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ABSTRACT

A study examined whether scaffolding (the interaction that emerges when novices and experts work cooperatively) can be extended if the scaffolding model for facilitating problem-solving instruction is imposed. Eight teachers were instructed and coached in the use of scaffolding to teach first graders listening comprehension skills. When a group of eight teachers was introduced to reciprocal teaching (teaching in which there is a dialog between teacher and students as well as among students, and in which students take turns assuming the role of teacher) within the scaffolded instruction framework (all having received the same preparation), they varied considerably in the manner in which they applied their skills. Each teacher read expository passages to her students (six per group) that were written at a third grade level. Two sample sets of dialogue are given; what distinguishes the two examples is that one teacher supported the students at a "word level" while the other supported them at an "idea level." An examination of the transcripts of the classes also showed that some teachers relied more on instructional statements, others on prompting statements, still others on reinforcing statements. These statements were evaluated against the contributions of the students to elicit an instructional profile. (Copies of dialogues and tables of data are included.) (NKA)

Interactive Cognition to Promote Listening Comprehension

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The studies by DeLoach and Reeves bring to life Vygotsky's theory of the social origins of cognitive skills and lend support to the notion that scaffolded instruction is more than a convenient metaphor for describing how novices might acquire skills through interaction with an expert. These studies indicate that there is a pattern of interaction that emerges when novices and experts work cooperatively. In fact, this pattern can be evaluated qualitatively for the purpose of identifying the experts' skill at adjusting the scaffold and this skill, in turn, is reflected in the progress of the novice.

There is a natural extension of this line of research which suggests that rather than observe for the emergence of scaffolded instruction in problem solving activity, one impose the model of scaffolding for the purpose of facilitating problem solving instruction. This is the extension explored in this paper. Specifically, I will describe a study in which teachers were instructed and coached in the use of scaffolded instruction to teach listening comprehension skills to first grade students. There are four points I wish to make: 1) the scaffolding model has the potential to significantly influence instructional practice; 2) the same variability observed among the parents in the DeLoach and Reeves studies is also observed among teachers instructed in the use of scaffolding; 3) this instructional variability appears to be reflected in the performance of the students; and 4) there is a virtual gold mine of research opportunities in the investigation of those variables which interact to promote as well as impede scaffolded instruction.

The context in which we will examine scaffolded instruction is a series of lessons in which first grade teachers were using reciprocal teaching as an intervention to improve the ability of their students to understand informational text that was being read aloud to the students. Reciprocal teaching is an instructional format best represented as a

dialogue between teachers and students as well as among students in which there is turn-taking assuming the role of teacher. The individual who is teaching is responsible for leading the dialogue. The dialogue is structured by the use of four strategies identified in previous research to be effective means of monitoring and enhancing comprehension; predicting, questioning, clarifying, and summarizing. We can illustrate the use of each of these strategies in facilitating the dialogue by examining Dialogue #1 in Table 1. The students have just heard a paragraph describing the various kinds of equipment that are used by aquanauts in their exploration of the ocean floor. One of the students has been assigned the role of teacher and begins by asking a question, "... what does the aquanaut need when he goes under water?" Three other students offer responses which the student-teacher acknowledges, "those are all good answers." The adult teacher joins in with her own question and after it is answered, the student teacher reassumes leadership for the dialogue by summarizing, "For my summary, this paragraph was about what the aquanaut (sic.) need to take when they go under the water." Another student elaborates upon that summary suggesting that the paragraph is also about <u>why</u> the aquanauts need those things. A third student then interjects a request for clarification of the word "gear" to which another student responds. When the student who is teacher is unable to think of a prediction the adult teacher suggests one and the students build upon her prediction speculating as to some of the creatures that live in the ocean.

Teacher preparation

When classroom teachers are introduced to reciprocal teaching it is within the framework of scaffolded instruction. The teachers are told that the purpose of the instructional program is to guide students from the

acquisition to independent application of the four strategies for the purpose of enhancing comprehension. They are advised that this transfer of responsibility will necessitate engaging in different teaching strategies over the course of time; initially providing explanation coupled with modeling, then fading out the modeling and functioning more in the role of coach providing corrective feedback and encouragement, promoting self-evaluation, and reintroducing explanation and modeling as appropriate. The teachers are also told that the rate at which this transfer occurs will vary among their students but that no matter how slow the rate, each learner should be challanged at his or her level of competence; each student is to be given the support necessary to successfully execute the strategy and the support is gradually withdrawn as the students indicate increased competence understanding the text.

In addition to characterizing the instruction in this way, we also implement the scaffolded instruction model in our preparation of the teachers who will be involved in our research. Initially, we model for the teachers through the use of videotapes as well as transcripts and scripted text. We then role play with the teachers, first having them assume the role of the students and then asking them to assume the role of teacher. Finally, we join the teachers frequently as they work with their students for the purpose of coaching them, typically by soliciting self-evaluation from the teachers, offering encouragement, and answering specific questions they may have as they work with their groups.

Teacher implementation

Despite the fact that each teacher receives the same preparation, there is, in fact, considerable variability in the manner in which the teachers enlist tha scaffolded instruction model as they engage in reciprocal teaching. To support this statement, I would like to present

representative transcripts of dialogue which occurred during reciprocal teaching instruction. Before presenting this dialogue, I will describe the study from which the transcripts are taken.

For the four years prior to this study, Brown and Palincsar had investigated the use of reciprocal teaching with junior high students. The results supported that reciprocal teaching was a powerful instructional strategy as the students made dramatic and reliable gains in reading comprehension as measured by criterion referenced as well as standardized measures, transfer tests, and maintenance and generalization probes. The purpose of this study was to extend the investigation of the reciprocal teaching intervention from junior high to first grade students with the aim of examining the relationship between listening and reading comprehension skills and providing early lessons in text comprehension to students identified as at risk for academic difficulty.

The eight first grade teachers participating in this study were recruited from two middle sized city schools by their building principals. Each teacher was a female and had more than ten years of teaching experience at the elementary school level. Each of the eight teachers instructed a group of six students, four of whom were identified to be at risk for academic difficulty, and two for whom no difficulty was suspected who could serve as catalysts and additional models in the group. Listening comprehension was assessed using the listening comprehension subtest of the Sequential Tests of Educational Progress as well as criterion-referenced measures. The students identified as at risk typically scored in the 25th percentile or below on the standardized measure and averaged 30% on the criterion referenced measures.

The intervention occurred over a period of 20 consecutive school days for one half hour each day. The lessons were conducted outside of the classroom in a library or small room to minimize distractions while a

substitute teacher worked with the remainder of the class conducting activities from the Peabody Language Development Kit. The teachers conducting the reciprocal teaching lessons read expository passages to the students that were written at a third grade level. These passages included an array of topics, including the myth of the Loch Ness Monster, underwater life, the way cats communicate, and animals and their habitats. Each teacher worked with the same material in the same sequence. All lessons were audio-taped.

There were three questions that guided the exploration of the transcripts. First, given that the teachers were provided the same general instructional framework and were working toward the same objectives with similar children and identical materials, what similarities and differences in dialogue could be discerned? Two, could these differences be characterized in such a way as to facilitate qualitative statements about scaffolded instruction? Three, would student-teacher dialogue change over the course of time indicating modifications in the scaffold.

To answer the first two questions, we identified samples of dialogue from days one, five, ten, fifteen, and eighteen through twenty when teachers were working with identical segments of text for the purpose of achieving the same apparent goal; for example reviewing the strategies, clarifying a word or concept, or eliciting a summary. The third question was investigated by examining changes in dialogue over time, within each group and among the groups. Reminding myself that I couldn't keep you here all evening reading transcripts, it was a challange to decide how to best capture and reflect what transpired in the course of this instruction. Keeping in mind that the second point of this presentation is that there was indeed variance in the manner in which the teachers implemented scaffolded instruction I will attempt to identify and illustrate principal differences focusing on the nature and extent of support provided by the various

teachers in a qualitative manner by sharing two sets of sample dialogues and in a quantitative manner as well. Dialogues 2A and 2B (Table 2) are taken from Day One of Reciprocal Teaching Instruction. Both teachers are reviewing the strategies to which the students had been introduced the previous week through the use of worksheet activities that named and described each of the strategies. What distinguishes Dialogue 2A from 2B is the type of support that each teacher provides. In Dialogue 2A the teacher supports the students at a "word level" as opposed to "idea level" even going so far as to provide the initial phonemes of the word she is seeking in Lines 16 and 74. Interestingly, the students become bogged down in this word level activity and stray from generating question words to generating words that start with a "w." In contrast, in Dialogue 2B, the teacher solicits the involvement of the students in identifying the four strategies by supporting the students at an idea level. When she poses a question and receives no response, she rephrases the question. For example, "...do you remember what we did when we talked about questioning? What do we ask questions about?" When the students offer a response, this teacher works from that response, elaborating upon it or refining it. For example, in line 8 a student suggests that when you summarize you "tell about the story" and the teacher adds, "yes, and you don't have to tell all about it, just the most important ideas." This bit of dialogue is also useful for pointing out another feature that characterized this teacher's instruction. There is a certain structure and punctuation. For example, she initiates the dialogue by asking, "Does anyone remember those four activities?" and she concludes, "We're going to use those four activities; summaries, questioning, predicting, and clarifying to help us understand the story."

In addition to the type of support and structure provided by the teachers we observed differences in the skill with which teachers appraised and made use of existing knowledge to extend knowledge and understanding.

For example, in the following three dialogues (presented in Table 3), three teachers are clarifying the word, "aquanauts;" but the processes by which they arrive at the definition are quite different. In Dialogue 3A, the teacher tells the children what aquanauts are, "When you get big and study Latin, if you study Latin, you'll know that aqua means water." In Dialogue 3B, the teacher calls attention to the differences between the words "astronauts" and "aquanauts" and a students who is apparently familiar with the word "aquanauts" indicates that they go "down in the ocean." In Dialogue 3C we have an excellent opportunity to see how the teacher frames and builds from the students' knowledge. She first tries to identify words the children might be familiar with that share the same root word as "aquanaut" by asking, "Have you ever heard of aquaman or aquarium? What do you think of when you hear aquarium?" When a student incorrectly responds, "A person," the teacher uses that response and returns to "aquaman." After discussing where aquaman helps people, she returns to the word "aquarium" calling attention to the root word "aqua" which, by now, the students are able to identify as "water." This interplay between the students and teacher seems to be an important hallmark of scaffolded instruction which allows the teacher to evaluate and build understanding.

We detected another important difference when we examined the transcripts that can be represented in a quantitative manner. If we labeled each teacher's dialogue according to whether she made an instructional statement, "I could make a summary of all that important information by saying...", a prompting statement, "Why don't you ask us about...", or a reinforcing statement, "That's an important word to clarify," interesting trends emerged. Referring to Figure 1; Teacher A is one of our teachers from whom we were able to collect many samples of scaffolded instruction as we had defined and characterized it. On Day 5 the proportion of statements this teacher made which were categorized as

instructional in nature was 45%, while prompting statements included 43% of her statements and only 13% of her statements could be characterized as praise statements. This is in contrast to a comparison teacher whose instructional statements represented only 12% of her total statements while 81% of her statements were prompts, and 7% were reinforcing. Teacher A is actively engaged in modeling and instruction at this time while Teacher B is engaged in the type of activity we associate with coaching already. Interestingly, while Teacher A reduces the proportion of her instructional statements to 33% by Day 8, Teacher B has increased hers, although only to 17%. Instead of instructing, Teacher A is now able to rely more on prompts and reinforcing statements to sustain the dialogue. By the conclusion of the intervention, Teacher A has once again reduced the proportion of her statements that are instructional in nature (to 17%) while concurrently increasing prompting and reinforcing statements. The proportion of Teacher Statements in isolation don't, of course, capture the whole picture. These statements have to be evaluated against the contributions of the students. One means of evaluation is to determine the extent to which the students are able to function more independently of the teacher over time. When we juxtapose the interchanges between the students and these two teachers to evaluate how independently each group is able to work, an interesting profile emerges. The pattern for Day 5 (indicated in Table 4) looks quite similar across both groups with the teachers and students turn-taking in a predictable fashion. The teacher's turn is followed by the students' which is followed by the teacher's, etc. However, on Day 18 Group A's pattern looks quite different from Day 5 as well as quite different from Group B. On Day 18, Teacher B remains pivotal to the lesson. In almost every instance, her turn is followed by a student's turn, followed by the teacher's turn, maintaining a pattern very similar to the one identified for Day 5. Group A's dialogue assumes a different pattern over time. By Day 18, the students are able to attain as many as ten exchanges independent of the teacher.

Student performance

Comparisons of turn-taking patterns leads to the third point of this presentation which is that the instructional variability observed among the teachers appears to be reflected in the performance of the students. There are two sets of measures which I will use to describe the performance of the students; pre and posttest measures of the students' ability to engage in the instructional activities and criterion-referenced assessments of listening comprehension. I will limit discussion of these data to the two groups we have just been comparing. The pre- and posttest data are presented in Table 6. These data were collected by having each student listen to a total of four short pieces of text (two in pretesting and two in posttesting). They were first presented the title of the text and were asked to tell us three things they thought they would hear about or three things they would like to learn about in a story which had this title (predicting from title). The students were then told that they were to listen carefully so that they could tell us what the little story was all about (summary). They were then asked to listen again for the purpose of thinking of a question about what they had heard (questioning). Finally, they were asked to listen one last time for the purpose of suggesting what might happen next in the story (predicting from text). In addition, there was a word embedded in the text that was intended to elicit a request for clarification. The students were told with each reading that they should stop the reader if there was a word they did not know the meaning of (clarification). If the child did not request clarification then the last step in the pretesting activity was to ask the child if they knew what the embedded word meant. If they were unable to identify the meaning, the

sentence in which the word appeared was reread and the children were given the opportunity to use context to assist them.

The scores reported in Figure 2 reflect the proportion of total points possible that students earned for each of these activities. While the groups' scores are comparable during pretesting, posttest results indicate that while Group B earned more points for their predictions from title, and gains were comparable across the two groups for requests for clarification, Group A surpasses Group B on the ability to generate summaries, generate questions, and make predictions based upon the text. To give you a sense of the type of change these numbers reflect, we can examine a sample of a student's pretest and posttest responses. (Examples will be given)

The criterion referenced assessments were administered by reading 350 word passages to the students individually. After each paragraph, the students were asked two questions designed to elicit both recall and inferences from the passage for a total of ten questions per passage. Three of these measures were administered prior to beginning the intervention and nine were administered during the course of instruction. The results of these measures for Groups A and B are charted in Figure 3. The first plot represents the mean for baseline. The second, third, and fourth plots represent the means for intervention which has been divided into thirds. The results indicate that while Group B shows some initial response to instruction for the first third of instruction, there is no further change over time while Group A continues to make gains over baseline throughout the course of instruction and, in fact, achieves 75% accuracy with the comprehension questions for the last third of the intervention.

Summary with implications for further research

In our reciprocal teaching research we have regarded scaffolding as an important model of interactive cognitive instruction. It has guided us in

conceptualizing the intervention, preparing the teachers with whom we work, and observing as well as evaluating their instruction.

The dictionary suggests that the word "model" has a number of synonyms ranging from "plan" to "mold." As a plan of instruction scaffolding seems to make a good deal of sense and there is certainly a significant history to support it. As Rogoff and Lave (1984), and, most recently, Collins and Brown (in press) point out, scaffolded instruction with its modeling, support, and fading components characterizes the apprenticeship by which knowledge and skills were handed down over the generations. In addition to its ecological validity, we would cite the research reported in this colloquium as empirical support for this model.

But there is an important distinction between plan and mold. Molds don't allow for variance and variance is a distinguishing feature of classrooms. The variance that we have encountered includes teacher-centered variance, such as knowledge, teaching/learning style, and motivation and student-centered variance related to knowledge, teaching/learning style, and motivation. The dynamic interaction of these variables suggest that it would be folly to speak of scaffolded instruction in a highly prescriptive manner. On the other hand, it would seem that we can't simply bow to the variance. The qualitative differences in the manner in which teachers implement scaffolded instruction have resulted in student achievement differences. These differences suggest that it is encumbant upon researchers and teachers to identify the critical features of scaffolded instruction as well as effective means of influencing instruction to incorporate these features.

Table 1

Sample Reciprocal Teaching Dialogue : Dialogue 1

Student 1:	My question is, what does the aquanaut need when he goes under water?
Student 2:	A watch
Student 3:	Flippers
Student 4:	A belt
Student 1:	Those are all good answers.
Teacher:	Nice job! I have a question too. Why does the aquanaut wear a belt, what is so special about it?
Student 3:	It's a heavy belt and keeps him from floating up to the top again.
Teacher:	Good for you.
Student 1:	For my summary now... This paragraph was about what the aquanaut need to take when they go under the water.
Student 5:	And also about why they need those things.
Student 3:	I think we need to clarify "gear."
Student 6:	That's the special things they need.
Teacher:	Another word for gear in this story might be equipment, the equipment that makes it easier for the aquanauts to do their job.
Student 1:	I don't think I have a prediction to make.
Teacher:	Well, in the story they tell us that there are "many strange and wonderful creatures" that the aquanauts see as they do their work. My prediction is that they will describe some of these creatures. What are some of the strange creatures that you already know about that live in the ocean?
Student 6:	Octopuses.
Student 3:	Whales?
Student 5:	Sharks!
Teacher:	Let's listen and find out. Who will be our teacher?

Table 2

Introduction to Strategies : Dialogue 2A

T: First of all, who can remember what the first thing was that we talked about that we do when we start to listen?

S: Summarize.

T: Good. Summarize. Did you hear that G__? Summarize. Now, what does summarize mean, G__?

S: Summarize.

T: Listen and tell what you heard in a few

S: questions

T: In a few wor

S: words

T: In a few words. So we have to listen and then tell back once you've heard. What was another thing we learned how to do? You told us, instead of listening is what? Ask what?

S: Question

T: O.K. so you listen, and then you ask questions about what you heard. Like what did he do? How old was he? Where did he go? What did he do? See. Questions start with certain words. What words did they start with? They start with those "w" words.

S: What?

T: What. Give me another.

S: Why?

T: Why.

S: Where.

S = student
T = teacher

Table 2 (continued)

T: Where. Good.

S: Will.

T: Will. What else?

S: Where.

S: Why.

S: Will.

T: I said will. Will you go or will you come here?

S: Wow.

T: No. It has to start with a "w." Will.

S: Wow.

T: But that's not. No, you don't start a question with that. No.

S: Why.

T: Why, who, where, will, when

S: Water.

T: Now you're not listening, S___. You don't start a question with water. That wouldn't make good sense. Now what question could you start with water? Now you might say, "what is water? Say, "where is water?" But you can't start a question with water. Is is also a good question starter.

(The teacher then proceeded to give further examples of question starters and then led into a discussion of predicting...)

O.K. so we have had summarizing, questions. Now these two S__ doesn't know about. What was it we talked about Friday? Something... Remember the weatherman? What does the weatherman do?

S: Tell the whatever it's going to be. The weather.

T: What did we call what he thinks the weather is going to be?

Table 2 (continued)

What he thinks is going to happen tomorrow. What's the big word?

S: Predic

T: Pretty good. Predicting. You say predict?

S: Predict.

T: That's pretty good. I like that. So we make a prediction. We tell what we think is going to happen next in the story. Do we have to be right?

S: No.

T: Because is the weatherman always right?

S: No.

(At this point the teacher had the children predict what they would do when they returned to their classrooms...)

T: And the last thing we learned how to do was clarify. Now what did that big word mean? Clarify. Make a big word more

S: little

S: bigger

T: understandable. No. Make a word so that you could under

S: stand

T: stand. So if you don't understand a big word, then you have to either ask someone what that word means or when you get bigger, you can go look it up in the dictionary. O.K. So the four things we are going to do... we're going to summarize. Say that.

S: Summarize.

T: We have to listen in order to do that. We have to ask questions, we have to predict...

S: We have to predict.

T: What's going to happen next. And we clarify words we don't

S: know.

Table 2 (continued)

Introduction to Strategies : Dialogue 2B

T: Today we are going to do something using those four things we talked about last week. Does anyone remember those four activities that we were talking about when we were talking about thinking as we listen to the story?

S: We give a summary.

T: One was summary, right. And what do we do when we talk about summarizing? T__?

S: Tell about the story.

T: Yes, and you don't have to tell all about it, just the most important ideas. What was another thing we talked about? B__?

S: Questions.

T: Yes, we talked about questioning. And do you remember what we did when we were talking about questioning. What do we ask questions about? About anything at all?

S: About the story and to see if we understand.

T: Right. We will ask questions that will give us information about the story and that will help us see if we were listening or if we fell asleep. What is something else we did? We did two more things. Summarizing, questioning... Remember we talked about the weatherman and we said that the weatherman does this? What does the weatherman do

S: Give a ...

T: What does he do when he tells us it's going to be a beautiful weekend?

S: prediction!

T: Right. You remembered that big word. And what do we do when we predict about the story?

S: We think about what might happen.

T: Next in the story. Right. And then we did one more. The last thing was...if you don't know something you might raise your hand and ask that it be ... clarified. That was a a big word, wasn't it? So, we're going to start today with some stories and we're going to use those four different activities ... summaries, questioning, predicting, and clarifying to help us understand the story.

Table 3

Defining "Aquanauts" : Dialogue 3A

T: Okay, they were aquanauts. When you get big and study Latin, if you study Latin, you'll know that aqua means water. Okay, let's put our hands down. We were talking about aquanauts. They did talk about astronauts a little bit. What's the difference between an astronaut and an aquanaut, S__?

S: An aquanaut goes in water and a

T: astronaut

S: astronauts go in sky.

T: Very good. I've got to bring those pictures. Time magazine had some very good pictures of the astronauts that went up last week and got the satellites.

Defining "Aquanauts" : Dialogue 3B

T: The name of our story today is called "The Aquanauts." Now, does anyone know what an aquanaut is? We've all heard of astronauts, haven't we? Where does an astronaut go?

S: To the moon.

T: Yes. Where do you suppose an aquanaut goes?

S: Up to the moon.

T: No, that's where astronauts go. Listen to these words astronauts and aquanauts. Where do you think they might go?

S: Down in the ocean.

T: Very good. Now, do you suppose that this story might be about going down into the ocean? All right, let's find out.

Table 3 (continued)

Defining "Aquanauts" : Dialogue 3C

T: Today's story is called "The Aquanauts." If I just said that the story is going to be about aquanauts, can you predict what you think...

S: What does it mean?

T: Well, that's a good place to start. Has anyone heard the word aquanaut before. Have you heard of aquaman, or aquarium? What do you think of when you hear aquarium?

S: A person.

T: Who was aquaman?

S: A person who helps people.

T: How did he help people?

S: Underwater.

T: Yes, he could help people under water. Do you know what aquarium is?

S: It's a fish tank.

T: Do you hear any part of the word that is similar to what we are talking about?

S: No.

T: Aquanauts, aquarium, aquaman.

S: Aqua.

T: Aqua is a word that means where aquaman can live. Where the fish live, in the...

S: Water.

T: Aqua means water. So, aquanauts have something to do with the water. I wonder exactly what they are going to be.

Figure 1

Proportion of Instructional, Prompting, and Reinforcing Statements

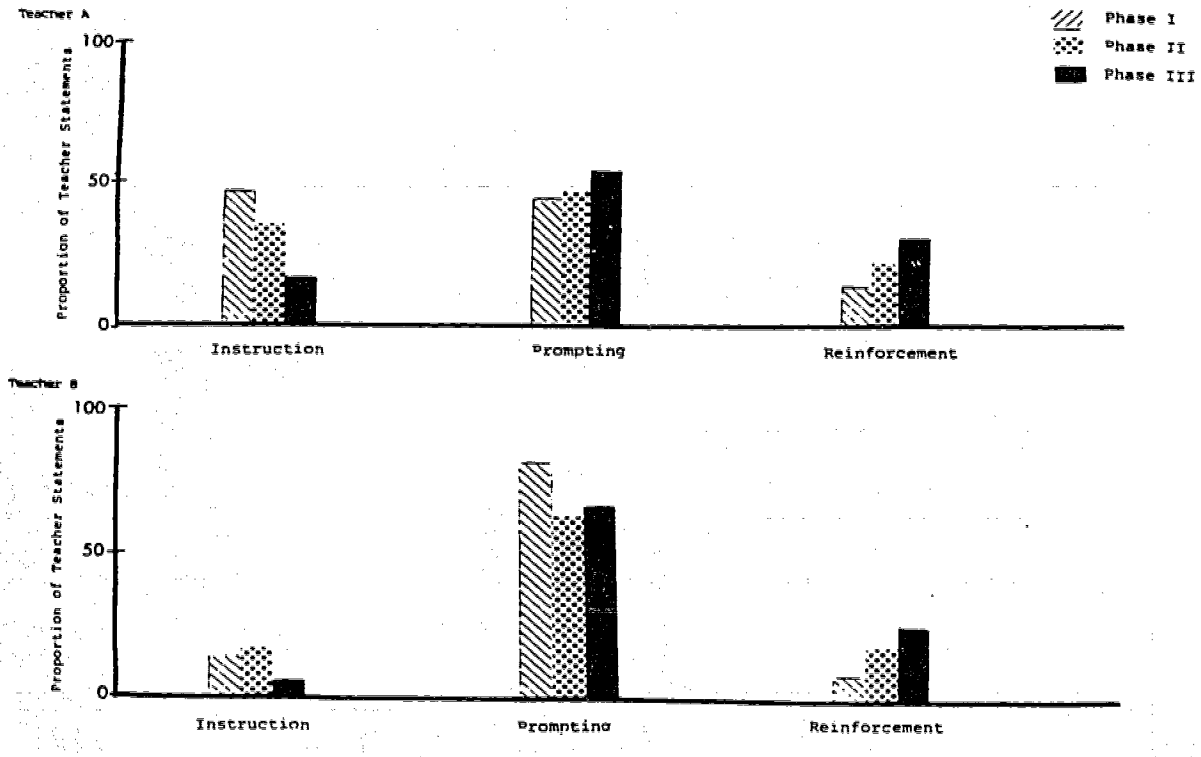

Figure 2

Pretest/Posttest Data: Transfer Measures

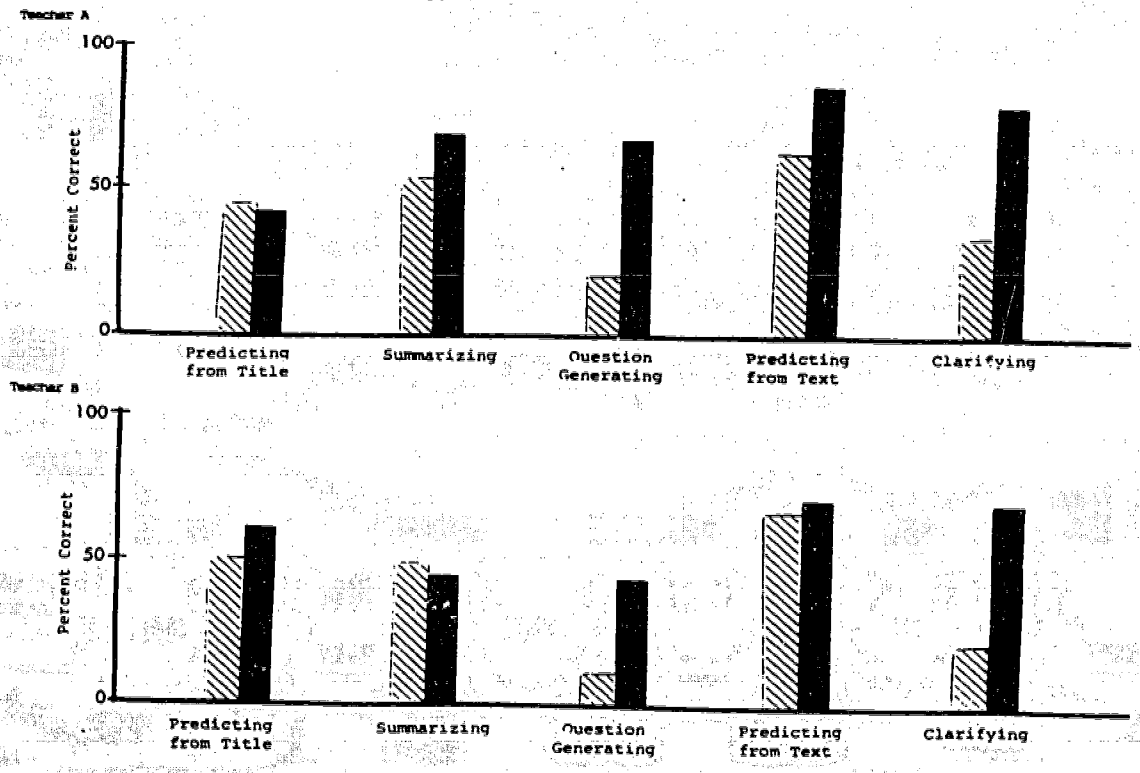

Figure 3

Student Performance on Criterion Referenced Comprehension Measures

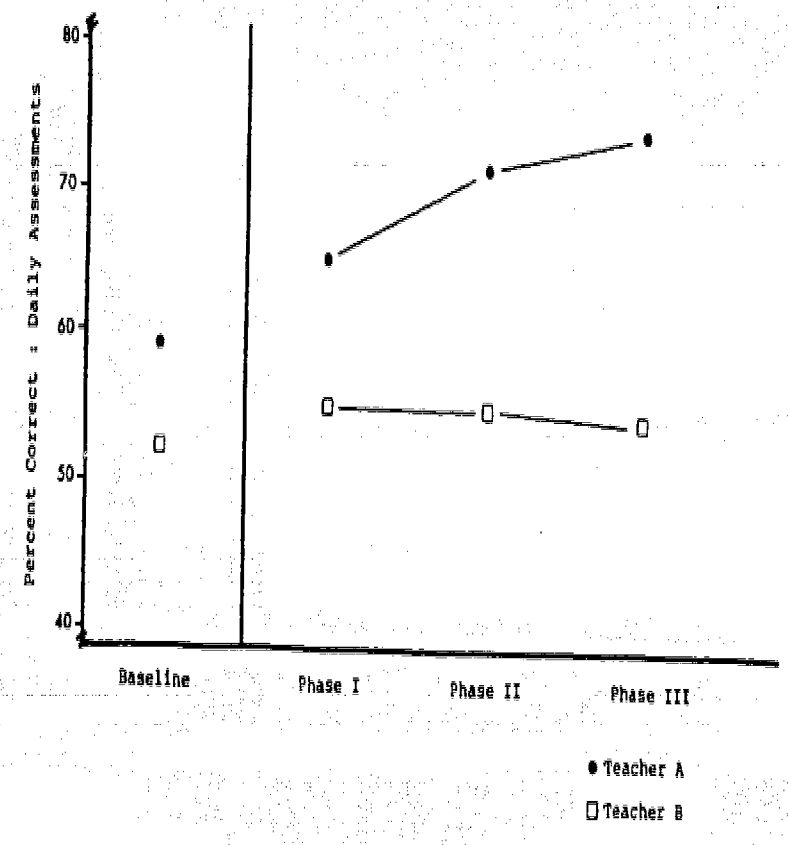

Table 4

Student - Teacher Turn-taking Over Time

	Phase I		Phase III	
	Teacher A	Teacher B	Teacher A	Teacher B
1.	T	T	S	T
2.	S	S	T	S
3.	T	T	S	T
4.	S	S	T	S
5.	S	T	S	S
6.	T	S	T	T
7.	S	T	S	S
8.	T	S	T	T
9.	S	T	S	S
10.	T	S	T	S
11.	S	T	S	T
12.	T	S	S	S
13.	S	T	T	T
14.	T	S	S	S
15.	S	S	S	T
16.	T	T	S	S
17.	S	S	S	T
18.	T	T	S	S
19.	S	S	S	T
20.	T	T	S	S
21.	S	S	S	T
22.	T	T	T	S
23.	S	S	S	T
24.	S	S	S	S
25.	T	T	S	T
26.	S	S	S	S
27.	T	T	S	T
28.	S	S	S	S
29.	T	T	S	T
30.	S	S	S	S
31.	T	T	S	T
32.	S	S	S	S
33.	T	T	T	T
34.	S	S	S	S
35.	T	T	T	T
36.	S	S	S	S
37.	S	S	T	T
38.	T	T	S	S
39.	S	S	S	T
40.	T	T	T	S
41.	S	S	S	T
42.	T	S	S	S
43.	S	T	T	T
44.	T	S	S	S
45.	S	T	S	S
46.	T	S	T	T
47.	S	T	S	S
48.	T	S	T	T
49.	S	T	S	S
50.	T	S	S	T

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