Examining the Context of Strategy Instruction

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The goal of literacy instruction is to teach reading and writing as tools to facilitate thinking and reasoning in a broad array of literacy events. An important difference in the disposition of children to participate in literacy experiences is the extent to which they engage in intentional self-regulated learning. The contexts attending six traditional models of strategy instruction are examined. An exploratory study, conducted with heterogeneous third graders, is reported, examining the implementation and outcomes of three models of strategy instruction—Direct Instruction, Reciprocal Teaching, and Collaborative Problem Solving—which manipulated teacher and student control of activity, as well as the instructional context.

WITH EACH DECADE, the instructional agenda attending the teaching of literacy is refined to include increasingly lofty goals. Indeed the emerging definition of the term *literacy* is indicative of this refinement. Historically, we have associated literacy with the ability to read and write, with reading and writing assuming rather narrow connotations. For example, it was not until the 1920s that the emphasis on reading for the purpose of deriving meaning from text emerged as a goal of reading instruction (Resnick & Resnick, 1977). Previously, reading was valued principally for mastery of a very limited set of prescribed, religious texts. Today, discussions of the goals of reading instruction turn to *high literacy,* or the pursuit of learning that is beyond that of adapting to the goals of the prevailing culture (Bereiter & Scardamalia, 1987), and *critical literacy,* or the ability to use reading and writing to go beyond the demands associated with minimum competency (McGinley & Tierney, 1989) for the purposes of thinking and reasoning.

Perhaps the most important shift in our understanding of literacy is the recognition that it is not possible to define literacy without regard for its culturally and contextually specific nature (Langer, 1987; Scribner & Cole, 1980; Vygotsky, 1978). From this perspective, reading and writing become the tools that facilitate literate thinking, enabling the individual to participate in a broad array of literacy events.

Central to the dialogue regarding literacy is the tenet that every child has the right to the educational opportunities to achieve literacy, not simply "bright" children, "normally achieving" children, or the children of majority culture or middle class families. However, there are numerous ways in which children differ in terms of their disposition to participate in literacy experiences. One of these differences is the extent to which they engage in the intentional self-regulated learning that promotes literacy.

Self-regulated learners use, with flexibility, three principal types of knowledge: (a) knowledge of strategies for accomplishing learning tasks efficiently; (b) metacognitive knowledge of one's own learner characteristics and the task demands, which enables the reader to select, employ, monitor, and evaluate strategy use; and (c) real world knowledge (A.L. Brown, Campione, & Day, 1981; Palincsar & Brown, 1989; Pressley, Borkowski, & Schneider, 1987). In addition, the self-regulated learner demonstrates the motivation to employ this knowledge effectively (Paris & Oka, 1986).

A sizable literature, employing interview, self-report, and measures of on-line processing of text, documents the failure of students with reading difficulties to display the knowledge, beliefs, and behaviors that characterize self-regulated learners (A.L. Brown & Smiley, 1977; Garner, 1980; Meltzer, Solomon, Fenton, & Levine, 1989). Certainly, these metacognitive and strategy deficits cannot be identified as the sole cause of reading problems (Swanson, 1989; Wong, 1985); however, there

is substantial evidence that many poor readers, in comparison with more capable readers, are not as aware of the variables that interact in reading and do not engage in flexible strategic activity that enhances reading.

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Given these differences among good and less capable readers, teaching for self-regulation, as represented by strategy instruction, has become an important agenda in special and remedial education. In this paper, we consider the prominent forms of strategy instruction in special and remedial education. Specifically, we examine the extent to which these models of strategy instruction represent reading as tool use in problem-solving contexts.

We begin by discussing the features of instruction that foster the teaching of strategies as tool use. We then examine the characteristics of six models of strategy instruction in reading: Direct Instruction, Cognitive Behavior Modification, Strategies Intervention, Direct Explanation, Informed Strategies for Learning, and Reciprocal Teaching. Finally, we describe our experiences in designing and implementing a model of strategy instruction that focused on teaching students to be strategic readers in a group problem-solving context.

The Context of Strategy Instruction

Interest in the context of instruction has been influenced by Whitehead's (1929) discussion of what he called the inert knowledge problem. He used the phrase "inert knowledge" to refer to the knowledge that individuals recall when explicitly asked to do so but that they fail to use spontaneously, even when it is relevant to a particular problem-solving activity. Whitehead was particularly intrigued with the manner in which formal education seemed to lead to the accumulation of inert knowledge. We recently encountered an illustration of the inert knowledge problem in interviews conducted with third graders. For example, when asked how to assist a student who had difficulty understanding what she was reading, one particularly sophisticated student suggested a broad array of options, such as skimming first, studying the pictures, using context cues to figure out hard words, and asking for help when absolutely stuck. When provided a piece of text and asked to think aloud how he would read it for the purpose of taking a test on the content, the student engaged in none of the strategies that he had identified, although there were multiple occasions for him to do so.

To counter the problem of inert knowledge, educational theorists, such as Dewey (1933), have called our attention to the usefulness of viewing knowledge as tools, noting that when people learn about a tool, they learn not only what it is, but how and when to use it. In contemporary literature, teaching knowledge as tool use has been referred to as *situated cognition,* attained through the use of authentic tasks (J. Brown, Collins, & Duguid, 1989), and *anchored instruction* (Cognition and Technology Group at Vanderbilt, 1990). Central to these discussions is the notion that one of the major goals of instruction must be the creation of shared environments in which students and teachers explore meaningful problems that provide occasions for real use of knowledge. Given this goal, we consider the contexts created by traditional models of reading strategy instruction found in the special and remedial education literature.

Direct Instruction

In Direct Instruction, the steps of the strategy targeted for instruction are presented by the teacher in a sequential fashion, generally determined through task analysis. Students practice these steps as the teacher provides and eventually fades prompts. A hallmark of Direct Instruction is the active and directive role assumed by the teacher who maintains control of the pace, sequence, and content of the lesson:

> 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 "directed" by a worksheet, kit, learning center, or workbook. (Baumann, 1988, p. 714)

The effects of Direct Instruction have been investigated with general and special education students learning an array of comprehension strategies, such as identifying the main idea (Baumann, 1984), understanding anaphoric relationships (Baumann, 1986), critical reading (Darch & Kameenui, 1987; Patching, Kameenui, Carnine, Gersten, & Colvin, 1983), and study skills (Adams, Carnine, & Gersten, 1982). Typically, the comparative condition in these studies has been a form of traditional instruction as represented in commercial language arts materials. The research suggests that Direct Instruction is an effective means of teaching the targeted comprehension strategies; normally and low achieving readers have mastered the skills presented. What is less clear from these studies is the extent to which the students' ability to understand and recall text has been enhanced as a consequence of direct instruction of particular strategies. In part, the results are inconclusive as a function of the measures selected. Those studies that have included measures of generalization beyond the targeted strategies suggest that improvement is typically limited to the targeted strategies; students who have demon-

strated mastery of the targeted strategies have neither concurrently demonstrated improvement in their ability to comprehend text nor displayed the flexibility necessary to use the targeted strategies in novel contexts. In other words, the problem of inert knowledge appears prevalent in examining the results of Direct Instruction.

Cognitive Behavior Modification

Similar to Direct Instruction, Cognitive Behavior Modification (CBM) has become a broad, encompassing term used by some (e.g., Ryan, Weed, & Short, 1986) to refer to all self-instruction programs. Traditionally, a CBM approach is one in which students are hypothesized to regulate their performance by means of internalizing a prescribed set of monitoring statements (once again determined through task analysis) before, during, and after performing a task. Typically, these statements focus on problem definition, attention focusing, self-reinforcement, and self-coping. The development of CBM was influenced by several theoretical perspectives on learning (Meichenbaum, 1985). Social learning theory emphasized the importance of students' cognitions in facilitating self-control, drawing researcher's attention from overt behaviors to the ways in which students were mediating those behaviors. The research on verbal mediation pointed to the importance of teaching for production and use of mediators, as well as task comprehension. A third influence, stemming from the writings of Vygotsky (1978) and Luria (1976), was the interest in the shift of psychological functions from the interpersonal to the intrapersonal levels. Luria proposed that this shift occurred in three phases. First, the adult's speech controls the child's behavior. Second, the child is directed by his or her own overt speech. Finally, this speech, and thus control, becomes internalized.

Examples of CBM interventions in reading include the work of Dansereau et al. (1979) in the instruction of study skills and Miller, Giovenco, and Rentiers (1987) in the instruction of error detection.

Research indicates that CBM is an effective means of strategy instruction, particularly when used with above average learners. This research has not addressed the following, however: flexibility of strategy use, generalized use of instructed strategies, and changes in reading awareness and attitudes following instruction. Similar to Direct Instruction, CBM represents strategies as a series of discrete steps, selected and modeled by the teacher with no occasion to evaluate the students' representation of reading activity. Furthermore, there is variability across the CBM studies in terms of the focus on the processes of reading (e.g., how one determines the main idea vs. detail and how one reads for understanding).

The Strategies Intervention Model

The Strategies Intervention Model, developed at the University of Kansas Institute for Research in Learning

Disabilities, has emerged from an extensive research program studying the academic performance of students identified as learning disabled and low achieving (Deshler & Schumaker, 1986; Lenz, 1989). As in Direct Instruc-

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tion and Cognitive Behavior Modification, the strategies are taught as a series of steps. Unlike the other models, the Strategies Intervention Model comprises two phases of instruction. In the acquisition phase, the student is taught to apply the strategy in a supported setting. In the generalization phase, students learn to apply the strategy in the general education setting. The Strategies Intervention Model is also distinguished by the fact that instruction is preceded by assessment regarding the students' current strategy use in specific contexts. Thereafter, the instructional steps are quite comparable to those used in Direct Instruction and Cognitive Behavior Modification: modeling and verbal rehearsal of the steps of the strategy, and guided practice and feedback with materials controlled for complexity, length, and difficulty with the use of mastery criteria to determine when the student can proceed to more difficult materials. Investigations indicate that sustained instruction is successful in improving strategy use, as well as content learning.

Direct Explanation

Direct explanation (Duffy et al., 1986; Duffy et al., 1987) is distinguished from the previous models in several respects. It is an approach suggesting that any skill can be recast as a strategy. To this extent, both the teacher's and the students' attention is focused on skills as tools to make sense of text. To accomplish this, the teacher must provide (a) declarative knowledge (i.e., inform the students about the name of the strategy, the purpose for which it could be useful, steps in deploying the strategy); (b) procedural knowledge (i.e., teach the students how to use the strategy); and (c) conditional knowledge (i.e., inform the students about when the strategy would be appropriately used). In an effort to teach the skills as tools, the teachers "talk aloud" about the mental processes they use when experiencing difficulty understanding text, the way in which application of the skill can increase comprehension, and the mental steps that should be taken to use the skills strategically. At this point, the steps correspond quite well with those of the Learning Strategies Intervention model, including the use of modeling, guided practice, and independent practice.

Investigations of Direct Explanation have been conducted by third- and fifth-grade teachers working with

their lowest groups of readers. Students in the Direct Explanation condition showed significantly greater procedural and conditional knowledge of the strategies. In addition, metacognitive interviews indicated greater awareness on the part of the experimental students regarding the strategic nature of reading. The results of reading achievement measures have been somewhat mixed, with experimental students scoring significantly higher on the word study subtest of a reading achievement test, but not on the comprehension subtest of this measure.

Informed Strategies for Learning

Informed Strategies for Learning (ISL) represents a curricular approach to strategy instruction (Paris, 1986). Specifically, ISL consists of 20 modules addressing four comprehension processes: planning for reading, identifying meaning, reasoning while reading, and monitoring comprehension. Each module highlights a different strategy (e.g., finding the main idea), and each strategy is taught in three lessons. These lessons inform students about the value of the strategy, provide metaphors that assist the students in understanding the strategy, and offer guided practice and provide occasions for applying the strategy in science and social studies content.

Distinguishing ISL from the previous methods of strategy instruction are group dialogues in which the teachers and students discuss their thoughts and feelings about the strategies and their usefulness, emphasizing personal aspects of strategy use. Although investigations of ISL support its effectiveness in increasing students' awareness of strategies and strategy use, the results regarding the effects of ISL on reading comprehension have been less encouraging.

Reciprocal Teaching

Reciprocal Teaching (A.L. Brown & Palincsar, 1989; Palincsar & Brown, 1984, 1988) features the instruction of four strategies that are taught and practiced as a set of complementary activities to be used flexibly as the text, the needs of the reader, and the demands of the text suggest. In contrast to the previous methods, Reciprocal Teaching places less emphasis on teacher explanation or mastery of discrete strategies and greater emphasis on the collaboration of teachers and students to use specific strategies to render the text meaningful.

In Reciprocal Teaching, teachers and students take turns leading a dialogue about the meaning of the text with which they are working. The discussion focuses on generating questions from the text, summarizing the text, clarifying portions that impair understanding, and predicting upcoming content based on clues that are provided by the content and structure of the text. When these dialogues begin, the teacher assumes principal

responsibility for leading and sustaining the discussion, modeling skilled use of the strategies for the purpose of understanding the content. Even from the first day of instruction, however, the children are encouraged to participate in the discussion by generating their own questions, elaborating upon or revising the summary, or suggesting additional predictions. The teacher enables the participation of each student in the dialogue through the use of specific feedback, additional explanation, and modeling.

Investigations of Reciprocal Teaching have been conducted with at-risk students in the primary grades (as listening comprehension instruction) and with remedial readers in middle school. At both levels, Reciprocal Teaching has significantly increased students' ability to use the targeted strategies and to attain higher scores on standardized and criterion-referenced comprehension measures. In addition, these gains have been demonstrated to maintain over time and to generalize beyond the experimental setting. Reciprocal Teaching research has not assessed students' conceptions of reading activity or changes in those conceptions with instruction.

Summary

There is a prolific line of research investigating strategy instruction with special needs students, as represented by the six models reviewed in this section. When we introduced these models, it was with the question, "How do these models represent strategy instruction as instruction in tool use?" The instructional features in which we were particularly interested included (a) a focus on how and when to use the strategies in a flexible and opportunistic manner, (b) deployment of the strategies while engaged in authentic reading activity, and (c) exploration of the strategies in shared environments.

There is considerable variability in the appearance of these features across the models examined, and none of the models features all of these characteristics. There is the least evidence for these features in the Direct Instruction and Cognitive Behavior Modification models. These models typically pay less attention to the metacognitive information regarding strategies. The fact that the strategies are typically represented as a series of steps that are applied to contrived pieces of text mitigates against strategy instruction in authentic contexts. Finally, the agenda is set exclusively by the teacher in these models, who is very controlling and directive in this instruction. These models are perhaps most vulnerable to the criticism of Poplin (1988), among others, who criticized current instructional practices employed in the area of learning disabilities for their application of reductionist thinking with its underlying tenet that human learning can be broken into component parts.

Although metacognitive information is prominent in the remaining models covered in this section, there is still considerable variability in the authenticity of the

tasks with which teacher and learner are engaged, and in none of the models do the students have the potential to influence the learning environment to the same extent as the teacher.

Nevertheless, research on each of these models supports, at least to some degree, the benefits of these representations of strategy instruction. What is not yet possible is a comparison of the relative effectiveness of these various models. Such a comparison is precluded by differences in the student outcome measures (e.g., only a few studies have included direct measures of strategy use) and the contexts in which these interventions were conducted (e.g., individual, small group, and whole class instruction).

Although the present state of strategy instruction research does not permit empirical comparisons across the various models, this would seem to be an important endeavor, particularly given the low incidence of strategy instruction currently taking place in both general and special education settings, as well as the fragmented nature of the curriculum experienced by children having difficulty learning to read and write (Carter, 1984; McGill-Franzen & Allington, 1990; Rowan & Guthrie, 1989; Ysseldyke, Thurlow, O'Sullivan, & Christenson, 1989). Each of the six models represents different conceptions of teaching and learning, suggesting different goals of instruction and significantly different roles for teachers and students. Comparative research could provide information regarding the critical features of strategy instruction, in addition to aiding educators in selecting a model or models of strategy instruction most compatible with their own conceptions of teaching and learning. Finally, we need to press ourselves as a research community to identify what a model of strategy instruction would look like if we wanted to maximize the use of metacognitive instruction with authentic tasks in shared environments. The study that we discuss in the second half of this article was designed with these purposes in mind.

An Alternative Model of Strategy Instruction

The purpose of the study was to evaluate the implementation process as well as the differential effects of using three approaches for instructing heterogeneous groups of third-grade students to be strategic in their reading activity. Central to this study was the question, "How does the context within which strategy instruction occurs influence the nature of this instruction and its outcomes?" We provide only highlights of this study for the purpose of exploring the implementation issues that are of central interest to us in this article (see Palincsar et al., 1990, for details of this study).

In this investigation, teaching and learning were represented along a continuum, with teacher control at one end of the continuum and student control at the other

end. Three instructional conditions were designed to represent three locations along the continuum: (a) Directed Instruction at the teacher-controlled end, (b) Reciprocal Teaching approaching the middle of the continuum, and (c) Collaborative Problem Solving representing student-controlled instruction. The Collaborative Problem Solving condition was also designed to maximize students' use of metacognitive knowledge while they were engaged in authentic activity in a shared environment.

The two classes of third-grade students participating in this study were from two schools. Their decoding and comprehension skills ranged from first through fifth grade (as measured by the Metropolitan Reading Achievement Test). The children were first administered an array of pretests assessing comprehension of expository text, metacognitive knowledge of reading, and strategy use. Comprehension was assessed using text that was appropriate to the decoding levels of the individual students. Metacognitive knowledge and strategy use were assessed through an interview, as well as through think-aloud protocols while children read from ambiguous text.

The students within each class were then placed in triads by matching them according to the results of the pretest measures, and a child from each triad was then randomly assigned to one of the three instructional conditions. This resulted in two groups of 6–7 heterogeneous third graders experiencing each instructional condition. Furthermore, in each of the six instructional groups, there were 2 children reading at least a year below grade level.

Instruction occurred for 30–40 minutes a day, 3 days a week, for a total of 25 sessions. Teaching was done by the investigators, assigned such that each condition was taught by more than one investigator. The text with which the children were working across the three conditions were expository passages written at the third-grade level about an array of topics that were science-like in content (e.g., Living Lights, Life in an Ant Nest). To accommodate the varying decoding levels of the participants, during instruction, reading was conducted as a read-along.

A number of variables were held constant across the three instructional conditions, including instructional time, the text with which the children were working, and the information regarding the purposes of the instruction.

The Instructional Procedures

In Direct Instruction, three strategies (summarizing, question generating, and clarifying) were presented in a series of sequenced steps. Modeled after the work of Baumann (1988), the teacher provided crafted explanations and demonstrations regarding each step in executing the targeted strategy, and guided the children's practice with each step. For example, students were taught

summarizing via four steps derived from the work of Kintsch and VanDijk (1978): select the topic, delete trivia, delete what is redundant, and invent a topic sentence. They practiced each step, to mastery, with both explicit and implicit main idea text. The teacher instructed by verbalizing the steps that were guiding her activity (e.g., "The first thing I need to do is figure out the topic of this paragraph . . .").

This condition has its theoretical roots in both behaviorism and cognitive psychology. Emphasized in this condition was the role of the teacher as informer and the role of student as information recipient (Anderson, 1990). The support or scaffolding provided the students was a function of sequencing the instruction from easy to hard and moving on in the sequence only as the children indicated mastery with each step. Finally, this condition can best be described as activity driven; the text and the context of the reading situation did little to inform the course of instruction. The very explicit agenda in this instructional context was learning the strategies.

The second procedure was Reciprocal Teaching (A.L. Brown & Palincsar, 1989; Campione & Brown, this issue; Palincsar & Brown, 1984). Reciprocal Teaching, as described earlier, assumed the form of a dialogue structured with the use of four strategies that were taught and practiced as a set of complementary activities to be used in a flexible manner, depending upon the demands of the text and the purposes for which the group is reading, as well as the needs of the reader. These strategies were generating questions from the text, summarizing the text, clarifying portions of the text that impair understanding, and predicting upcoming content based on clues that are provided by the content and structure of the text. In contrast to Direct Instruction, Reciprocal Teaching placed less emphasis on teacher explanation and greater emphasis on collaboration by teachers and students to bring meaning to text. Reciprocal Teaching has its roots in both cognitive psychology and social constructivist theory, emphasizing the active role of the learner as well as the critical role played by social interactions in learning.

The third procedure was Collaborative Problem Solving. In this condition, the goals of instruction were to have the students identify strategies they thought would be useful to understanding and monitoring their understanding of text. In addition to generating the strategies, the students evaluated the effectiveness of the strategies as well as the criteria for determining their success in implementing the identified strategies.

This procedure began by providing opportunities for the students to work collaboratively and establish a participation structure that would promote collaboration. Prior to introducing text to the group, there were 2 days of activities. For the first activity, the children in this condition were asked to collaborate in the creation of a new animal. When the group concurred that the creature was finished, they described each feature and explained how

these features would influence the animal's behavior, suggest its habitat, provide a means of defense, and so forth. The second activity involved the completion of a cloze task. Given ambiguous paragraphs with words deleted, the students were encouraged, as a group, to suggest possible solutions to the missing segments of text. As a group, the children determined whether a particular solution was reasonable and whether one solution might be more appropriate than others.

Following each of these activities, the teacher led a discussion regarding the process of working as a collaborative group and the role of individual contributions to the group effort. In addition, the teacher described the activities as problem solving and illustrated how there was often more than one satisfactory solution to each problem. Finally, the teacher introduced the concept of reading as problem solving and encouraged the students to identify the kinds of problems they might encounter as they read text and how they might solve these problems.

To illustrate the Collaborative Problem Solving condition, a transcript is provided from the 2nd day of instruction. At this point in the instruction, the teacher was interested in introducing the children to the concept of strategic reading.

The students were presented with two vignettes and were asked to vote on which of two children they thought could do better on a test to determine how well the children read their science books. The child in the first vignette (Sara) read the chapter, in sections, asked herself questions about what she had read, and made sure that she could answer both her own questions as well as those at the end of the chapter. If she had trouble with the questions, she reread that portion of the chapter. The child in the second vignette (Susan) read the chapter through to the end and then read it again. Votes were collected: Sara garnered three votes and Susan received four. The teacher then asked the children to describe their reasons for their votes.

Marion: [Sara] tried to figure out the questions. She asked herself questions and if she couldn't do it, she read it over to try to find the answer. She'd probably do better cause she'd remember.

Tara (who also voted for Sara): Cause she's ask herself questions, instead of just reading two times. So when she [the teacher] asks questions in the text, she'll [Sara] know most of the answers.

Teacher: Let's talk about Susan. What reasons might she do better?

Carey: Cause if she's read twice, she'll memorize it more and she'll get the questions right.

Jessica: If she reads twice, when the teacher asks her questions, she'll know cause she read twice . . . about the same thing Carey is saying.

Ben: If she read through twice, she wouldn't forget it.

Teacher: O.K. so it's a better way to remember . . . So maybe there are some different ways to learn. These different ways to learn are called strategies. What can we call the strategy that Sara used?

Marion: Using her brain to do it and asking herself questions.

Teacher: So "asking questions" would be the name of the strategy or behavior that she was using to study. What might you call the strategy that Susan was using?

Tara: She was reading it over.

Teacher: We could call it "reading it over." Some of you also called it "memorizing." Can you think of times when asking yourself questions might be better then memorizing?

Tara: If you were memorizing and it was long, you might forget parts and there might be questions from the parts you forgot.

Carey: But what if it wasn't very long?

Teacher: Are you saying that memorizing might be a good strategy when it's a shorter story? . . . Is there anyone who feels they need more information?

Several students: Yes.

Teacher: What would be helpful for you to know to decide who might do better?

Ryan: Give them the test!

[Students laughing]

Ryan: Give them the test and see who finished first.

Teacher: What do you mean, who finished first?

Ryan: Who got the right answers.

Teacher: Okay but this is before the test and we need to predict who will do better.

Marion: Well, I'd probably need information about how slowly Susan reads. Maybe Sara doesn't read that often. Maybe she reads a lot.

Ryan: How old are they? One could have more experience.

Teacher: Can you explain that some more?

Ryan: They'd know more about it if they were older cause they would have a few more years.

Teacher: So they might know more about what they were reading.

Ryan: Like I'm smarter than my brother and I'm two years older than he is.

Teacher: So how does that affect the things you could read?

Ryan: Well, my brother is not that good of a reader as I am.

This led to a discussion of the role that prior knowledge plays in determining one's approach to reading. The teacher then introduced the children to another vignette in which two hypothetical children were reading for the purpose of telling others about what they had read. While one child wrote each word in his notebook, the second child wrote down a main idea from each of the paragraphs in his notebook. Again the children voted (once again three to four), had a discussion in which they labeled the strategies, evaluated the pros and cons of each strategy (including the opinions that copying was cheating, that summarizing would take less time, and that summarizing was the same thing as writing down everything except that it was writing down only the most important things), indicated what additional information would be useful, and reconsidered their votes, in fact, recasting them unanimously for the second child.

In a separate lesson, to elicit additional strategies from the students, the teacher introduced the students to a robot who could read all the words, but had no understanding of what it read. The teacher asked, "If we could program the robot to be a good reader, what would we teach the robot to do to help it to understand what it read?" The children then identified a list of strategies. The list generated by the students was combined with the list of strategies generated during the vignettes. After these 3 days, the children were given the same texts that were being used in the Direct Instruction and Reciprocal Teaching groups. The children discussed purposes for reading and decided which strategy they would like to implement with each segment of text. They tested out the strategy, and discussed how they used the strategy, what the outcomes were, and whether this was an effective strategy. There was less modeling than occurred in Reciprocal Teaching; rather, the teacher's instruction was in response to the attempts that the children made as they discussed the text. The Collaborative Problem Solving condition was informed by holistic as well as social constructivist theories of learning (see Stone, 1989).

Issues of Implementation

Throughout this study, the investigators/teachers maintained field notes regarding the instruction. In addition, all instruction was audiotaped, several lessons were videotaped, and the investigators met frequently (often daily) to discuss issues of implementation. Several issues have been selected for discussion in this article: ease of implementation, the participation structure, assessment of response to instruction and group heterogeneity, and the role of the text.

Ease of Implementation. One of the features of teaching that contributes to its complexity is uncertainty (Clark, 1988; Shavelson & Stern, 1988). Carrying out preselected activities, monitoring student participation, and managing student transitions constitute a full agenda for most teachers. It is difficult for teachers to simultaneously think about what children are trying to say, build

upon their responses, and tailor assistance as opportunities and the need arises. Our experiences indicated that, as teachers abdicated control of the instruction and worked toward establishing intersubjectivity with the students (see Rommetveit, 1974), the instruction became increasingly difficult. This was particularly true of the Collaborative Problem Solving condition. A solid knowledge of the text did not ensure preparation to teach in this condition. Literally, throughout the study, the teachers had to resist the urge to plan the direction the lessons should take. This condition required that the teachers frequently revisit the goals of this condition: student generation of strategies, student identification of the heuristics for strategy implementation, student evaluation of their own success with the strategies, and student evaluation of the merits of the strategies selected. Teacher attention was focused on alternative means of assisting students to achieve these outcomes. Children's participation in determining these techniques was also solicited. For example, a week into the Collaborative Problem Solving condition, a child who had missed one session returned. The teacher asked the group what strategy they might use to help the missing student catch up in the story on which they were working. The children began by suggesting that they could ask questions. After a short discussion, it became clear that asking questions would probably not make much sense. They then modified that idea to suggest that Ben (the missing child) could ask the questions. When this proved difficult, the group decided the best way to help Ben would be to summarize what they had read thus far. The group then discussed and presented their summary, which Ben was able to evaluate for its effectiveness in informing him about the story. Affecting the ease of implementation were the participation structure and opportunities for assessment, each of which is addressed below.

The Participation Structure. Sociolinguists and others who study classroom interactions have noted the powerful role of participation structures in classroom settings. Cazden (1986) defined the participation structure as "the rights and obligations of participants with respect to who can say what, when, and to whom" (p. 437). In this study, the Directed Instruction condition represented a traditional participation structure; consequently, it was easily understood by all. The semi-structured nature of the Reciprocal Teaching dialogues assisted the teachers and students in establishing the participation structure in this condition. The undefined nature of the participation structure in the Collaborative Problem Solving condition meant that it was continually emerging. Furthermore, it was not uncommon for the children's conceptions of this condition to differ from the teacher's. To illustrate, when one group of children in the Collaborative Problem Solving condition determined that they would summarize the text together, one child offered to write the first sentence and then passed the paper to the next child, a case of serial collabora-

tion. In another instance, when the children elected to generate questions by working in pairs within the group, they were indignant when their peers had generated the same questions and accused one another of cheating. The teacher used this as an occasion to discuss why the children's questions were similar and the criteria they had used to determine these questions.

Assessment of Response to Instruction. There were striking differences across the three conditions in terms of the role that assessment of student progress played. Assessment is a critical issue to the extent that the teacher needs to be aware of each individual's response to instruction: What has each child learned about strategic activity in comprehension? With what is each child experiencing success and difficulty? What is each child internalizing in the group activity and using in his or her individual comprehension efforts?

In the Direct Instruction condition, particularly given that the attainment of mastery was integral to this condition, the teacher was well aware of who was experiencing difficulty and with what. In the Reciprocal Teaching condition, assessment was somewhat more difficult but was eased by the children's turn-taking leading the discussion. In Collaborative Problem Solving, assessment and diagnosis of each individual participant's learning was more unwieldy. However, what was open to assessment was much broader in this condition. For example, in neither of the other conditions were the naive conceptions children held about reading as available to the teacher. To illustrate, in the Collaborative Problem Solving condition, the children's initial strategy list included (a) memorize every word and (b) picture it all in your head. As the children attempted to implement these strategies, they quickly realized their shortcomings. As one child stated (regarding picturing), "We all came up with different pictures. This could be good but maybe not." They then discussed the role that the text, as well as the purposes for reading, played in determining whether "picturing" was a good strategy.

The Issue of Heterogeneity. As indicated earlier, the children were grouped heterogeneously. The Reciprocal Teaching and Collaborative Problem Solving groups more easily accommodated this diversity to the extent that there were multiple opportunities for children to participate at various levels in the instruction. For example, one child in the Reciprocal Teaching condition had considerable difficulty using the questioning and summarizing strategies; however, this child had a wealth of background knowledge, and consequently made numerous predictions about the content of the text. The teacher worked with this child to help him read for the purpose of confirming his predictions and use the relationship between his predictions and the information in the text to inform a summary of the text. In the Direct Instruction condition, teaching to mastery

meant that certain children were given unnecessary instruction and practice.

The Role of the Text. Although the texts with which the children worked were constant across the three conditions, the role the text played in instruction differed markedly in each condition. In the Direct Instruction condition, the text was virtually irrelevant. Because of the piecemeal fashion in which the children approached the text, they seldom made reference to earlier content in the text and there was little discussion of the content. In fact, when the children were asked (on a weekly basis) to evaluate the lessons, one child in the Direct Instruction condition complained that she did not like the lessons because "we don't get to read." (It should be noted, however, that there was no condition with which the children uniformly were displeased, and the majority of children across the three conditions indicated that they enjoyed the lessons.) In contrast to Direct Instruction, in Collaborative Problem Solving, it was often difficult to maintain a balance between discussion of the content and discussion of the strategies useful to learning about the content. In this condition, the children spent much more time responding to the content, and relating it to stories read earlier and to prior knowledge.

The implementation issues suggest that although there was something to recommend each of the instructional conditions, each instructional condition also had its own set of problems. The costs associated with each condition increase the value of determining the outcomes.

Results

The results indicated that there were no 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 measure, 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 heterogeneous groups of students, the Collaborative Problem Solving condition was the most effective, as determined by changes on the criterion-referenced measure assessing comprehension. In more concrete terms, while only 1 child out of 14 in the Direct Instruction condition achieved criterion performance on the comprehension measure, 7 out of 13 children in Reciprocal Teaching and 9 out of 14 children in Collaborative Problem Solving achieved criterion performance. This finding becomes more interesting when one considers that each condition was equally effective in teaching the isolated strategies.

To determine whether there were differential effects according to the entering achievement levels of the

students, analyses were conducted to divide the children into the lowest and highest achieving thirds as measured by the corresponding pretests. These 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. The scale and distribution of test scores suggest that this outcome cannot be attributed to "ceiling effects." Finally, when asking about main effects for instructional condition, the analyses indicated that, for the strategy measure alone, Direct Instruction was not as effective as Reciprocal Teaching or Collaborative Problem Solving for high achieving students. There were no significant differences among the instructional conditions for low achieving students.

Conclusion

There is little dispute regarding the importance of teaching students to become self-regulatory in their comprehension activity. What is subject to dispute is the manner in which instruction is best designed to achieve this goal. Current models of strategy instruction represent quite disparate notions of the contexts in which students learn to become self-regulatory. In this article, we examined six of these models and concluded that there was considerable variability regarding the emphasis on using strategies in a flexible and opportunistic manner, the acquisition of strategies while engaged in authentic reading activity, and exploration of the strategies in environments that were created by both students and teachers. We also described the implementation of an instructional procedure, called Collaborative Problem Solving, designed to capture these features of instruction. When this procedure was compared with more traditional models of strategy instruction, the investigation disclosed unique problems, as well as opportunities, related to ease of implementation, establishing the participation structure, conducting assessment during instruction, and accommodating heterogeneity among the students. Given the impoverished contexts in which a significant proportion of literacy instruction occurs in special education and remedial settings, investigations of this nature may serve to expand and enhance our visions of the roles of students and teachers in literacy learning. 🔍

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