nights after a full moon, these fireworms suddenly leave their burrows and swim to the top of the sea. It is quite an unusual sight!

Many other creatures of the deep sea carry their own lights. There are shrimps and clams that glow in the dark, deep waters of the ocean. Some squids that live deep in the ocean use their lights to blind their enemies.

Scientists are very much interested in living lights. Unlike sunlight, starlight, or electric light, living lights are cold lights. All their energy is turned into light, and none is lost as heat. It is hoped that the discovery of how living lights work may someday teach people how to make cold lights to light homes, and perhaps even cities!

Letter from Fictitious Student

Dear Third and Fourth Graders,

I have a problem and it has to do with reading. I think books are so boring! Everything I read is dull, dull, dull. My friends and my sister like to read and spend time doing so at night. Why don't they think reading is boring? What can I do so reading doesn't seem so boring? Thanks for your help.

Sincerely,

Sample Questions

For each one, select the question that would be the most helpful for learning and remembering the information in the story.

(1)

Sue: How does the mother turtle get ready to lay her eggs?

Salvador: How many feet deep is the hole for the eggs?

Steve: Are mother turtles big or little?

(2)

Bob: The sea turtle is not really crying.

Billy: Why do the sea turtle's eyes water as she lays eggs?

Bruce: How much water comes out of the sea turtle's eyes?

(3)

Linda: What do sea turtles' eggs look like?

Lou: Is the mother sea turtle tired when she finishes laying her eggs?

Lois: The mother sea turtle throws sand around the nest to hide it.

Vignettes Used in Phase Two

The students discussed and voted for the one student in each vignette who was doing the most helpful activity for his/her reading job. They were told that the students in the vignettes were third and fourth graders.

Vignette One

Mr. Smith said, "Read and study Lesson Two to get ready for a test."

Sally: She read to the end of each paragraph. She got to the end; she looked up; and she asked herself a question about the paragraph. If she could answer it, she kept reading. If she couldn't answer it, then she read the paragraph over.

Sue: She read the whole lesson all the way through. She stopped, and then she read the whole thing over again.

Vignette Two

Mr. Conrad's class. The job is to read directions to make a pinata so that when they are finished, they can do it.

Jane: She read every step carefully. She concentrated on pronouncing the words and making no mistakes. She closed her eyes, looked up, and pronounced the hard words.

Jennifer: She read each step carefully. When she was done, she closed her eyes too. She looked up and she pictured that step in her mind.

Vignette Three

The students were working in groups of three. One student was to read the lesson to tell the other two students about it.

Dan He copied every word.

Derrick: He wrote down the main ideas.

Name _____

Video Planning Sheet

We are going to make a video to let others know what we have been doing. We will tell them about the stories we have been reading and the strategies we have used to help us understand and remember the stories. Maybe the audience will want to read the stories and try out the strategies. We have a lot to do to get ready for our video!

1. Who should we make the video for? _____

   _____

2. Let's start with the story "Chimps That 'Talk' with Humans." What should we tell them about it?

   a. _____

   b. _____

   c. _____

   d. _____

3. Let's suggest strategies people could use when they read this story. How about if we talk about the ones we have used and give them examples? Let's keep a list of strategies we have used.

   _____

   _____

   _____

   _____

4. I wonder if, we should have the story itself on the video. Maybe we could make a cover for it. Maybe we could also show our other stories with covers.

Video Planning Sheet

Here is the order for the video planning presentation:

1. Introduction:

Here are my jobs:

APPENDIX D: STRATEGY CHARTS

APPENDIX D: STRATEGY CHARTS

Group One's Strategy Chart

Ask questions

Summarize

- Think about important parts
- Think about meaning

Make mind pictures

Reread

Use if You Need To

Do what they do

Use dictionary

Look at pictures - Guess from Pictures

Use words around big words

Guess what will happen next

Guess from the title

Ask for help from other people

- Meaning of words
- Don't understand

Guess from headings

Use experience (Stories, movies, t.v.)

Group Two's Strategy Chart

Picture in mind

Reread

Write down questions

Think about why

Ask myself questions

Summarize

Think about important parts

Mark important pages

Stick to the story

Skim for important words (in dark print)

Think about questions

Predict

<u>To Pick a Book</u>:

Flip through and try it

Flip through - See what's interesting

Don't flip too fast

<u>If You Can</u>

<u>If You Need To</u>

Say words over and over

Sound out words

Ask teacher

If you don't understand what it means, say

Ask someone who has read it

Read back first

Look at pictures and guess

Talk to somebody who has read it

Skip hard parts and come back

Think about questions

Predict from title

Look at cover

Read inside cover

APPENDIX E: INTERVIEW QUESTIONS USED ON THE LAST DAY OF INSTRUCTION

APPENDIX E: INTERVIEW QUESTIONS USED ON THE LAST DAY OF INSTRUCTION

What are some of the things you were learning in this group?
What are some of the strategies you learned?
Which ones did you use?
Do you use all of them?
How would you use some of them?
How do you know which ones to use?
Which strategies are particularly helpful?
Which ones didn't seem helpful?
Do you think the work you've done will help you to be a better reader? How and why?
One of the strategies you talked about is summarizing. What is that?
You also mentioned asking yourself questions. What is that?
You also talked about the strategy of mind pictures. What is that?
One day I saw "Use your experience." What is does that mean?
On the first day, I saw you work together to make a picture and write a story. Did you work on other things together? Was it helpful? How was that helpful?
Which story was your favorite?
Which story did you like the least? Why?
What were some of your most favorite activities?
What were some of your least favorite activities? Why?