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## Reciprocal Teaching: An Instructional Model Applied to Improve Written Language Performance and to Enhance Critical Thinking Skills among Sixth Grade Students

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RECIPROCAL TEACHING: AN INSTRUCTIONAL MODEL APPLIED TO IMPROVE  
WRITTEN LANGUAGE PERFORMANCE AND TO ENHANCE CRITICAL THINKING  
SKILLS AMONG SIXTH GRADE STUDENTS

by

Virginia Serrano Sison

A Dissertation Submitted to the Faculty of the School of Education  
of Loyola University of Chicago in Partial Fulfillment of the  
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## VITA

Virginia Serrano Sison was born on February 18, 1948 in Manila, Philippines. She is the daughter of Francisco Sison (deceased) and Oliva Serrano.

Her elementary and high school education was completed at St. Rita College in Manila, Philippines. She graduated as First Honorable Mention. She enrolled at the University of the Philippines to obtain her Bachelor of Science in Elementary Education. Throughout her studies, she was the recipient of a university scholarship for academic excellence. She graduated Cum Laude in March, 1968.

In August, 1968, she came to the United States as a Smith-Mundt Fulbright Scholar and enrolled at the University of Notre Dame in South Bend, Indiana. She completed her Master of Arts in Education in August, 1970. She continued her education at DePaul University, Chicago, Illinois, and completed her Master of Education majoring in Reading and Learning Disabilities in June, 1971.

On her return to the Philippines in June, 1971, she had the opportunity to visit American Schools in Europe. Upon her return to the Philippines, she taught sixth grade at the American School in the Philippines. She was also the Reading Coordinator of the school.

She returned to the United States in May, 1973. She became the Educational Coordinator of Francis Community School in Milwaukee, Wisconsin from September, 1973 to June, 1974.

She was appointed Learning Disabilities Specialist at Gary Community School Corporation in September, 1974. She remained in this

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She is an active member of Association for Supervision and Curriculum Development, Phi Delta Kappa, International Reading Association, American Educational Research Association, and Midwest Educational Research Association. She is also a member of the Indiana Council for Exceptional Children. She organized a symposium on a New Status for Staff Development and also presented her paper entitled, PROJECT ICARE, A MODEL FOR STAFF DEVELOPMENT, for the Midwest Educational Research Association in October, 1987 held in Chicago, Illinois.

TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS . . . . .	ii
VITA. . . . .	iii
LIST OF TABLES . . . . .	vii
LIST OF FIGURES . . . . .	ix
CONTENTS OF APPENDICES. . . . .	x
 Chapter	
I. INTRODUCTION . . . . .	1
Definition of Terms. . . . .	8
Limitations of the Study . . . . .	11
II. REVIEW OF RELATED LITERATURE . . . . .	13
Vygotskian Concept to Instruction. . . . .	13
Instructional Programs Applying the Vygotskian Concept	15
Summary. . . . .	23
The Writing-Composing Process. . . . .	24
Summary. . . . .	26
Writing Instruction. . . . .	27
Summary. . . . .	33
III. METHOD . . . . .	36
Hypotheses . . . . .	36
Subjects . . . . .	36
Procedure. . . . .	39
IV. RESULTS. . . . .	62
Summary of Results Related to Hypothesis 1 . . . . .	64
Results Related to Testing Null Hypothesis 2 . . . . .	65
Summary of Results Related to Hypothesis 2 . . . . .	74
Results Related to Testing Null Hypothesis 3 . . . . .	76
Summary of Results Related to Hypothesis 3 . . . . .	77
Summary of Findings. . . . .	81

V. DISCUSSION . . . . .	84
Discussion Related to Testing Null Hypothesis 1. . . . .	84
Discussion Related to Testing Null Hypothesis 2. . . . .	86
Discussion Related to Testing Null Hypothesis 3. . . . .	87
Conclusions. . . . .	91
Limitations of the Data. . . . .	92
Implications for Research. . . . .	94
REFERENCES. . . . .	97
APPENDICES. . . . .	102

LIST OF TABLES

Table	Page
1. A Comparative Summary of Subjects' Age and Gender Across Groups. . . . .	37
2. A Comparative Summary of Subjects' Socioeconomic Status and Gender Across Groups. . . . .	39
3. A Comparative Summary of Frequencies of Agreement Scores Across Baseline and Training Conditions . . . . .	41
4. A Comparative Summary of Frequencies of Agreement Scores Across Training Conditions and Use Conditions . . . . .	42
5. A Comparative Summary of Frequencies of Agreement Scores Across Baseline and Use Conditions. . . . .	43
6. Comparison of the Required Work and the Actual Amount of Work Completed by Each Group. . . . .	50
7. Comparison of Classroom Setting and Instructional Format. . . . .	52
8. A Comparative Summary of Frequencies of Agreement Across Baseline and Training Conditions. . . . .	62
9. A Comparative Summary of Frequencies of Agreement Across Training and Use Conditions . . . . .	63
10. A Comparative Summary of Frequencies of Agreement Across Baseline and Use Conditions . . . . .	64
11. Summary of Mean Gain Scores - Experimental Group. . . . .	66
12. Analysis of Variance Table - Experimental Group . . . . .	67
13. Summary of Mean Gain Scores - Control Group . . . . .	67
14. Analysis of Variance Table - Control Group. . . . .	68
15. Summary of Mean Gain Scores - Experimental Group. . . . .	70
16. Analysis of Variance Table - Experimental Group . . . . .	71
17. Summary of Mean Gain Scores - Control Group . . . . .	71
18. Analysis of Variance Table - Control Group. . . . .	72



19. Summary of Grades: Compositions. . . . .	77
20. Summary of Grades: Compositions. . . . .	78

LIST OF FIGURES

Figure	Page
1. A Graphic Presentation of Pretest and Posttest Mean Gain Score Changes on Cornell Critical Thinking Test Form X. . .	69
2. A Graphic Presentation of Pretest and Posttest Mean Gain Score Changes on Test of Problem Solving. . . . .	73
3. A Graphic Presentation of Teacher Ratings of the Students' Compositions During the Use Session . . . . .	79
4. A Graphic Presentation of Teacher Ratings of Students' Compositions During the Maintenance Phase . . . . .	80

CONTENTS OF APPENDICES

Appendix	Page
A. Reciprocal Teaching Model - A Vygotskian Perspective. . .	103
B. Sample Model Passages . . . . .	109
C. Reciprocal Teaching Holistic - Evaluation Form. . . . .	113
D. Sample Episodes - Reciprocal Teaching Training Session. .	115
E. Sample Episodes - Reciprocal Teaching Use Sessions. . . .	118
F. Sample Students' Summary Comments in Reciprocal Teaching Evaluation Form . . . . .	122
G. Sample Evaluation Phrases Used by Students on Other Students' Compositions/Essays and on Their Own. . . . .	125
H. Teacher Evaluation Form for Scoring Students' Composition	128

## CHAPTER I

### INTRODUCTION

Good writing and careful thinking have been found to be closely associated. A majority of people take as a given that clear and thoughtful thinking can enhance the quality of writing. This assumption was used as an agenda for research by the National Assessment of Educational Progress in 1981. Presently there is renewed interest and emphasis in stressing this assumption which is reflective of an overriding finding reported by the National Assessment of Educational Progress in 1981, "that students at each age level had little difficulty making judgments about what they read. Most lacked the problem solving, critical thinking skills to explain and defend their judgments in writing" (Applebee et al., 1981). The Carnegie Foundation Report (1983) on the current state of secondary education in America recommended the teaching of writing across the curriculum and clearly expressed its rationale in the statement of its President Ernest Boyer, "clear writing leads to clear thinking, clear thinking is the basis of clear writing."

The role of writing in thinking is usually attributed to some combinations of four factors (Applebee, 1984):

- (a) the permanence of the written word allowing the writer to rethink and revise over an extended period;
- (b) the explicitness required in writing if meaning is to remain constant beyond the context in which it was originally written;
- (c) the resources provided by the conventional forms of discourse for organizing and

thinking through new ideas or experiences and for explicating the relationship among them; (d) the active nature of writing, providing a medium for exploring implications entailed within otherwise unexamined assumptions.

Olson (1984) corroborated these statements and indicated that thinking and writing are interdependent processes - ways of making meaning out of experience. However, she acknowledged that writing as a learning tool in heightening and refining thinking is not readily apparent.

Empirical investigations conducted by Bereiter and Scardamalia (1981) on learning to write established a firm psychological basis on which to understand the writing process. The transition from oral to graphic expression according to Vygotsky (1978) parallels the development of symbolic thought. Olson (1984), Good and Watt (1963) added that the transition from a face-to-face communication to a remote audience is critical in the development of abstract reasoning.

Conducting a longitudinal study of children's language development, Loban (1976) wrote:

The data very often show a steady nondramatic chronological development. This would indicate that linguistic "stages" are no more discrete, no more sudden than the stages of physical development reported by Gesell and Ilg.

Vygotsky (1962) was the first modern psychologist to stress the social origins of language and thinking. Consistent with this Vygotskian thought, Stubbs (1982) wrote:

Reading and writing are sociolinguistic activities. People read and write meaningful language that serves particular social functions in different communities. They are also psychological activities involving processing of visual information and various kinds of problem solving.

Furthermore, Nystrand (1982) stated that all the psychological and psycholinguistic factors in writing can easily be overcome by powerful

social and cultural factors. Written language serves as the central theater for meanings for an individual child within his/her social environment. Consequently, writing is no harder to learn than any other language system as long as the learner realizes that there are important reasons to learn it.

Traditionally, the four language processes of listening, talking, reading, and writing are paired in two ways: talking and listening as first order processes which are acquired without formal or systematic instruction and the second order processes of reading and writing learned initially only with the aid of formal and systematic instruction. Verbal language represents the most available medium for composing, but the uniqueness of writing among verbal processes must be established and supported because many curricula and courses in English still consist exclusively of reading and listening (Emig, 1971). The emphasis of writing and language research have rarely crossed and written language has usually been excluded from the domains of language research (Bloomfield, 1933). Before the 1960's, writing research focused on identifying the best teaching methods in writing. Then they began to examine the writing process itself.

Collins and Genter (1980) stated:

A major breakthrough in the teaching of writing has been made possible by the convergence of two recent developments in science and technology. Cognitive science, which brings together the discipline of cognitive psychology, artificial intelligence, and linguistics has begun to provide us with the theoretical means for constructing formal process theories of human cognition. Thus, we now have many of the tools needed for constructing a process theory of writing.

Research on writing has been rather meager, but in recent years

vast knowledge on the composing process has increased. Flower and Hayes (1980) used a protocol analysis designed to assess the conceptual processes taking place when a person writes. These protocols consisted of description of the activities, ordered in time, which a subject engages in while performing a writing task. In this process the subjects were asked to say aloud everything they thought and everything that occurred to them while performing the task no matter how trivial it may have seemed. Examination of the protocols yielded the following general description of the composing process: "They draw on a variety of mental operations such as making plans, retrieving ideas from memory, drawing inferences, creating concepts, developing an image of the reader, testing what they have written. A writer is a thinker on a full time cognitive overload." There is considerable research data supporting the theoretical descriptions of the mental operations involved in writing, of what constitutes the competence of a skilled writer and how this competence is acquired. "Much complexity is involved in the act of transforming thought to print. Writing is an endless series of making choices and changes, creating and integrating ideas and communicating" (Bereiter, 1984; Emig, 1971; Flower, 1980; Hayes, 1980; Scardamalia, 1984).

Writing serves a unique purpose in learning. Vygotsky (1962), Luria (1971), and Bruner (1971) have demonstrated that higher cognitive functioning like analysis and synthesis appear to develop with the support system of language, particularly written language. Vygotsky concluded in his book, Thought and Language (1962):

Processes such as association, attention, imagery, inference or determining tendencies are insufficient without the use of that sign, the word. It serves as the means by which we direct mental operations, control their course and channel them toward the solution of the problem confronting us.

Bruner's subjects in his experiments (1971) were unschooled Wolof speaking children who were asked to categorize objects with various shapes and colors without the presence of those objects or referents. If they could point or label with the objects present, the children performed as schooled children. These studies led him to conclude that it is the written language that makes possible cognitive growth because in writing the referent is not present.

Luria (1971) used a mother-child situation wherein the mother shows the child an object and named it by a corresponding word, thus changing the environment perceived by the child. Under the control of the mother's instruction, the child began to use speech, naming objects which interested him or her, separated them from his or her environment and concentrating his or her attention. The process of communication between two people turned into new forms of organization of psychological processes in the growing individual. Such behavior reportedly serves as a means for organizing attention, facilitates coding in language in such a way the basis of which abstraction and generalization occur and the historical process by which written language is formed.

There is general agreement among behavioral and cognitive theorists of learning as to the importance of environmental factors and those factors inherent to the learner that contribute to the interactive nature of learning (Brown & Campione, 1981). Cognitive



approaches to learning stress that learning is an active, constructive, and goal oriented process that is dependent upon the mental activities of the learner. Learning is focused on the acquisition of knowledge and knowledge structures rather than on behavior (Shuell, 1987). Those theorists associated with cognitive theoretical orientation acknowledges the following: (a) the role of metacognitive processes such as planning and setting goals and subgoals (e.g. Brown et al., 1981; Flavell, 1981); (b) the active selection of stimuli (e.g. functional or nominal) (Underwood, 1963); (c) the attempt by learners to organize the material they are learning, even when no obvious basis of organization is present in the materials being learned (e.g. Shuell, 1969); (d) the generation or construction of appropriate responses (e.g. Wittrock, 1974); and the use of various learning strategies (e.g. Weinstein and Mayer, 1986). Greeno (1980) says that a major objective of instruction is to strengthen at a minimum the students' skills in solving problems. The instructional objectives of a course are that the students acquire specialized knowledge they need to solve problems in the subject domain of the course and the hope is that in the process of acquiring their domain specific knowledge that the student will also strengthen their general skills in problem-solving and reasoning.

Numerous studies have been conducted to determine which teaching methods foster language learning. One noteworthy teaching method, reciprocal teaching, has been shown to increase reading comprehension and comprehension monitoring. Reciprocal teaching is a direct instruction program designed by Brown and Palincsar (1982) that

improved comprehension-fostering and comprehension-monitoring skills.

It included:

1. Expert scaffolding - providing support that is temporary, interactive, and adjustable;
2. Practice with concrete strategies - training of summarizing, questioning, predicting, and clarifying skills;
3. Cooperative learning discussions - providing social support through collaboration of the expert and student.

Three studies (Brown & Palincsar, 1982; 1984) were conducted to test the effectiveness of reciprocal teaching as an instructional method to increase comprehension and to ascertain that their comprehension was proceeding smoothly (comprehension monitoring). After 20 days of intervention and approximately eight weeks after the study, overall gains have been reported in comprehension. At baseline, the typical student scored 45% accuracy on the criterion-referenced measure of comprehension. After reciprocal teaching, 71% of the experimental group achieved a criterion of at least 70% accuracy in contrast to only 19% of the control group. These gains were maintained over time (eight weeks) and were transferred to content areas in the regular classroom (science, social studies) as indicated by changes in percentile rankings among all seventh-grade students.

For this investigation, reciprocal teaching will be used to explore its utility in fostering written language performance and enhancing critical thinking and problem solving skills.

### Definition of Terms

A major objective of the research project is to investigate the relationship of educational intervention and written language in the achievement of critical thinking and problem solving skills. The following definitions are included to increase semantic clarity.

#### Critical Thinking

For the purpose of the investigation at hand, critical thinking is defined as reasonable, reflective thinking that is focused on deciding what to believe or do. It involves a variety of proficiencies, a set of tendencies and good judgment, a conception that combines creative thinking, critical thinking, and problem solving - all skills that are thoroughly interdependent in practice (Ennis, 1981).

Critical thinking refers to the careful and precise thinking that is used to resolve some problems. It always manifests itself in connection with some identifiable activity or subject area and never in isolation (McPeck, 1981). Learning to think critically is in large measure to know when to question something and what sorts of questions to ask. Not just any questions will do (Passmore, 1963).

According to Ennis (1981) the proficiencies and set of tendencies to think critically include:

- a. Proficiencies: Observing, inferring, explanations, generalizing, conceiving, and stating assumptions and plans; offering well-organized and well-formulated lines of reasoning; evaluating authoritative-sounding statements; deductive and inductive

reasoning; detecting standard problems and realizing appropriate action.

- b. Tendencies to: exercise these proficiencies; take into account the total situation; be well-informed; demand as much precision as the subject permits; deal with the parts of a complex situation in an orderly fashion; consider seriously other points of view than one's own; withhold judgment when the evidence and/or reasons are insufficient; accept the necessity of exercising informed judgment.
- c. The exercise of good judgment.

Bloom's cognitive categories (1956) include a variety of thinking skills; knowledge, comprehension, application, analysis, synthesis and evaluation.

### Metacognition

Metacognition is defined as:

one's knowledge concerning one's own cognitive processes and products or anything related to them, e.g. learning relevant properties of information data. Metacognition refers among other things to be the active monitoring and consequent regulation and orchestration of these processes in relation to the cognitive objects on which they bear, usually in some concrete goals and objectives. Metacognitive skills are not as new as they appear. Checking results or solution against certain criteria or goals to determine the effectiveness of an activity is metacognition. Self-questioning during problem solving is an important skill to develop which can find itself applicable to daily living or in school (Flavell, 1978).

Metacognition demands the ability to introspect about one's performance and to differentiate one's perspective from that of other

related areas of study, thus social cognition, role-taking, and communication become directly relevant (Brown & Palincsar, 1981).

### Writing

In writing, the writer is not merely turning out sentences, rather rapidly generating ideas, making associations, throwing up trial sentences, evaluating, diagnosing and guiding the process of writing (Flower & Hayes, 1985).

Collins and Genter (1980) view writing as a process of generating and editing text within a variety of constraint. These constraints are reported to come from three sources: structure (what are good sentence forms, paragraph forms), content (what ideas are to be expressed and how they are related), and purpose (what are the goals of the writer and what is his or her model of the reader).

Emig (1971) characterized writing as an artificial process, a technological device wherein results are in visible graphic product. With writing, the audience is usually absent; however, because there is a product involved, writing tends to be a more responsible and committed act.

In sum, writing is the stage in which thought is transformed into print. It is an act of discovery since only as we write what we think can we grasp what we want to truly communicate (Olson, 1985).

The present study was designed to focus mainly on the variations in achievement over time when the reciprocal teaching method was used. It was expected that the percent of agreement across baseline, training, and use phases of the reciprocal teaching group would be significantly different over time. It was further anticipated that

measures of critical thinking and problem solving skills would be significantly different between experimental and control groups. In addition, it was expected that teacher-student ratings of writing, spelling ability, and vocabulary would be qualitatively different across groups.

In the present study, 48 sixth grade students enrolled in an elementary school in Gary, Indiana, were tested in the above mentioned measures.

The following specific research questions were addressed in this study: Is there a difference in the percent of agreement across baseline, training, and use phases of the investigation in the reciprocal teaching group? Do measures of critical thinking and problem solving skills differ between experimental group (reciprocally taught class) and control group (traditionally taught class)? Is there a qualitative difference in teacher-student ratings of writing, spelling ability, and vocabulary of verbal and written expression across groups?

#### Limitations of the Study

The study sample was not randomly selected; however, assignments to the two sixth grade classes and to small groups in the experimental class followed a random sampling procedure.

The teacher participant was recommended by the principal because she is a model teacher in the school. She was also highly motivated following a successful and satisfying experience during the pilot study in spring, 1987. She cannot be assumed to be a typical teacher.

This study was limited to selected critical thinking and problem

solving skills measured by the standardized tests used for this investigation.

The expectations on written language are to comply with the goals and objectives outlined in the curriculum of the school system in which the investigation was done.

This study is limited to sixth grade students in the urban school where the study was undertaken. Any attempt to apply the findings to all sixth grade students would be an error of overgeneralization. Certain aspects of this study may have far reaching application; however, conclusions are limited to those supported by the actual data.

## CHAPTER II

### REVIEW OF RELATED LITERATURE

This chapter consists of a review of the literature related to reciprocal teaching applying the Vygotskian concept to instruction, the writing-composing process and studies related to writing instruction.

#### Vygotskian Concept to Instruction

Reciprocal teaching applies the theoretical concepts of the Russian psychologist, Lev Vygotsky who theorizes:

Learning awakens a variety of internal developmental processes that are able to operate only when the child is interacting and conferring with the people in his environment. Children can imitate a variety of actions that go well beyond the limits of their own capabilities. Using imitation, children can create/mimic a variety of actions that go well beyond the limits of their own capabilities. Thus children are capable of doing more in collective activities under the guidance of adults (Vygotsky, 1978).

Vygotsky emphasized the role of expert who leads social interactions which have a central place in learning. These interactions provide a push for cognitive growth. Social interaction is the process through which cognitive skills are introduced (Day, 1983). Vygotsky's account of social interactions and mental processes is heavily dependent on the forms of mediation, such as language, involved. Furthermore, he believed that experts mediate the environment for children, serve as models and monitor the state of student's understanding. Through these interactions, children's



knowledge and skills of their culture are developed and organized and new ways of responding to people and materials around these children are acquired. Development occurs only when the child is able to independently carry out the learning task. Vygotsky termed this construct internalization; inter becomes intra (Wertsch, 1985).

Children have different capabilities to learn under the guidance of the teacher. There are differences among children with equal level of development also differences among those of the same age. The difference lies in the zone of proximal development (Vygotsky, 1978), which is the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers. Wertsch (1985) referred to the following as factors that would foster the transition between these two stages:

1. Cognitive readiness on the part of the child;
2. Willingness on the part of the adult expert to transfer responsibility to the child;
3. Reflective assessment to inform the child of the significance of his behavior; and
4. Explicitness of the adult's directions.

Briefly, Vygotsky's view on learning emphasized that skills and knowledge are acquired through social interactions, teachers can become expert models for students by guiding and monitoring their activities until internalization is completed, and development takes place when a student can perform task independently.

### Instructional Programs Applying the Vygotskian Concept

Although not explicitly stated, several instructional programs appeared to be based on the Vygotskian perspective. They have been developed to improve learning skills in the areas of reading, writing, critical thinking and problem solving.

Feuerstein (1969) asserted that cognitive growth is the result of incidental and mediated learning. He wrote, "Mediated learning is the training given to the human organism by an experienced adult who frames, selects, focuses, and feeds back environmental experience in such a way as to create appropriate learning sets." Feuerstein developed two assessment programs: the Learning Potential Assessment Device (LPAD) and the Instrumental Enrichment (IE) Interaction Program to demonstrate his concept of mediated learning. Reports showed dramatic improvement of student performance resulting from interaction with an adult who guided problem solving activity but allowed the student to structure and regulate activities of his/her own. He pointed out that the reason for the poor performance of many disadvantaged adolescents is the lack of consistent mediated learning.

The Cognitive Research Trust (CORT) Thinking Program by DeBono (1976), emphasized Vygotskian concept of deliberate and explicit teaching and expert mediation to foster effective thinking. He believes that many effective thinkers are wasted by current educational practices because thinking skills are not taught directly in the usual classroom. His experiences using the program led him to conclude that given an opportunity, children who are considered academically backward may emerge as effective thinkers. Venezuela has

become the first country in the world to include the teaching of thinking skills using the CORT Thinking Program. It was adapted for local use by Dr. Margaretta Sanchez. The pilot test of the program was so successful that the Venezuelan Minister of Education decided to introduce the program into all the elementary schools throughout the country in grades 4, 5, and 6. Elsewhere in the world, the CORT Program had been used for over eight years by more than 5,000 schools in England, Scotland, Wales, Eire, Australia, New Zealand, Canada, Spain, Malta, and Nigeria.

The CORT approach puts heavy emphasis on the teacher. The lesson starts with the teacher explaining very simply and briefly its theme or purpose. This is often done through the use of an example taken from the lesson notes. The main purpose of the lesson is made by clear illustrations rather than by explanation. Practice is the most important aspect of the program and can be supplemented by the teacher. Discussion and feedback are major components in which the teacher discusses with the pupils to give attention to the process being taught. Pupils may be given individual writing assignments that require use of one or more tools taught in the CORT lessons.

Another instructional program illustrating the Vygotskian concept of explicit instruction to develop specific reading/learning strategies to comprehend text is the Chicago Mastery Reading Program with Learning Strategies. The 1980 version of the Reading Comprehension and Study Skills strands for Grades 5 and 6 is part of the Chicago Mastery Learning Reading Program with Learning Strategies. It is intended to improve the ability of students in Grades 5-8 to

comprehend text through mastery of specific reading/learning strategies. The immediate objective of the program was to improve scores on criterion-referenced tests based on 131 key objectives defined by the Chicago school system. The first activity in each unit was teacher directed and she explains the concepts and strategies to be learned. This was followed by one or more self-instructional activities that further develop these concepts and strategies. The exercises were usually prompted to remind students of the strategies. Prompts are gradually faded as students become more proficient. Prompts take the form of instructions to "think something" or "ask yourself something." Campione and Armbuster (1985) made this observation about the program: "A major concern of the program is to guide students in the thinking steps involved in applying new concepts and executing new strategies. Variation across units teach more by offering examples of concepts and strategies students should follow in executing these strategies on their own."

Admittedly, the evaluation of the program was difficult because it was implemented on a large scale. There were serious problems in data collection.

Bereiter and Scardamalia (1981) applied the Vygotskian concept of learning through social interactions to improve writing ability. Both designed a successful training study on writing to explore the transition process from a language production dependent on a conversational partner to a system capable of functioning autonomously. It was an investigation into the development of composition using discourse most profoundly dependent on interaction

with a conversation partner. The process known as Procedural Facilitative Intervention is directed on children's writing and focused on particular mental operation. Procedural facilitation reduces the executive demands of a task and permits learners to make fuller use of the knowledge and skills they already possess. It is a mild form of instructional intervention that does not teach anything. It does not force the learner to adopt new strategies or abandon old ones. It simply makes it easier for learners to make maximum use of their high-level knowledge and skills in task situations where executive burden is normally so great that it inhibits their use. By having a teacher perform that part of the task that the children have failed, such as the executive control of memory search, tapping available schema or memory store, a successful composition can develop. The learner "does it all" as far as the central information processing tasks are concerned. Several conclusions from the results point out the overall relevance of these interventions. First, children seized on every procedural facilitation offered, claiming that it helped whether there was tangible evidence. This suggests that the executive demands of composition are quite high. Second, children frequently claimed that the procedure helped them to do something they could normally manage in writing, such as evaluating and revising or planning. This suggests that children at least have intimation of goals and problems in writing lying beyond those they normally pursue. Third, children respond to the interventions as giving them power. Children who have been trained in the use of discourse elements have become boastful about their ability to plan

anything. Depending on the treatment, the children started to concern themselves with evaluation, with conscious choice of the discourse elements or plot structures.

All the instructional programs mentioned earlier have shown the incorporation of aspects in the Vygotskian perspective on learning. Reciprocal teaching has demonstrated a more comprehensive application of Vygotsky's view on learning and his theory on the zone of proximal development. Its successful implementation has been appropriately documented.

### Reciprocal Teaching

Three components of successful cognitive skills training programs have been reported by Brown, Palincsar, and Armbuster (1984). These are:

1. Skills training - Practice in the use of appropriate skills;
2. Self-control training - Direct instruction in how to monitor effective use of skill;
3. Awareness training - Information dissemination concerning reasons why strategies improve skill and where strategies improve skill and where strategies should be used.

Brown and Palincsar (1982; 1986) conducted three studies to test the effectiveness of reciprocal teaching as a means of instructing seventh grade poor readers about the activities they could use to increase comprehension and to ascertain that their comprehension was proceeding smoothly. Reciprocal teaching includes three main components:

1. expert scaffolding;

2. guided practice in applying concrete strategies;
3. cooperative learning discussions.

Scaffolding represents a "process wherein a child or a novice solve a problem, carry out a task or achieve a goal which would be beyond his unassisted efforts" (Wood, Bruner, & Ross, 1976). The selection of a learning task for the purpose of teaching an emerging skill in the learner is the first task in scaffolded instruction (Applebee & Langer, 1983). This task must be evaluated to determine the difficulty that it will present to the learner. The teacher makes a decision to produce a much simpler task to ensure successful achievement (Bruner, 1978; Wood, 1976). Modelling, questioning, and explanation are used to make the task explicit and render appropriate approaches to the task on hand (Applebee & Langer, 1983). Critical to the teaching-learning process is the role of dialogue, a situation wherein the learner and the teacher are in a supportive conversation. Brown and Palincsar (1981), Wertsch (1980) gave support to the role of the dialogue after observing children engaged in problem solving: "They display the kind of behaviors that are characteristics of dialogue, posing and responding to their questions, essentially internalizing the dialogue they have experienced in the initial stages of problem solving when they are collaborating with a more expert individual."

Reciprocal teaching involves having teacher and students take turns leading dialogues focusing on text features. The activities include: (a) clarifying the purposes of reading, i.e. understanding the task demands, both explicit and implicit; (b) activating relevant

background knowledge; (c) allocating attention so that concentration can be focused on the major content at the expense of trivia; (d) critical evaluation of content for internal consistency and compatibility with prior knowledge and common sense; (e) monitoring ongoing activities to see if comprehension is occurring, by engaging in such activities as periodic review and self-interrogation; and (f) drawing and testing inferences of many kinds, including interpretations, predictions, and conclusions. In the series of studies, the investigators concentrated on four, commonly accepted, comprehension-enhancing activities: summarizing, questioning, clarifying, and predicting. In the first study, four seventh grade students were selected and individual teaching was conducted. The reciprocal method was compared to a traditional teaching method. In the second study the investigator worked with groups of two students again on a "pull-out" basis. In the third study volunteer reading teachers attempted to implement the intervention in their existing reading groups. The sequence of phases include baseline (six-eight days), reciprocal teaching (ten days), and maintenance (six days).

These series of studies were considered successful for several reasons. First, the effect was large and reliable. Of the ten subjects included in Studies 1 and 2, nine students improved to the level set by good comprehenders and all subjects in Study 3 met this level. Second, the effect was durable. Maintenance probes showed no drop in the level of performance for up to an eight week period (Studies 2 and 3). Although there was a decline after six months (level dropping 70-80% to 50-60%), only one session with the



reciprocal teaching procedure was sufficient to raise performance back to the short term maintenance level (Study 1). Third, the effect generalized to the classroom setting. Of the ten students taking part in Studies 1 and 2, nine showed a clear pattern of improvement, averaging a 36 percentile increase, thus bringing them up to at least the average level for their age. Other interesting results from this method include a qualitative change in the students' questions, summaries, and dialogues. Classroom teachers even reported that they had fewer disruptive behavior problems.

In an attempt to illustrate a Vygotskian perspective, a reciprocal study (Morgan, 1987), was designed and carried out to exemplify many of the issues being studied today on self-monitoring and cognitive strategies learning. A field experiment was conducted with 145 graduate students enrolled in seven personality assessment courses at a large, private urban university. One group of students received reciprocal teaching instruction while a second group received only traditional content instruction. The traditionally taught courses dealt with theory, administration of non-projective and projective personality tests. The first half of the course was devoted to lecture and the second half consisted of a group practicum format. All students were required to successfully complete a midterm examination based upon lecture and reading materials. During the second half of the semester, students were exposed as a group to fifteen formal presentations using model case study evaluations provided by the instructor. These formalized presentations were followed by open and informal class discussions. In addition, during

the second half of the semester, all students were required to individually administer and interpret three personality assessment case studies. During the initial reciprocal teaching class sessions (baseline sessions), students individually read case studies and answered questions about them. Diagnostic feedback was provided to each student immediately upon completion of each assignment. Following the reciprocal teaching baseline sessions, the students were divided into small groups. With an expert model each group engaged in the process called "reciprocal teaching." The students took turns posing questions, evaluating, and summarizing the case they read. Other members in the group commented on the quality of the evaluations and were encouraged to assist in the formation of better assessment questions and/or summaries. These reciprocal teaching sessions were conducted in a small group practicum format for several weeks. Results indicated that there was improvement from the beginning of the personality assessment courses until the end in student ability to arrive at an accurate and defensible psychodiagnostic evaluation as a result of reciprocal teaching instruction. In addition those students in the reciprocal teaching groups were rated as more professionally competent in the assessment of personality by intern supervisors and university personnel than those in the traditionally taught groups.

For the purpose of this present study, Morgan's instructional techniques on reciprocal teaching was used. (See Appendix A for Morgan's Instructional Model.)

#### Summary

Vygotsky believed that skills and knowledge are acquired through

social interactions. Teachers can assume the role of expert models for students by guiding and monitoring their activities until internalization is completed. Development takes place when a student can independently perform a task. This Vygotskian perspective on learning is now exemplified in several self-monitoring and cognitive strategies learning programs. The most comprehensive application of Vygotsky's theory of the zone of proximal development and his concept of learning is reciprocal teaching.

#### The Writing-Composing Process

The earliest study of the composing process was conducted in 1946 when John Bruggen investigated the rate of flow of words during composing of 84 junior high students. He devised an elaborate system of "hardware" that consisted of a kymotgraph, rollers, motor-driven punch, magnetic coils, a disk with wires, springs, magnetic coils and a copper stylus. This hardware was necessary to record the activities of an examiner who sat behind a one-way screen and simulated each of the 84 subjects' writing bursts and pauses.

VanBruggen found that "good" writers, as measured by scores on standardized tests spent more time in long pauses; less competent writers paused for briefer intervals. Additionally, good writers often paused before they wrote whole segments of text, while poor writers frequently paused before sentence- and word-level tasks. He also discovered that students who had mastered the mechanics of writing wrote a rapid rate between pauses; students who had not mastered these skills wrote more slowly.

The beginning of laboratory case studies on the composing process

of the writer can be traced to the works of Janet Emig (1971). She studied the composing processes of eight high school seniors who were selected by their teachers as good writers. The students met with the investigator four times and each time were requested to compose orally while composing on paper. Emig observed them during their writing and also interviewed these students. Results of her study focused on the behaviors of the writers bringing interests in the cognitive processes of the writers.

Over the next decade following Emig's (1971) research, there was a rush of studies emphasizing the essentially heuristic, problem solving strategies useful in successful writing. The complexities of data gathering and the analysis of data limited investigations to include twenty subjects ranging from elementary students, junior and senior high school students, college students, and experienced adults. Writers were allowed to select a topic ahead of time and encouraged to rehearse and plan (Emig, 1971; Matsushashi, 1981; Sommers, 1980) or assigned topics so they were not able to prepare (e.g. Flower & Hayes, 1981; Gould, 1980). Observations were done with subjects within the researcher's view or through a one-way screen. In other studies researchers observed outside of the room with videotape monitor. Writers' behaviors during composing process showed such activities as energetic spurts of writing or revising (Emig, 1971; Matsushashi, 1981; Perl, 1979). Other behaviors frequently investigated are the time spent in pausing during the process of composing (Gould, 1980; Matsushashi, 1981) and time spent in reading and revising (Glassmer, 1980; Matsushashi, 1981). Immediately after, subjects were

interviewed. They were asked about their writing activities and attitudes toward writing (Emig, 1971; Pianko, 1979).

A study by Flower and Hayes (1981) showed that protocol analysis can be used to identify processes in writing. The use of protocol analysis had been developed by cognitive psychologists as a powerful tool for the identification of psychological processes in problem solving tasks (Newell & Simon, 1972). A protocol is a description of activities, ordered in time, which a subject engages in while performing a task. The description of task performance does not include every task. A typical protocol from a one-hour session includes four-five pages of a writer's notes and text as well as a fifteen-page manuscript typed from the tape recording. A major contribution of Perl (1979) to the Flower and Hayes study (1981) is an elaborate coding system for protocol analysis. The system divides writer's behaviors into sixteen major categories and fifteen subcategories. The coding system is complemented by Perl's numbering system for a time line which allows her to measure the time of each writing behavior.

#### Summary

The description of the composing/writing process mirrors the thinking process. The information obtained from research describes the behaviors of writers as they engage in writing or composing. The review does not include studies of development, studies of the effects of instructional techniques or studies that deal with writing environment. Planning, translating, reviewing, and revising are subprocesses that occur without definite time limits during the

writing/composing process. A writer is constantly intermixing these subprocesses while writing. Current research indicates that the writing/composing process is recursive, not linear, as described by earlier theories. Also, it indicates that there is a difference in behaviors between successful and unsuccessful writers. Successful writers spend much of their composing time in the planning process and they plan at a higher level. Furthermore, successful writers do not consciously attend much to the surface levels of their text as they compose. The attention of successful writers is focused on the global aspects of their text.

#### Writing Instruction

The University of California, Berkeley, Bay Area Writing Project Collaborative Research Study 2, 1980, addressed the issue of providing students with ongoing practice in sustained thinking and writing. The assumption behind this writing program is that most students have not been trained to show what they mean. Training means performing daily mental warm-up, short and rigorous training routines. Rebekah Caplan (1980), a teacher in reading and composition in suburban middle school in California, built into her curriculum a training program for student writers which attempted to engrain craft in writing. Craft is defined as the ability to make use of specific details, automatically, habitually, through regular and rigorous practice. The coordinating features were:

1. Daily practice expanding a general statement into a paragraph.
2. Applying the difference between telling and showing in the

editing process.

3. Practicing specific ways to select and arrange concrete details in developing an idea or structuring an essay.

Catherine Keech (1980) conducted an experimental study of Caplan's (1980) training program for student writers in three advanced composition classes over twelve weeks of instruction.

Keech found that in general, the greater use of concrete details tended to be associated with better holistic scores for individual students. A qualitative examination of the argument essays revealed that the presence of supporting details was an important characteristic in distinguishing upper-half from lower half papers on the holistic scoring range. Further examination of papers in the argument mode showed that while concrete details were typical of better papers and noticeably lacking from most poorer papers, this pattern was broken in most cases. Sustained and competent use of abstractions adequately compensated for the absence of supporting concrete details. In other cases, it was clear that the use of many concrete details did not adequately compensate for the absence of meaningful abstractions or for other weaknesses in writing. No consistent pattern of improvement of holistic scores or increase in use of specifics could be observed across three experimental classes as compared to the three control groups. They attributed the findings to differences in use of materials, procedures used in testing and possibly critical differences in the initial ability of students of the three participating teachers.

Anderson, Bereiter, and Smart (1980) did a study on the

activation of semantic networks in writing. As an alternative to traditional pre-writing activities, an instructional procedure was devised in preparation for writing. Students learned to compose lists of potentially usable words and to build compositions around them. Compared to controls on a posttest composition, sixth grade experimental subjects produced twice as many words, almost three times as many uncommon words, more ideas, and more elaborated ideas. These gains were made without loss on global impressionistic ratings.

In a study of intensive vocabulary instruction as a prewriting technique, Duin and Graves (1987) used three methods to teach vocabulary to students prior to having them write an expository essay: intensive vocabulary and writing instruction, intensive vocabulary instruction alone, and traditional vocabulary instruction. Subjects for the study were eighty seventh grade students who were taught thirteen words over six days. Dependent measure included vocabulary knowledge as measured by multiple choice pre- and posttests, the number of target words used in pre- and posttest essays, quality of writing on the pre- and posttest essays as measured by two types of writing scales and attitudes as reported on attitude inventories. The vocabulary and writing group outperformed the two groups, and the vocabulary group consistently outperformed the traditional vocabulary group. The implication is that teaching a related set of words to students before they write an essay in which the words might be used can improve the quality of the essay.

Scardamalia and Baird (1980) conducted research on children's strategies for composing sentences. Three studies are reported, each



involving approximately thirty children at each of two age levels (eight-nine and ten-eleven years). Children were given the task of writing successively more interesting sentences. Their difficulties centered around inability to find reader-based contexts for their topics and limited syntactical fluency. The performances of younger subjects improved significantly under conditions of heightened reader awareness, but this same conditions interfered with the performance of the older subjects. In contrast, forcing older subjects to refocus on ideas improved significantly the performance of these subjects, but interfered with the performance of younger subjects.

Scardamalia, Bereiter, and Woodruff (1979) did a study on the effects of content knowledge on writing. Sixty elementary school children wrote compositions on two self-devised topics, one about which they claimed to know a great deal and one about which they claimed to know little. Exhaustive analysis and other dependent variables failed to reveal any significant difference due to familiarity of topic. Neither were there differences in quality of plans or in pupils' self-estimation of quality. Familiarity did result in naming more items of content to include or exclude. Although the knowledge base is obviously vital in writing, these findings indicate that the quality of children's writing is more determined by other cognitive components.

Bereiter, Scardamalia, Anderson, and Smart (1980) did a study in teaching abstract planning in writing, an attempt to find a way to enable children to draw upon their latent knowledge of discourse grammar in the on-line planning of written compositions that was

top-down, in the sense that it required making choices first at a higher level than was customary and then applying them at a lower level. In writing each sentence in a composition the student is first to decide what text element it is to represent, that is, what kind of sentence in a rhetorical sense it is to be, then they compose the actual sentence instead of trying to plan the sentence directly. Two intact grade six classes in a middle income suburban public school constituted the experimental and control groups. There were 26 subjects in each class. Training for the experimental class consisted of thirteen 75-minute sessions conducted by the two authors, Anderson and Smart who also prepared the curriculum materials. Four genres were covered: description (three sessions), instruction (three sessions), argument or opinion (three sessions), and narrative (four sessions). The typical training sequence consisted of first introducing the basic set of planning elements for a genre, discussing their meaning, practicing discrimination and production of individual elements and then using the set of planning elements in writing composition. Using the planning element consisted of choosing a planning element, listing it, then writing a sentence following the selected plan element, choosing and listing a next element, writing the next sentence in the composition and so on. Basic elements were those commonly found in children's compositions. "High level" were those characteristic of more sophisticated writing. For example, for the opinion essay, the basic elements included "give an opinion," "give a reason for an opinion," and "tell more about the reason", and "give opposite opinion." High level planning elements included such

things as "give a personal or real life example" and "tell how the idea you have given is a little bit wrong; give an exception."

Both experimental and control groups were given a pretest in which they were asked to describe their favorite TV show and a posttest in which they were asked to describe another TV show that they like. The most direct measure of possible experimental effects is in the number and kind of text elements actually used in their compositions. The experimental group significantly exceeded the control group both in the number of text elements produced and the number of different text elements used. The main difference appears to be in the use of text elements which take into account opposing and qualifying arguments.

Paris and Scardamalia (1980) conducted a research on discourse schemata as knowledge and as regulators of text production. Children in grades four and six ( $N = 30$  in each group) arranged text grammar elements as they thought would do in writing an argument composition and also composed arguments following prescribed conventional and unconventional arrangement of text elements reflected the order actually found in children's compositions. Children had greater difficulty writing to the unconventional arrangement, as evidenced by latencies, deviations from plan and global ratings of success in following the plans. These results support the idea that discourse schemata have psychological reality and are not merely emergents of lower level processes.

A study to examine children's ability to integrate information when they write was conducted by Bracewell and Scardamalia (1979).

This research examined the extent to which children integrate information in material that they read. The skill examined is closely related to Hirsch's (1977) semantic integration - the coordination of meaning that forms the basis of readable prose. Children were instructed to write best coordinated and worst coordinated sentences just like those they had read in a previous task. Thirty-two students in each of grades two, four, and six were tested. Each child did the reading task before the writing task so that the materials and procedure of the reading task could act as the model for writing. The major finding was an interaction of instruction with task for grades four and six students thus supporting the hypothesis. A similar pattern was not found for grade two students. The integration level of items on both reading and writing tasks was at an intermediate level.

#### Summary

Students can learn to write what they mean if they are taught to do so. By training it meant purposeful teaching, modeling, and regular as well as rigorous practice.

Summarizing results of studies in writing instruction:

1. Well-designed training programs with well-defined instructions will improve performance.

2. Scaffolding for the development of emerging skills in vocabulary development, composing sentences and essays is necessary.

Task analysis is an extremely important aspect in the training program.

3. Self-monitoring and generalization of learned skills are most

helpful to learning.

### Recapitulation

In the selective review of literature presented in this chapter, an attempt was made to highlight the Vygotskian perspective on learning and to summarize some of the self-monitoring and cognitive strategies learning programs in which this Vygotskian concept has been exemplified.

Several other programs manifest the essence of Vygotsky's theory of learning and the zone of proximal development. These are Feuerstein's assessment programs, Learning Potential Assessment Device (LPAD) and the Instrumental Enrichment (IE) Interaction Program; DeBono's Cognitive Research Trust (CORT) Thinking Program and the 1980 version of the Chicago Mastery Learning Reading Program with Learning Strategies.

Reciprocal teaching has been appropriately documented to have a more comprehensive focus on the Vygotskian perspective on learning and the theory of the zone of proximal development. The emphasis on social interactions for cooperative learning and interpersonal relations has been systematically explored. Results of the research studies mentioned in this chapter utilizing reciprocal teaching indicate improved reading comprehension-fostering and comprehension-monitoring skills, improvement in the students' ability to arrive at an accurate and defensible psychodiagnostic evaluation, and development of high-level compositions using discourse most profoundly dependent on interaction with a conversation partner.

Research studies on the composing-writing process report the

description of behaviors of writers as they engage in writing. The description mirrors the thinking process and showed the difference in behaviors between successful writers and unsuccessful writers.

Planning, translating, reviewing, and revising are subprocesses that occur without definite time during the writing-composing process and a writer is constantly intermixing these subprocesses while writing.

Results of the research studies in writing instruction firmly demonstrate the importance of purposeful teaching, modeling, and regular and rigorous practice in training students to learn to write. In sum, the results of the studies are: well-designed training programs with well-defined instruction will improve performance; scaffolding and task analysis are extremely important aspects in the training program; self-monitoring and generalization of learned skills are most helpful in learning to write.

## CHAPTER III

### METHOD

This chapter includes hypotheses to be tested, the subjects for the study, a discussion of the procedure used for the investigation, a description of the testing instruments used, and the design and statistical analysis used.

#### Hypotheses

The following null hypotheses were tested:

1. There is no statistical difference in percent of agreement scores across baseline, training, and use phases of the investigation for the reciprocal teaching group.
2. There is no statistical difference in measures of critical thinking and problem solving skills between the experimental group (reciprocally taught class) and the control group (traditionally taught class).
3. There is no statistical difference in qualitative teacher-student ratings of writing, spelling ability and vocabulary for verbal and written expression across groups.

#### Subjects

Forty-eight black students enrolled in two sixth grade classes at a public elementary school in Gary, Indiana served as the subjects for this investigation. These two intact classes were used as the experimental group (reciprocally taught class) and control groups

(traditionally taught class). There were twenty-four students in each group ranging between eleven and twelve years of age. The demographic characteristics of the students in both groups appeared to be homogeneous with respect to such variables as socioeconomic status and school attendance. The students were randomly assigned to class by the principal of the school.

Table 1

A Comparative Summary of Subjects' Age and Gender Across Groups

<u>Experimental Group</u>			
Subjects	11 years old	12 years old	Total
Male	5	1	6
Female	10	8	18
Total	15	9	24
<u>Control Group</u>			
Subjects	11 years old	12 years old	Total
Male	6	4	10
Female	7	7	14
Total	13	11	24

There were sixteen male students, six in the experimental (reciprocally taught group) and ten in the control group (traditionally taught group). There were thirty-two female students, eighteen in the experimental group and fourteen in the control group. Examination of the contents of Table 1 indicates that across the two



groups appear homogeneous with respect to age and gender.

The socioeconomic status of each subject in the study was based on the occupations of both parents classified according to the Minnesota Scale for Paternal Occupations (see The Minnesota Scale for Paternal Occupations n.d. in Loban, 1976, pp. 137-138). The major socioeconomic categories comprising the Minnesota Scale consist of the following descriptors: I. Professional; II. Semiprofessional and managerial; III. Clerical skilled trades and retail business; IV. Reserved for all farmers; V. Semiskilled occupations, minor clerical positions and minor business; VI. Slightly skilled trades and other occupations requiring little training or ability; VII. Day laborers of all classes (and families whose sole livelihood was public assistance).

In Table 2, the letter F stands for father's occupation and the letter M stands for mother's occupation. In the experimental group twelve parents are professionals, twenty-one were semiprofessional and/or managerial, two worked in the clerical skilled trades, five worked in semiskilled occupations, and eight worked in the slightly skilled trades. The control group consisted of eight parents who were professionals, twenty who were semiprofessional and/or managerial, thirteen who worked semiskilled occupations, and seven who worked in slightly skilled trades. Based on the information appearing in Table 2, the distribution of the socioeconomic status of the subjects used in the investigation appeared to be similar across groups.

Table 2

A Comparative Summary of Subjects' Socioeconomic Status and Gender  
Across Groups

		<u>Experimental Group</u>															
Subjects		I		II		III		IV		V		VI		VII		Total	
		F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Male		4	2	1	3					1						6	5
Female		2	4	11	6	2				4		1	7			18	19
Total		6	6	12	9	2				5		1	7			24	24

		<u>Control Group</u>															
Subjects		I		II		III		IV		V		VI		VII		Total	
		F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M
Male		2	3	3	4					6	3	4	1			15	11
Female		1	2	6	7					1	3	1	1			9	13
Total		3	5	9	11					7	6	5	2			24	24

Procedure

Pilot Study

A pilot study was conducted in May-June, 1987. The pilot study was conducted in the same school used in the actual investigation with the same teacher, but with another group of sixth grade students. The purposes of the pilot project were the following:

1. To train teacher participant through modeling by the investigator of the reciprocal teaching method of instruction.
2. To assess the readability of the standardized test, Cornell Critical Thinking Test Form X and Test of Problem Solving used to

measure critical thinking and problem solving skills.

3. To test readability, comprehension, and applicability of the passages used in the investigation.

4. To test readability, reliability, comprehension, and applicability of the Reciprocal Teaching Holistic Evaluation Form developed by the investigator to be used in the reciprocal teaching group.

5. To determine if the eight-week time period was sufficient for the treatment intervention trials.

Results of the Pilot Study. There was only one intact sixth grade class in the pilot study. The thirty students in the class were divided into three groups: control group (traditionally taught group - ten students), locating information group (ten students), and reciprocal teaching group (ten students). All participants were administered the Cornell Critical Thinking Test Form X and Test of Problem Solving. The original plan was that these pretest and posttest scores would serve as the dependent measures for selected critical thinking and problem solving skills. However, due to time constraints during the pilot trials, only the pretest scores were obtained. During the pilot trials, most of the time was spent on validating the Reciprocal Teaching Holistic Evaluation Form and training reciprocal teaching strategies to the teacher participant.

A comparative summary of frequencies of agreement scores across baseline and training conditions for the reciprocal teaching group is presented in Table 3. This is followed by a summary of frequencies of agreement scores across training and use conditions in Table 4. The

McNemar Test for Significance of Changes, chi square and contingency coefficient values were used to test for changes in percent of agreement scores across baseline, training, and use conditions.

Table 3

A Comparative Summary of Frequencies of Agreement Scores Across Baseline and Training Conditions

		Training Session		
		-	+	
Baseline Session	+	0	0	Chi square = 5.14 (1,N = 10) = 3.84 p = .05
	-	3	7	

Table 3 shows the results of the agreement on the reciprocal teaching holistic evaluation form during the baseline and training sessions for the reciprocal group. At the beginning of the reciprocal training session (baseline session), the percent of agreement was 00 increasing to 70 at the end of the training session. The Chi square value was found to be 5.14 and significant at .05 level. The finding indicates that there is a significant difference in percent of agreement across baseline and training conditions.

Table 4

A Comparative Summary of Frequencies of Agreement Scores Across  
Training Conditions and Use Conditions

		Use Session		
		-	+	
Training Session	+	0	0	Chi square = 6.13 (1, N = 10) = 3.84 p = .05
	-	2	8	

Table 4 shows the results of the agreement on the reciprocal teaching holistic evaluation form during the training and use sessions for the reciprocal group. At the beginning of the reciprocal training session the percent of agreement was 70 increasing to 80 at the end of the use session. The Chi square value was found to be 6.13 and significant at .05 level. The finding indicates that there is a significant difference in percent of agreement across training and use conditions.

Table 5

A Comparative Summary of Frequencies of Agreement Scores Across  
Baseline and Use Conditions

		Use Session		
		-	+	
Baseline	+	0	0	Chi square = 6.13 (1,N = 10) = 3.84 p > .05
Session	-	2	8	

Table 5 shows the results of the agreement on the reciprocal teaching holistic evaluation form during the baseline and use sessions for the reciprocal group. At the beginning of the reciprocal baseline session the percent of agreement scores was 00, increasing to 80 at the end of the use session. The Chi square value was found to be 6.13 and significant at .05 level. The finding indicates that there is a significant difference in percent of agreement across baseline and use conditions.

Description of the Language Arts Class for the Traditionally Taught Group

The traditionally taught language arts class emphasized a curriculum based on the textbook. Class time was devoted to direct instruction of the unit lessons included in the textbook (refer to Table 6 for comparison of the required work and actual amount of work completed). During the first four weeks of the session, the following

lessons and activities were included:

Unit Lessons

1. Lesson One: Understanding Kinds of Sentences (5-7 school days)

Part II: Spelling  
Section I: Short Vowel  
Sounds

2. Lesson Two: Understanding Complete Subjects and Predicates

Part II: Spelling  
Section II: Long Vowel  
Sounds

3. Lesson 3: Understanding Simple Subjects and Predicates

Part II: Spelling  
Section III: More Long

Activities

Practice Exercises

1. Copying 10 sentences and adding capital letters and punctuation marks.
2. Completing 10 sentences by adding words of their own and identifying the kind of sentence
3. Application - Writing ten sentences about another country they have studied: 2 for each kinds of sentences and additional 2 of any choice.

20 spelling words  
(Pretest-Teach-Retest-Reteach-Mastery Test)

1. 10 sentences-Recognizing complete subjects and complete predicates by underlining
2. 10 short phrases - Students write complete sentences for them
3. Application - write ten sentences about someone they know.

20 spelling words (Pretest-etc.)

1. 10 sentences - Copy sentences and underline simple subject and simple predicate
2. 10 sentences - Completing sentences by adding simple subject and simple predicate
3. Application - Write 12 sentences about a puzzle or a game

20 spelling words (Pretest-Teach etc.)

## Vowel Spellings

4. Lesson 4: Identifying the Subjects of Sentences
1. 10 sentences - Copy the ten sentences and write (you) after each sentence in which the subject is (you) understood.
  2. 10 sentences - Copy ten sentences and add the proper punctuation. Underline each subject and write (you) after each sentence in which the subject is you (understood).
  3. Application - Write five interrogative and five imperative sentences about autumn. Underline the subject and write the word (you) after each sentence that has an understood subject.

Part II: Spelling  
Section IV: Plurals

20 spelling words (Pretest-Teach-etc.)

During the second half of the eight week period, students in the traditionally taught class were exposed as a group to ten formal presentations using model passages provided by the instructor. These formalized presentations were followed by open and informal class discussions on sentence construction, paragraph writing, and the spelling of words (refer to Table 7 for classroom setting and instructional format). In addition, the students were administered two standardized tests (the Cornell Critical Thinking Test and the Test of Problem Solving) to obtain pretest scores on selected critical thinking and problem solving skills. During the second half of this eight-week period, all students were required to write three compositions on topics they listed as being of special interest to them. During the two-week maintenance phase, the students were also asked to write five more passages on topics they had chosen from the



list. All these passages were systematically graded by the teacher.

After the eight-week period, the students were again administered the two standardized tests (the Cornell Critical Thinking Test and the Test of Problem Solving) to obtain posttest scores on selected critical thinking and problem solving skills.

#### Description of the Language Arts Instructional Program for the Reciprocally Taught Group

Students in the reciprocally taught group were given also instruction related to grammar, spelling, and composition. The same teacher taught both groups using the same instructional goals with the exception of the application of the reciprocal teaching format used during the eight-week period. Prior to the beginning of the instruction, the students were administered two standardized tests, the Cornell Critical Thinking Test Form X and the Test of Problem Solving, to obtain pretest information on critical thinking and problem solving skills.

During the experimental phases of the investigation, the students participated in a series of highly structured exercises (refer to Table 6 for required work and actual amount of work completed) designed to provide students with relevant experiences related to the writing process (i.e. planning, translating, and reviewing which consisted of reading and editing). The analysis of writing and evaluation of content were the main focuses of the open and informal class discussions (refer to Table 7 for classroom setting and instructional format). Reciprocally taught students were randomly assigned to small groups (five in four groups and four in one group).

They systematically rated ten instructor-provided model passages during the series of baseline sessions; rated, interpreted and defended another ten instructor-provided model passages during a series of reciprocal training sessions; and rated, interpreted, and defended another three student-provided compositions during a series of simulated language arts class sessions. Toward the end of the eight week period, the students assigned to the reciprocal teaching group were also required to take the two standardized tests to provide a posttest assessment of critical thinking and problem solving skills.

#### Description of the Baseline Reciprocal Teaching Sessions

After a brief introduction to the reciprocal teaching format, each student evaluator was asked to read and individually evaluate ten model passages provided by the teacher and to make impressionistic judgments on each scale of the reciprocal teaching evaluation scale. Prior to the dissemination of the model passages to the student evaluators, three experts (two sixth grade teachers and the principal) systematically evaluated each of the investigator developed model passages and rated each on the descriptors of the reciprocal teaching evaluation scale. There was high agreement ( $r = .91$ ) across most ratings. Further discussion among the judges led to consensus where rating disagreements manifest themselves. A written expert consensus rating form was prepared and presented to the student evaluators upon completion of each model passage evaluation. Baseline percent of agreement was determined by comparing the baseline diagnostic evaluative ratings across the students.

### Description of the Reciprocal Teaching Training Sessions

After the baseline sessions, students systematically evaluated another set of ten model passages provided by the teacher. After the student evaluators rated each passage on the reciprocal teaching evaluation form, the teacher called for a vote of scores on each scale of the rating sheet (How many four's, three's, two's, one's) and displayed the cumulative vote to the entire group. Discussion was not permitted during the individual evaluation. After the cumulative vote call, discussion was allowed. The students took turns posing questions about the model passages they read and evaluated. The other members of the group commented on the quality of the evaluations and assisted in the formulation of questions and summaries. As in the baseline sessions, a written expert consensus rating form was prepared and presented to the student evaluators upon completion of each model passage evaluation. Student evaluators were instructed to conform to the empirically derived expert ratings and discrepancy judgments were openly discussed with the teacher. Each of the ten model passages was evaluated three times by the student evaluators and the actual recorded scoring judgments remained independent. Reciprocal teaching percent of agreement scores were determined by comparing the training diagnostic evaluation ratings across the students.

### Description of the Reciprocal Teaching: Use (Composition Writing) Sessions

Upon successful completion of the reciprocal teaching training sessions utilizing teacher-provided model passages, students began

disseminating their own individually written passages one by one to each of the group members. As in the reciprocal training sessions, a group member was asked to individually evaluate the passage information quickly and to make summarizing impressionistic judgments on each scale of the reciprocal teaching evaluation scale. Discussion was not allowed during the reading period. After all student readers had rated the three compositions, the student whose composition was rated led the discussion of his or her impression of the passage and systematically tallied the individual ratings, item by item, attempting to arrive at a group consensus rating. All discrepancies were discussed and defended by individual group members. Students were required to sign their individual evaluation forms; this information was utilized to diagnose and remediate student misconceptions both in the student group and in future consultations with the teacher. The teacher and the investigator carefully monitored group activities, circulated among the groups, observed, recorded, provided expert on-line diagnostic assistance and served as arbitrator of disagreements during the group meetings. This rate, arbitrate, feedback-procedure was continued until all students' passages had been systematically evaluated by all group members and the teacher. After group consensus (student leader, group members, and teacher) had been achieved, the final draft of the passages was then prepared by the students and presented to the teacher for formal evaluation. At the next group meeting, the graded individual composition (A, B, C, or redo for a C), along with written feedback commentary and a completed rating form prepared by the teacher were presented to the group for

Table 6

Comparison of the Required Work and the Actual Amount of Work  
Completed by Each Group

Experimental Group	Control Group
Teaching Period - 8 weeks = 40 days	Teaching Period - 8 weeks = 40 days
Maintenance Period - 2 weeks = 10 days	Maintenance - 2 weeks = 10 days
<hr/>	
1. Reciprocal Teaching Baseline Session - (2 days-45 minutes each session) -	Phase I: Four Weeks = 20 days
a. Evaluation of 10 passages using the Holistic Evaluation Form	1. Direct Instruction of Language Usage - 40 minutes - 3 days a week; 20 minutes, 2 days a week
b. Writing Summary Comments for the Passages	a. Unit Lesson (Approximate- one unit-5 to 7 days) Source: Textbook
2. Reciprocal Teaching Training Session - (20 days - 45 minutes each session)	(1) Practice Sheet - 1 daily
a. Evaluation of 10 passages using the Holistic Evaluation Form approximately 1 passage for 2 days)	(2) Application - 10 sen- tences (required by textbook)
b. Writing Summary Comments for each passage	2. Direct Instruction in Spelling- 20 minutes, 2 times a week (2 days each week)
3. Reciprocal Teaching Simulated Use Session - 3 Compositions (18 days, 45 minutes each session)	a. One unit - 20 words as required by textbook
a. Evaluation of compositions using the Holistic Evaluation Form	b. Mastery Test - 20 words in the unit lesson
b. Writing Summary Comments on the Compositions	3. Handwriting - Informal
	Phase II: Four weeks=20 days
	1. Presentation of Model Passages- (1 passage every 2 days)
	2. Informal Discussion -

Table 6 (continued)

---

<ul style="list-style-type: none"> <li>c. Grading of the Final Draft of the compositions by the teacher</li> </ul>	<ul style="list-style-type: none"> <li>a. Identifying kinds of sentences used in the passage</li> </ul>
<ul style="list-style-type: none"> <li>4. Maintenance Phase - 5 compositions</li> </ul>	<ul style="list-style-type: none"> <li>b. Discussion of punctuation marks used</li> </ul>
<ul style="list-style-type: none"> <li>a. Writing compositions in class</li> </ul>	<ul style="list-style-type: none"> <li>c. Identifying subjects and predicates (simple and compound)</li> </ul>
<ul style="list-style-type: none"> <li>b. Corrective feedback from the teacher</li> </ul>	<ul style="list-style-type: none"> <li>d. Evaluating of spelling</li> </ul>
<ul style="list-style-type: none"> <li>c. Final draft and final grades from the teacher</li> </ul>	<ul style="list-style-type: none"> <li>e. Evaluating sentences in paragraph as related to topic</li> </ul>
	<ul style="list-style-type: none"> <li>3. Assignment - 3 compositions</li> </ul>
	<ul style="list-style-type: none"> <li>a. Writing draft at home</li> </ul>
	<ul style="list-style-type: none"> <li>b. Corrective feedback from teacher</li> </ul>
	<ul style="list-style-type: none"> <li>c. Rewriting of final draft and final grade by the teacher</li> </ul>
	<ul style="list-style-type: none"> <li>4. Maintenance - 5 compositions</li> </ul>
	<ul style="list-style-type: none"> <li>a. Writing drafts at home</li> </ul>
	<ul style="list-style-type: none"> <li>b. Corrective feedback</li> </ul>
	<ul style="list-style-type: none"> <li>c. Final draft and final grade</li> </ul>

---

Table 7

Comparison of Classroom Setting and Instructional Format

Control Group	Experimental Group
I. Classroom Setting	
Large Group	Small Group - 5 in each group
II. Instructional Format	
Direct Instruction - Teacher Directed	Reciprocal Teaching - Teacher-Student take turns in leading class
1. Introduction	1. Modeling
2. Discussion	2. Dialogue - Questioning - Explanation
3. Corrective Feedback	3. Rate
4. Practice Exercise	4. Arbitrate - Cooperative learning discussion
5. Assignment	5. Feedback

discussion. The group discussion of the teacher-provided feedback served as an additional learning opportunity. Use of percent agreement was determined by comparing the use of diagnostic evaluation ratings across the students within each group.

### Instrumentation

The Reciprocal Teaching Evaluation Form. This rating scale was developed by the investigator. It consisted of behavior descriptors which have been reported to be characteristics of critical problem solvers as well as good writers. Items included were systematically derived from suggestions made by specialists in the fields of cognitive instructional psychology, critical thinking, and written language acquisition. The selected behavior descriptors were rated using "4" point scale where "1" is defined as "High" and "4" as "Low." In a scale which has only four points, no middle score is possible thus forcing respondents away from an uncommitted score; that is to say that respondents are forced to make decisions as to whether the passages and compositions presented to them for evaluation were the upper half or lower half. Prior to the final draft of the holistic evaluation form, the investigator, together with the sixth grade teacher involved in the investigation, a third grade model teacher recommended by the principal and the principal of the school, systematically evaluated the items selected for inclusion. A high agreement ( $r = .85$ ) was found across expert recommendations for item selection inclusion. Based upon the expert recommendations, where disagreements were found, further discussion among the judges led to consensus where rating disagreements manifested themselves. The



Reciprocal Teaching Evaluation Form was then used during the Pilot Study phase of the investigation at hand. The results from this pilot project prompted a few revisions of the evaluation form, the language was simplified and many of the statements were shortened. The descriptors were once again evaluated and rated by the same group of experts. Once again, there was a high agreement ( $r = .94$ ) across expert ratings. Discussion among the experts led to the consensus on all the remaining descriptors. The final selected descriptors were positioned on a one page evaluation form (see Appendix C for details).

#### Preparation of Model Passages

A total of twenty passages of approximately 100 to 200 words were used for the study. Ten model passages were used for the baseline data and ten model passages were used for the training sessions. These passages were summaries from stories selected by the teacher participant to conform with the curriculum requirement of the school district. These passages were from the reading textbook, Impressions: Level M, Houghton Mifflin Reading Series (1978) (see Appendix B for Sample Passages).

Prior to the dissemination of the model passages, three experts (two sixth grade teachers, principal) systematically evaluated each of the investigator-developed model passages and rated them on each of the descriptors of the reciprocal teaching holistic evaluation form. There was high agreement ( $r = .91$ ) across ratings and discussion among the judges led to the consensus. A written expert consensus rating was prepared and used as models which were presented to the student evaluators.

Cornell Critical Thinking Test Form X - Third Edition - Robert H.

Ennis, Jason Millman, Thomas Tomok. The reported definition of "critical thinking" upon which this test is designed is that: "Critical thinking is the process of reasonably deciding what to believe and do."

Form X was designed for use with fourth through fourteenth graders. The test consists of seventy-four items and divided into four parts:

Part I: Induction - Judging whether a fact supports a hypothesis.

In this section the test takers are asked to simply provide support not proof.

Part II: Credibility - Judging credibility of observation

reports: In this section students are expected to ask themselves which of the two statements is the best to believe.

Part III: Deduction - Deciding what follows: In this section students are reminded to respond as if the information given is true. They are asked to decide which of the alternatives listed is actually true.

Part IV: Assumption Identification - Judging what is assumed in an argument: In this section students are to decide what is taken for granted.

The test includes multiple choice items which can be completed in fifty-two minutes. It allows extension of the time limit whenever necessary and feasible.

The correlations of the Cornell Critical Thinking Test Form X with other tests that attempt to test for critical thinking ability range around .5, a number made plausible by differences among test makers about how to test for critical thinking (see Ennis, 1984). Correlations with scholastic aptitude tests range broadly around .5 as one might expect given that most subject matter tests also have this broad range around .5. Correlations with gender hover around zero, as one might expect if one assumes, that critical thinking ability is not gender related. The obtained .15 correlation of this test with SES (socioeconomic status) suggests less cultural bias than is found for most paper and pencil test. Correlations between subject matter knowledge and critical thinking ability range around .5, as one might expect assuming that scholastic aptitude would influence acquisition of both critical thinking ability and subject matter knowledge. The correlations with the attitudinal variables specified (toward school, peers, and self) are low (.16, .00, -.11). The slightly higher correlation with educational expectations (.19) is also not surprising, but low enough to give some assurance that there will be some good critical thinkers who do not spend a great deal of time in school. The reliability estimates range from .67 to .90 on Level X of Cornell Critical Thinking Test.

Test of Problem Solving - Linda Zachman, Carol Jorgensen, Rosemary Huisingh, Mark Barrett. The Test of Problem Solving (TOPS) assesses the school-aged child's ability to integrate his or her semantic and linguistic knowledge with his or her reasoning ability by way of picture stimuli and written responses. It is an expressive

test designed to assess children's thinking and reasoning abilities critical to events of everyday living.

The test is composed of five subtests:

Explaining Inferences: This expressive task requires the subject to give logical explanation for a present perception described by the examiner and depicted in an illustration.

Determining Causes: It requires the subject to tell logical reasons for the event that happened in the illustration.

Negative Why Questions: Requiring the subject to deal with exclusion, the negative why questions present inquiries as to why something would not occur.

Determining Solutions: This test requires the subject to state a logical and appropriate solution to an illustrated problem.

Avoiding Problems: Causality is assessed through this task by requiring the subject to state a way in which the depicted situation has been averted.

The TOPS was designed to be administered to subjects six years of age and older. Test norms have been established on children six years and zero months through eleven years and eleven months. There are fifteen illustrations and fifty items or questions which are not evenly distributed among the fifteen pictures. Each picture provides enough information around which to realistically cluster a number of thinking tasks.

Since the TOPS reportedly assesses the students' ability to use his language to express reasons and logical thoughts, it is critical to quantitatively acknowledge errors in grammar, syntax, semantics,

and vocabulary. In general a score of 2, 1, or 0 is assigned to each response based on the relevancy of the response to the problem and on the quality of the response regarding the linguistics and semantics aspects. The score is as follows:

2 points (Full Credit Response) - The response clearly states all of the important information to show the thinking process.

1 point (Partial Credit Response) - The response contains acceptable but not the most appropriate or concise information for the problem presented.

0 point (Unacceptable Response) - The response is irrelevant or inappropriate as to the information; linguistically or semantically imprecise reflecting vagueness, ambiguity, confusion, or incompleteness.

Development of the Test of Problem Solving began with the construction of an initial item pool of 96 items, including six thinking tasks of 16 items each. This item pool was administered to random samples of subjects at yearly age intervals from the ages of six years through eleven years. The item selection sample was composed of 456 subjects from 52 schools in the Allegheny Intermediate Unit, Pittsburgh, Pennsylvania and the Office of the Los Angeles County Superintendent of Schools in Downey, California. Seventy-five speech-language pathologists administered these items to subjects who had been randomly selected with consideration as to race, sex, age, and school.

The TOPS was developed following extensive review of available tests in the areas of problem solving, cognition, and intelligence.

After a review of the literature and other tests, the particular test tasks selected were those reputed to be reflective of problem solving, cognitive, and verbal expression skills. In addition, efforts were made to assess areas that are recognized by experts as being important in problem solving but which are not included at the present time in other formal measures. The empirical validity of the TOPS was established by the method of internal consistency. The test items maintain very satisfactory levels of discrimination across age levels. More specifically, in 295 of 300 instances (98.3% of the time), task items demonstrate significant discrimination ability between high and low scorers.

An examination of the task intercorrelations and correlations between tasks and total test indicates that this pattern of significant intercorrelation permits one to postulate the possibility of a common underlying trait or dimension being assessed by the separate tasks.

#### Design and Statistical Analysis

The overall analytic paradigm related to the investigation is presented below:

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Group 1	Group 2
Reciprocal Teaching Condition	Control (Traditional) Condition

---

### Independent Variables

#### Group

1. Reciprocal teaching condition (group 1)
2. Control condition (traditionally taught) (group 2)

### Dependent Variables

#### Achievement

1. Selected critical thinking skills (standardized measure)
2. Problem solving skills (standardized measure)
3. Writing/composing ability (criterion-referenced measure)
4. Vocabulary, written and verbal expression (criterion-referenced measure)
5. Spelling - (criterion-referenced measure)

#### Phase

1. Pretest (baseline) (4 days prior to intervention)
2. Intervention (training 20 days)
3. Intervention (use session 18 days)
4. Maintenance (10 days) (immediately following intervention)
5. Posttest (3 days - 12 days after intervention)

### Phase One

Phase one of the study included a systematic examination of the holistic evaluation of agreement for the passages and written compositions for the experimental group. The results were analyzed using the McNemar Test for Significant Changes (Siegel, 1956), chi-square, and contingency values were computed for the baseline and training crossbreak. To test the significance of the observed change, a four-fold table of frequencies to represent the first and second

sets of responses from the same individuals is used. The plus (+) and minus (-) are used to signify different responses. The cases which show changes between the first and second response appear in cells A and D. An individual is tallied in Cell A if he changed from plus (+) to minus (-). He is tallied in Cell D if he changed from minus (-) to plus (+). If no change is observed, he is tallied in either Cell B (+ responses both before and after) or Cell C (- responses before and after).

### Phase Two

Phase Two of the study consisted of an analysis of the pre and post test results from the two critical thinking and problem solving tests (Cornell Critical Thinking Test Form X and the Test of Problem Solving). The statistical procedure used was the Analysis of Covariance since the ANCOVAR procedure test for differences between groups after taking into account initial individual differences in the groups. The pretest measure was used as the covariant.



## CHAPTER IV

### RESULTS

The first null hypothesis stated that there would be no significant difference in percent of agreement across baseline, training, and use phases of the investigation over time in the reciprocal teaching group. As mentioned in Chapter III, the percent of agreement on the reciprocal teaching holistic evaluation form was determined for the reciprocally taught group during the baseline, training, and use sessions.

Table 8

A Comparative Summary of Frequencies of Agreement Across Baseline and Training Conditions

---

		Training Condition		
		-	+	
Baseline	+	0	3	Chi Square = 11.08 p < .001
Condition	-	8	13	

---

Table 8 displays the frequencies of agreement on the holistic evaluation form across the baseline and training condition sessions for the reciprocally taught group. At the beginning of the reciprocal training session (baseline session), the percent of agreement was 13

increasing to 67 at the end of the training session. The McNemar Test of Significance Changes was used to test null hypothesis one. The Chi square value of 11.08 was found to be significant at .001 level of significance (contingency coefficient values .0998).

Table 9

A Comparative Summary of Frequencies of Agreement Across Training and Use Conditions

		Use Condition		
		-	+	
Training Condition	+	0	16	Chi Square = 4.17 p < .05
	-	2	6	

Table 9 displays the frequencies of agreement on the holistic evaluation rating scale for the reciprocally taught group across the training and use sessions. During the use session the percent of agreement increased to 92 from a percent of agreement of 67 during the training session. Once again, the McNemar Test of Significance Changes was used to test for changes across conditions. The Chi square value of 4.17 was found to be significant at .05 level of significance (contingency coefficient value .0219).

Table 10

A Comparative Summary of Frequencies of Agreement Across Baseline  
and Use Conditions

		Use Condition		
		-	+	
Baseline	+	0	3	Chi Square = 17.05 p < .001
Condition	-	2	19	

Table 10 displays the percent of agreement across baseline and use conditions. The percent of agreement increased from 13 during the baseline session to 92 during the use session. The McNemar Test of Significance Changes yielded a Chi square value of 17.05 which was significant at .001 level of significance (contingency value .1725).

Summary of Results Related to Hypothesis 1

At the beginning of the reciprocal teaching training session (baseline session), the percent of agreement was 13 increasing to 67 at the end of the training session. During the use session, the percent of agreement among subjects increased to 92. Tables 8 to 10 present the comparative summaries of frequencies of agreement across baseline, training, and use conditions for the reciprocally taught group. The McNemar Test for Significance of Changes (Siegel, 1956), chi square, and contingency coefficient values were computed for the baseline, training crossbreak ( $X^2 [1, N=24] = 11.08, p < .001, c = .0998$ ), the training and use crossbreak ( $X^2 [1, N=24] = 4.17, p < .05,$

$c = .0219$ ), and the baseline and use crossbreak ( $X^2 [1, N=24] = 17.05$ ,  $p < .001$ ,  $c = .1725$ ). These significant results led to the rejection of null hypothesis one. Therefore, the findings related to testing null hypothesis 1 indicated that there were significant differences in percent of agreement across baseline, training, and use phases of the investigation over time using the reciprocal teaching method of instruction.

### Results Related to Testing Null Hypothesis 2

The second null hypothesis stated that there would be no significant difference in the achievement of selected critical thinking and problem solving skills over time across the two methods of instruction (i.e. across the experimental group and the control group).

### Analysis of Critical Thinking and Problem Solving Test Results

The pre and posttest results from the two critical thinking and problem solving tests, Cornell Critical Thinking Test Form X and Test of Problem Solving, were analyzed using the statistical procedure, Analysis of Covariance. The ANCOVAR procedure test was used to determine differences between groups after taking into account initial individual differences in the groups. It permits the comparison between groups on one variable when information is available on another variable correlated with it. In this investigation the pretest measure was used as the covariant. The particular statistical test yielding the answer is the F-ratio.

Table 11 shows the Mean Gain Scores for the experimental group on the results from Cornell Critical Thinking Test Form X. Table 12

shows the Analysis of Variance Table for the experimental group on the results from Cornell Critical Thinking Test Form X. Table 13 shows the Mean Gain Scores for the control group on the results from Cornell Critical Thinking Test Form X. Table 14 shows the Analysis of Variance Table for the control group on the results from Cornell Critical Thinking Test Form X. Figure 1 presents a graph showing the pretest and posttest mean gain score changes on Cornell Critical Thinking Test between experimental and control groups.

Table 11

Summary of Mean Gain Scores on the Cornell Critical Thinking  
Test Form X

Experimental Group

Group I	Group II	Group III	Group IV	Group V
21.60	20.00	34.80	15.80	23.00
N=5	N=5	N=5	N=5	N=4

Table 12

Analysis of Variance Table for the Cornell Critical Thinking  
Test Form X

Experimental Group

Source of Variation	Sum of Squares	DF	Mean Square	F
Main Effects	1010.158	4	252.540	3.627
GRP	1010.158	4	252.540	3.627
Explained	1010.158	4	252.540	3.627
Residual	1322.800	19	69.621	
Total	2332.958	23	101.433	

Table 13

Summary of Mean Gain Scores on the Cornell Critical Thinking  
Test Form X

Control Group

Group I	Group II	Group III	Group IV	Group V
5.20	8.40	7.60	6.80	10.00
N=5	N=5	N=5	N=5	N=4

Table 14

Analysis of Variance Table for the Cornell Critical Thinking  
Test Form X

Control Group

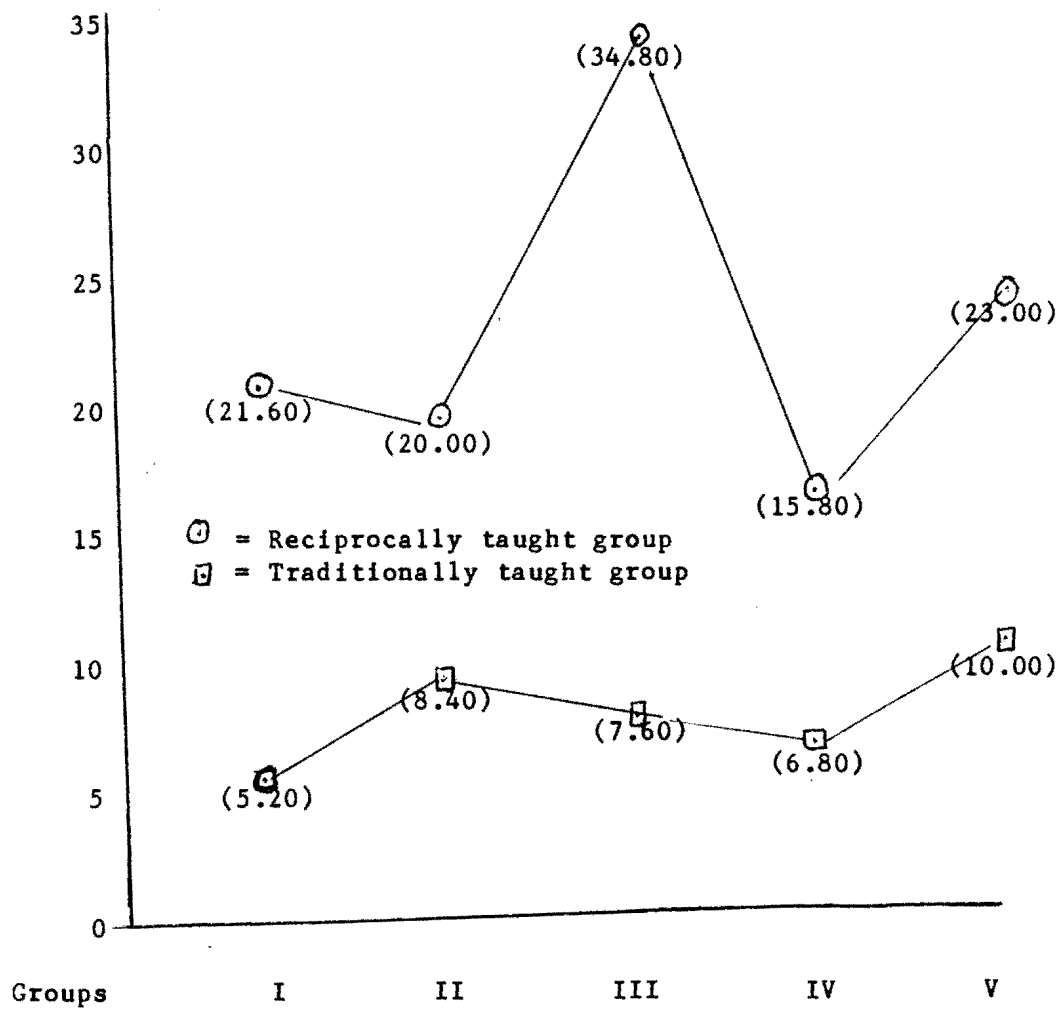
Source of Variation	Sum of Squares	DF	Mean Square	F
Main Effects	58.00	4	14.500	0.201
GRP	58.00	4	14.500	0.201
Explained	58.00	4	14.500	0.201
Residual	1368.00	19	72.000	
Total	1426.000	23	62.000	

Table 11 shows the following mean gain scores among the five groups: 21.60 for the first group, 20.00 for the second group, 34.80 for the third group, 15.80 for the fourth group, and 23.00 for the fifth group. The total mean gain scores for the experimental groups is 115.2. Table 13 shows the following mean gain scores among the five groups for the control group: 5.20 for the first group, 8.40 for the second group, 7.60 for the third group, 6.80 for the fourth group and 10.00 for the fifth group. The total mean gain scores among the five groups for the control group is 38.00. Figure 1 presents a graph showing the pretest and posttest mean gain score changes on Cornell Critical Thinking Test Form X between the two groups, experimental (reciprocally taught group) and control (traditionally taught group).

Examination of Table 12 shows that the F-ratio obtained for experimental (reciprocally taught group) group is 3.627. This value

Figure 1

A Graphic Presentation of Pretest and Posttest Mean Gain Score  
Changes on Cornell Critical Thinking Test Form X





is statistically significant at .05 level of significance ( $F [4,24] .05 = 2.78$ ). Examination of Table 14 shows that the F-ratio obtained for the control (traditionally taught group) group is .201. This value is not statistically significant.

Table 15 shows the Mean Gain Scores for the experimental group on the results from Test of Problem Solving. Table 16 shows the Analysis of Variance Table for the experimental group on the results from Test of Problem Solving. Table 17 shows the Mean Gain Scores for the control group on the results from Test of Problem Solving. Table 18 shows the Analysis of Variance Table for the control group from Test of Problem Solving. Figure 2 presents a graph showing the pretest and posttest mean gain score changes on Test of Problem Solving between experimental (reciprocally taught) group and the control (traditionally taught) group.

Table 15

Summary of Mean Gain Scores on the Test of Problem Solving

Experimental Group

Group I	Group II	Group III	Group IV	Group V
27.20	23.20	21.40	20.20	14.25
N=5	N=5	N=5	N=5	N=4

Table 16

Analysis of Variance Table on the Test of Problem SolvingExperimental Group

Source of Variation	Sum of Squares	DF	Mean Square	F
Main Effects	395.608	4	98.902	0.437
GRP	395.608	4	98.902	0.437
Explained	395.608	4	98.902	0.437
Residual	1900.350	19	100.018	0.437
Total	2295.958	23	99.824	

Table 17

Summary of Mean Gain Scores on the Test of Problem SolvingControl Group

Group I	Group II	Group III	Group IV	Group V
15.60	14.00	20.20	18.60	20.50
N=5	N=5	N=5	N=5	N=5

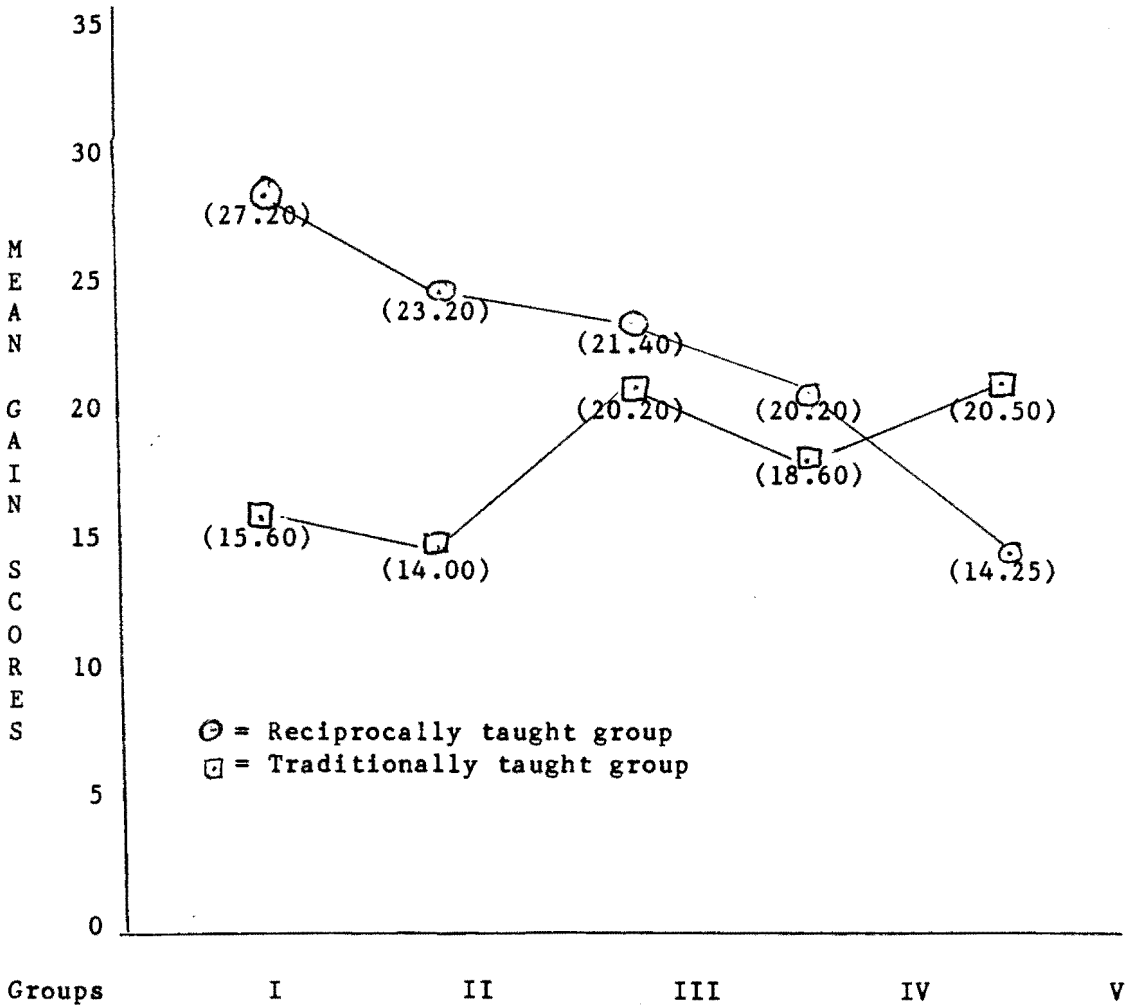
Table 18

Analysis of Variance Table on the Test of Problem SolvingControl Group

Source of Variation	Sum of Squares	DF	Mean Square	F
Main Effects	157.133	4	39.283	0.515
GRP	157.133	4	39.283	0.515
Explained	157.133	4	39.283	0.515
Residual	1448.200	19	76.221	
Total	1605.333	23	69.797	

Table 15 shows the following mean gain scores among the five small groups in the experimental group: 27.20 for the first group, 23.20 for the second group, 21.40 for the third group, 20.20 for the fourth group, and 14.24 for the fifth group. The total mean gain scores for the experimental group is 106.25. Table 17 shows the following mean gain scores among small groups in the control group: 15.60 for the first group, 14.00 for the second group, 20.20 for the third group, 18.60 for the fourth group, and 20.50 for the fifth group. The total mean gain scores among groups in the control group is 88.90. There is a difference of 17.35 between the mean gain score changes of the experimental (reciprocally taught) group and the control (traditionally taught) group. Figure 2 presents a graph showing the pretest and posttest mean gain score changes on the Test of Problem Solving between the two groups, experimental (reciprocally

Figure 2

A Graphic Presentation of Pretest and Posttest Mean Gain ScoreChanges on Test of Problem Solving

taught group) and control (traditionally taught group).

Examination of Table 16 shows that the F-ratio obtained for the experimental (reciprocally taught group) group is .989. This value is not statistically significant; therefore, the second null hypothesis related to measures of problem solving skills cannot be rejected.

Table 18 shows that the F-ratio obtained for the control group (traditionally taught group) group is .515. This value is not statistically significant. The Test of Problem Solving is designed to take into account the child's ability to integrate his or her semantic and linguistic knowledge with his or her reasoning ability. The results do not affirm an earlier assumption that there is a difference in the achievement of problem solving skills between experimental (reciprocally taught) group and the control (traditionally taught) group.

#### Summary of Results Related to Hypothesis 2

The second null hypothesis stated that there would be no significant differences in the achievement of selected critical thinking skills and problem solving skills over time across the two methods of instruction (i.e. across experimental group and control group). Examination of Table 12 showing the F-ratio obtained from the results of Cornell Critical Thinking Test Form X for the experimental group (reciprocally taught group) was 3.627. This value was statistically significant at .05 level of significance ( $F [4,24] .05 = 2.78$ ). Table 14 showed the results from the Cornell Critical Thinking Test Form X for the control group (traditionally taught group). An examination of Table 14 showed that the F-ratio obtained for the

control group is .201. This value was not statistically significant. Therefore, the findings related to testing null hypothesis 2 pertaining to the achievement of selected critical thinking skills indicated that there were significant differences across the methods of instruction (i.e. across experimental group and control group). In addition, the total mean gain scores for the experimental group (reciprocally taught group) was 115.2 while the total mean gain score for the control group (traditionally taught group) was 38. There was a difference of 77.2 between groups in favor of the experimental group.

An examination of Table 16 showed that the F-ratio from the Test of Problem Solving obtained for the experimental group (reciprocally taught group) was .989. This value was not statistically significant. Table 18 showed that the F-ratio obtained for the control group (traditionally taught group) was .515. This value was not statistically significant. The Test of Problem Solving was designed to take into account the child's ability to integrate his or her semantic and linguistic knowledge with his or her reasoning ability. Therefore, the findings related to testing null hypothesis 2 pertaining to the achievement of problem solving skills indicated that there were no significant differences across the two methods of instruction (i.e. across experimental group and control group). However, an examination of Table 15 showed that the total mean gain score for the experimental group (reciprocally taught group) was 106.25. Table 17 showed that the total mean gain score of the control group (traditionally taught group) was 88.90. There was a difference

of 17.35 from these composite mean gain scores between groups (i.e. across experimental group and control group). This result could be considered to approximate a substantial difference in favor of the reciprocal method of instruction.

In sum, for the dependent measure of achievement (selected critical thinking skills) it was possible to reject the second null hypothesis. However, it was not possible to reject the second null hypothesis for the achievement of problem solving skills.

#### Results Related to Testing Null Hypothesis 3

The third null hypothesis stated that there would be no difference in qualitative teacher-student ratings of writing, spelling ability and vocabulary for verbal and written expression across groups (i.e. experimental group and control group).

The final drafts of the three essays prepared by the students were presented to the teacher for evaluation. The essays in both experimental and control groups were rated according to the grading procedure of the school system: A (Highly Satisfactory), B+ (Very Satisfactory), B (Satisfactory), C (Passing), D (Failing). To insure an objective and consistent procedure for assessing the written compositions, the teacher and the investigator adopted the essential components of Test of Written Language (Hamill & Larsen, 1983) (see Appendix H for Informal Teacher Evaluation Instrument). The decision for this adoption was based on the fact that this test is highly reliable. The resulting coefficients using the Spearman-Brown formula for the Test of Written Language showed statistically significant at ( $p < .01$ ). In addition, this test is an instructionally relevant

measure of written expression and very closely aligned with the curriculum objectives of the school system according to the teacher participant.

Table 19

Summary of Grades: Compositions

	Use Condition				
	A	B+	B	C	D
Experimental Group	21	13	23	15	0
Control Group	0	10	8	35	19

Table 19 shows the results of the grade distribution of the students' compositions across the experimental and control groups. It is interesting to note that there was an average rating between A (Highly Satisfactory) to B (Satisfactory) for the experimental group subjects while the control group subjects received average ratings between C (Passing) to D (Failing). Figure 3 displays these ratings on a graph.

Summary of Results Related to Hypothesis 3

Table 19 indicated that in the experimental group (reciprocally taught group) the percent of compositions receiving A was 29, B+ was 18, B was 32, and C was 21. No students received D rating. In the control group (traditionally taught group) the percent of compositions receiving A was 00, B+ was 13, B was 11, C was 49, and D was 26. These results show that there was a consistently higher average rating of compositions in the experimental group over the compositions from



the control group.

In summary, the findings related to testing null hypothesis 3 indicated that there is significant difference in the qualitative teacher-student ratings of writing ability, spelling ability and vocabulary for verbal and written expression over time across groups.

After thirty-eight days of intervention, the students in both groups were provided with a ten-day maintenance phase. During this maintenance period, the students from both the control and experimental groups were asked to write five additional compositions. The final drafts of the students' compositions were again rated according to the grading procedure of the school system: A (Highly Satisfactory), B+ (Very Satisfactory), B (Satisfactory), C (Passing), D (Failing).

Table 20

Summary of Grades: Compositions

	<u>Maintenance Phase</u>				
	A	B+	B	C	D
Experimental Group	88	30	8	4	0
Control Group	0	5	5	82	28

Table 20 shows the maintenance phase results of teacher's ratings of the students' compositions from both the experimental group (reciprocally taught group) and the control group (traditionally taught group). The average rating for the experimental group is A (Highly Satisfactory) and the average rating for the control group

Figure 3

A Graphic Presentation of Teacher Ratings of the Students'

Compositions During the Use Session

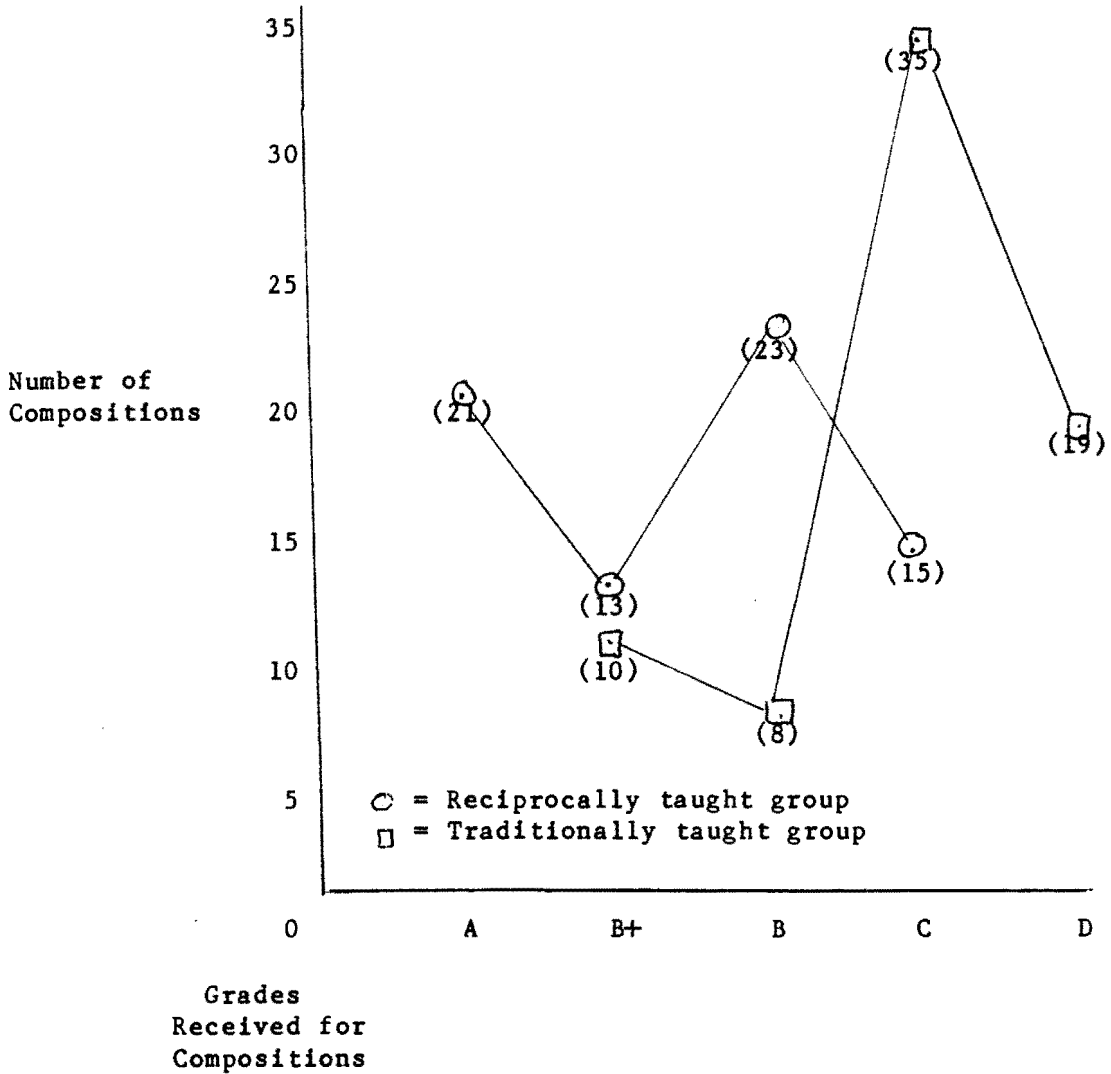
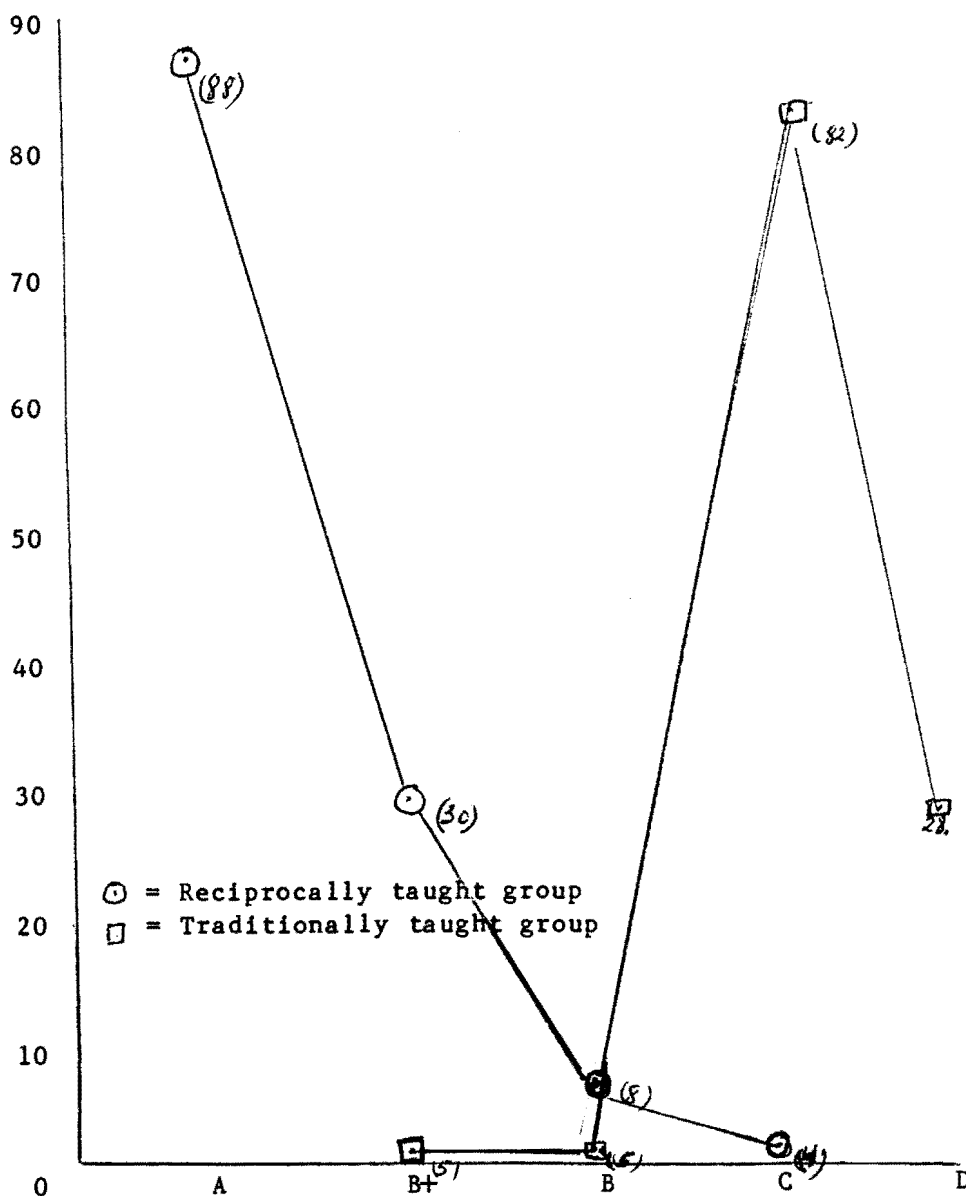


Figure 4

A Graphic Presentation of Teacher Ratings of Students'Compositions During the Maintenance Phase

ranges from C (Passing) to D (Failing). Figure 4 displays these ratings on a graph.

That said, the findings related to testing null hypothesis 3 indicated that the students in the experimental group made steady improvement in their compositions and also maintained the writing skills learned over time. However, the students in the control group did not show any improvement in composition grades.

#### Summary of Findings

The Reciprocal Teaching Holistic Evaluation Form was used only for the reciprocally taught group as part of instruction to test null hypothesis one: There is no difference in percent of agreement across baseline, training, and use phases of the investigation over time in the reciprocal teaching group. At the beginning of the reciprocal training session (baseline session), the percent of agreement among the subjects was .13 increasing to .67 at the end of the training session. During the use session, the average percent of agreement among subjects increased to .92. The McNemar Test for Significance Changes (Siegel, 1956), chi square, and contingency coefficient values were computed for the baseline and training crossbreak ( $X^2 [1, N=24] = 11.08, p < .001, c = .0998$ ) (where the fourfold table frequency entries were as follows: +0, +3, --8, -+13), the training and use crossbreak ( $X^2 [1, N=24] = 4.17, p < .05, c = .0219$ ) (where the fourfold table frequency entries were as follows: +0, +16, --2, -+6), the baseline and use crossbreak ( $X^2 [1, N=24] = 17.05, p < .001, c = .1725$ ) (where the fourfold table frequency entries were as follows: +0, +3, --2, -+19). These significant results led to the

rejection of null hypothesis one.

Two standardized tests, the Cornell Critical Thinking Test Form X and Test of Problem Solving were used to test null hypothesis two: There is no difference in measures of selected critical thinking skills and problem solving skills over time between the experimental group (reciprocally taught group) and the control group (traditionally taught group).

The F-ratio obtained from the results of Cornell Critical Thinking Test for the experimental group was 3.627 and significant at .05 level. The F-ratio obtained for the control group using the same test was .201. This result was not statistically significant. These significant findings led to the rejection of the null hypothesis two with respect to critical thinking skill differences. The F-ratio obtained from the results of Test of Problem Solving for the experimental group was .437. This result was not statistically significant. The F-ratio obtained for the control group using the same test was .515. This was not statistically significant either. Therefore, the second part of hypothesis two related to testing for differences in improvement of problem solving skills across groups was not supported. Another way to interpret these results is to use the difference of the mean gain scores of the experimental and control groups. The total mean gain scores for the experimental group was 106.25, while the total mean gain for the control group was 88.90. The mean gain difference was 17.35. The probability of significant difference using the mean gain scores did approximate a substantial difference.

The final drafts of the three compositions prepared by both control and experimental groups of students during the use sessions were presented to the teacher for evaluation. These compositions were rated according to the grading procedure of the school system. The results of the grade distribution of the students' compositions for the experimental group showed an average rating between A (Highly Satisfactory) to B (Satisfactory). In contrast, students enrolled in the control group received average and below average ratings (i.e. C (Passing) to D (Failing)). The findings related to testing null hypothesis three indicated that there was a significant difference in the quality of writing ability, spelling ability, and vocabulary for verbal and written expression across groups based on teacher-student ratings. Thus null hypothesis three was also rejected.

Finally, after thirty-eight days of intervention, the students were provided with a ten-day maintenance phase. During this time, the students from both experimental and control groups were required to write five compositions. The final drafts of these compositions were rated by the teacher. The average rating for the experimental group was A (Highly Satisfactory) while the average rating for the control group was between C (Passing) to D (Failing). These results indicated that the students in the reciprocally taught class were better able to maintain the skills learned and experienced greater improvement in written language.

## CHAPTER V

### DISCUSSION

This research study was designed to determine the utility of employing the reciprocal teaching method to enhance written language performance and critical thinking and problem solving skills. This chapter presents a discussion of the results related to testing each of the three null hypotheses stated in Chapter III. A general discussion of the results and implications for future research is also presented below.

#### Discussion Related to Testing Null Hypothesis 1

The first null hypothesis tested was that there would be no statistically significant difference in percent of agreement across baseline, training, and use phases of the investigation over time in the reciprocal teaching group.

The first dependent variable used as measure of achievement were the passages provided by the teacher. In the reciprocally taught group, there were ten teacher-provided passages consisting of 100 to 200 words. The Reciprocal Teaching Holistic Evaluation Form was used as part of instruction for the reciprocally taught group and was used as the source of documentation for the behavior change. At the beginning of the reciprocal teaching training session (baseline session), the percent of agreement among subjects was 13 increasing to 67 at the end of the training session. During the use session, the

average percent of agreement among subjects increased to 92. The McNemar Test for Significance Changes, chi square, and contingency coefficient values were computed for the baseline and training crossbreak ( $X^2 [1,N=24] = 11.08, p < .001, c = .0998$ ), the training and use crossbreak ( $X^2 [1,N=24] = 4.17, p < .05, c = .0219$ ), and the baseline and use crossbreak ( $X^2 [1,N=24] = 17.05, p < .001, c = .1725$ ).

Examination of the significant changes indicated that the reciprocal teaching method had consistently been instrumental in the increase of agreement among subjects who evaluated the passages. As the investigation progressed, the reciprocally taught class continued to improve until the end of the intervention (use condition). In addition to improvement in the quantitative scores, there was noted improvement in the quality of dialogue of the students. Examples of students' questions and responses and their patterns of improvement are displayed in Appendices D and E as illustrated in the Samples of Reciprocal Teaching Episodes. In addition, there were improvements in the quality of summary comments written by the students in the Reciprocal Teaching Holistic Evaluation Form and the quality of directive phrases used by the students to evaluate the compositions of their peers. Examples of these summary comments and directive phrases used are presented in Appendices F and G.

The improvement in agreement for the reciprocal teaching group can be explained by the fact that the students actively engaged in questions throughout the training sessions. At the beginning of the training session, the students were reluctant to participate. The



teacher had to call on volunteers. Most of the students used the items in the Reciprocal Teaching Holistic Evaluation Form to ask their questions. As the sessions continued, the students appeared to become more confident indicating they had become more familiar with the routine and consequently were more willing to serve as active participants. The students appeared to become more proficient and became more like their adult expert model. It should be noted that there were a few students who remained less involved (n=5) and had to be prompted to encourage participation.

Writing summary comments about the passages they evaluated seemed to be the most difficult task for the students. Some of them appeared to take the comments personally and felt animosity toward their critics. Some time was set aside for counseling the students in the experimental group (reciprocally taught group) to assist them in dealing with their feelings. Eventually, the relationships among the students improved. Ultimately, they appeared to become more open-minded and receptive to suggestions.

#### Discussion Related to Testing Null Hypothesis 2

The second null hypothesis tested was that there would be no statistically significant difference in measures of critical thinking and problem solving skills across groups (i.e. experimental group and control group).

The analysis of covariance was used to determine the possibility of significant differences between the two groups. Results related to the Cornell Critical Thinking Test Form X indicated a significant difference in measures of critical thinking skills between groups.

However, results related to Test of Problem Solving did not show any significant difference in problem solving skills across groups. Therefore, it can be concluded, that based on the results from the Test of Problem Solving, that there is no differential relationship in the achievement of selected problem solving skills across groups. Another way one could interpret the results is to use the comparison of the mean gain scores of the experimental and control groups. The former had a total mean gain score of 106.25, while the latter had a total mean gain score of 88.90. There appears to be a substantial difference of 17.35 between the mean gain scores across the two groups. An implication derived from this comparison is that the students who were in the reciprocally taught language arts class increased their semantic and linguistic knowledge which helped improve their reasoning and thinking abilities more than the students who were included in traditionally taught language arts class. However, during the process of composition revision students from both groups, experimental and control, practiced problem solving, thus, the difference in scores did not prove statistically significant.

#### Discussion Related to Testing Null Hypothesis 3

The third null hypothesis tested stated that there would be no statistically significant difference in qualitative teacher-student ratings of writing ability, spelling ability, and vocabulary for verbal and written expression between the experimental group (reciprocally taught group) and the control group (traditionally taught group).

During the use sessions, the students from the experimental group

were required to write three compositions. The final drafts of these compositions were presented to the teacher for grading. The students in the control group were also required to write three compositions. The final drafts were also presented to the teacher for grading. The average rating of the students in the experimental group was found to be between A and B while the average rating of the students in the control group was found to be between C and D. During the maintenance phase, the students from both groups were required to write five compositions. Each of the final drafts was presented to the teacher for grading. The average rating for the experimental group was found to be A and the average rating for the control group was found to be C and D. These differential results across groups further confirm results related to the utility of employing the reciprocal teaching method to enhance the achievement of improved quality in writing and spelling ability. Vocabulary for verbal and written expression also improved more for the students enrolled in the experimental group compared to the students enrolled in the control group.

The result most germane to the central thesis of this study is the response of the students to a follow-up interview. The twenty-four students who were involved in the reciprocally taught class unanimously declared that the approach has been helpful because it has forced them to "think deep" and taught them good study skills which they could apply in other school subjects particularly reading, social studies, and science. They also reported that exposure to the reciprocal teaching method made them do something which they had never done before, which was to evaluate their writing more closely, pay

more attention to their syntax, spelling of words, use of punctuation marks, and most important of all, the use of appropriate words to express their thoughts and to think more carefully about what to write in order to craft more organized essays. They stated that now they could fully understand how important it was to state clearly what they were writing about in order for people to understand their thoughts. They were also unanimous in declaring that they had become more resourceful in using references such as dictionary, thesaurus, and book of quotations. Above all, the students agreed that they had developed a more mature attitude in accepting corrections and suggestions from their classmates. They stated that they felt they had become more friendly to each other and felt closer to their classmates. They said that even their parents had participated in their discussions at home on the topics they had written because they have started to open up discussions with them.

It is important to note that some negative comments were also given by the students from the reciprocally taught class. They complained about the number of essays they had to read and the short time that was set aside to read and evaluate them. They stated that they initially disliked the reciprocal teaching holistic evaluation form because it was very long, too mechanical, and boring. However, they agreed that as they discussed more essays and learned to use the holistic evaluation form, the process became more interesting. They also expressed concern about writing the summary comments because they were afraid to hurt the feelings of their classmates which could cause them problems after school. Again, the students admitted that the

positive attitudes of their teacher and the investigator changed their feelings. They became less worried about their comments about their classmates' compositions. They all felt that the experience was very satisfying because they were helping their classmates.

The students from the traditionally taught group made a unanimous expression of disappointment for not being included in the reciprocally taught group. They asked the investigator to request their teacher to utilize reciprocal teaching in their language arts class too. They told the investigator about the good things which they heard from the other students about reciprocal teaching method. They expressed a desire to have an experience in reciprocal teaching.

It is, therefore, fairly safe to conclude that for the reciprocally taught group that there appeared to be a positive shift in quality of the students' written essays as well as their attitudes. The change was more toward the production of more highly organized content, more linguistically competent and mechanically competent written essays. The self-reported students' competence to evaluate written essays was also consistent with the significant changes noted from the empirical data base of this investigation. The teacher's evaluations of the students' essays from the reciprocally taught group support the shift of students' competence (highly competent A to B average rating). The students from the traditionally taught class showed less competence (C to D average rating). The teacher expressed concerns about these marginal grades from the traditionally taught class because of poorly organized content, run-on sentences, unclear statements, and lack of organized thought. This concern for the

students who were less competent in the traditionally taught group was expressed by the teacher for those few students (n=5) in the reciprocally taught class who made only marginal gains. While there was marked improvement noted on semantics and linguistic knowledge, poor organization of content remained a problem for the few students who made marginal gains only. However, the students in the reciprocally taught group were more active participants in class discussion, responding more critically and voluntarily, more precise observations on the completed essays of their classmates and highly appropriate responses to questions and use of vocabulary. Overall, improvement for the students in the traditionally taught group was noted in spelling and sentence construction.

### Conclusions

Overall, this investigation was designed as an attempt to demonstrate the utility of using reciprocal teaching as a method for teaching written language. An attempt was also made to set up a reasonable field experiment given the restrictions of the school system and the community in which the school system operates. Several conclusions are warranted within the limits of this study can be mentioned:

1. Reciprocal teaching as a method of instruction for written language appears to have merits in the achievement of selected critical thinking skills. It can also be said that exposure to reciprocal teaching improved written language performance.

2. The use of reciprocal teaching as a method of instruction for written language has demonstrated its ability to improve writing

performance in its major components of organization of content, productivity of ideas, and spelling of words.

3. The use of the holistic evaluation form embedded within the reciprocal teaching methodology helped the students to remain "on target" in their discussion and also in their writing.

4. The reciprocal teaching method appeared to be instrumental in improving students' attitudes and interpersonal relationships in that students enrolled in the reciprocal teaching group appeared to achieve a more mature attitude towards corrective feedback and suggestions from peers. Normally the students have always received corrective feedback only from their teacher or any adult tutor in any class related activities. Leadership and responsible behavior also appeared to be encouraged and enhanced during the reciprocal teaching sessions.

5. Exposure to reciprocal teaching also appeared to be related to the development of study habits which could be transferred to other school subjects such as reading, social studies, and science.

6. Teacher acceptance of the holistic evaluation form while not directly analyzed in this study is of considerable importance to the utility of the assessment procedure in a language arts class. Utility of the method for the stated purpose was supported by the great interest of the teacher using it as part of the method and also as a useful tool in evaluating students' compositions/essays.

#### Limitations of the Data

The investigator has attempted to make a claim that the reciprocally taught students were more competent in their written compositions compared to the students in the traditionally taught

class. There is evidence to suggest that their critical thinking skills have made further gains resulting from the intervention provided them. For those students enrolled in the reciprocally taught group, it is recognized that the improvement in students' agreement ratings may be attributed to the effects of practice and the consistent suggestions that students must conform to the ratings of experts, teacher, and other students. There was considerable care in the selection of the experts who prepared the expert consensus rating scale; however, it is recognized that the practitioners may not have been really "experts." Furthermore, it is recognized that we do not really know that the holistic evaluation form is valid and reliable in its ability to discriminate the essential components of written compositions. Randomization was used only in assigning students to small groups in the reciprocally taught group. The limited randomization procedure allowed variability a chance to manifest itself only in the reciprocally taught class.

It should be noted that an investigator bias effect is a possibility. Although the same teacher conducted the teaching and collected the data, the investigator was always present and participated in the discussion among small groups in the reciprocally taught class. The investigator also collected data from both groups for the standardized tests. However, the investigator was rarely present during the period of investigation in the traditionally taught class.

The findings reported above support the strengths of reciprocal teaching as a method of instruction providing one solution to the



problem of improving writing ability and enhancing students' critical thinking skills. The results from the holistic evaluation form can be used for individual diagnoses to identify general problems in students' writing. The investigator recognized the cumbersome nature of the procedure which some teachers may not find appealing. The mechanistic system under which the holistic evaluation form was conducted can be a problem in motivation to immature students.

The impressions of the students' strengths and weaknesses in their writing can help teacher gear instructional objectives to improve students' abilities in those areas which were identified as weak. Looking at the written compositions/essays and reviewing summary comments by other students, the teacher can bring the students closer to the preconceived ideal to what writing should be.

Application of the reciprocal method for classroom instruction provides the teacher with a tool for modeling, developing thoughtful questioning, increasing students' discriminating ability for thinking and reasoning, and more student practice in writing, as well as opportunity for self expression critically and reasonably through the written word.

Essay examinations will probably never replace multiple-choice tests of writing skill, neither will they replace other tests for measuring thinking skills. However, the holistic evaluation form and essay/composition writing can provide a useful method for analytic assessment of students' ability in writing and thinking.

#### Implications for Research

This study was designed to illustrate some of the issues which

are being studied in research on self-monitoring and cognitive strategy learning. The results reported here and the theoretical discussion stated within the context of a Vygotskian perspective on learning and the importance of social interaction should be regarded as a heuristic means for further work in the area. As Resnick (1985) states,

research on self-monitoring and metacognitive skills training is at this time highly promising but still largely unexplored domain.

Reciprocal teaching is viewed as a specific form of social interaction and is related to the acquisition of generalized cognitive skills. The mechanical nature of the reciprocal teaching holistic evaluation form and the rapidity at which expert assessment had been used during the instruction make it unlikely that in a regular language arts class, the teacher can actually be expected to ask the specific questions or produce the specific summaries that the learner were required to do in this investigation. It is my belief that further studies be done related to changing teacher attitudes toward employment of newer and empirically validated instructional approaches.

There is an assumed indirect relationship between the assessment strategies taught and the learner's skilled assessment performance.

As Resnick (1985) has stated,

this presumed indirect relation between the strategies taught and skilled performance raises the important theoretical question of how instruction that focuses on overt, self-conscious strategies that are not components of skilled performance might improve processes that progress automatically.

It is assumed that students' learning is derived from making

inferences and self-questioning which will eventually evolve into an automatic learning. This issue raises a more provocative discussion on learning and learning styles of students.

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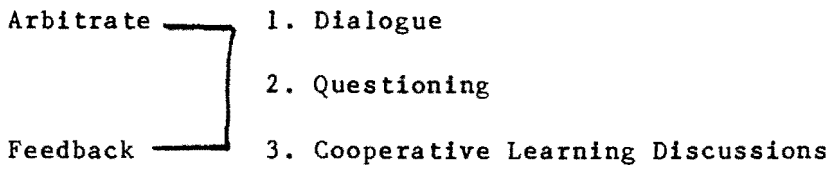
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**APPENDIX A**

Modeling

Rate



Morgan's Reciprocal Teaching Instructional Model  
with Sison's Interpretation

**APPENDIX B**

Goals: To determine credibility  
To make relevant and pertinent observations

### A NEW KIND OF BEAR?

One hundred years ago no one outside China has even known there was such an animal as the giant panda. Hidden away in the high mountainforests of the western part of Szechuan in western China near Tibet, the pandas roamed undistributed and undiscovered. Among those who explored this wilderness was a French Catholic priest named, Pere Armand David. During the years he spent in China he found hundreds of birds, mammals, insects, and plants on his expeditions. These specimens were all new to science.

Pere David and his Chinese hunting guides set up a camp in a thick bamboo forest and then the hunters spread out in different directions. After a ten-day absence, a group of guides returned "with a young white bear," which they took alive but unfortunately killed so it could be carried more easily. Soon several skins and skeletons of the "new kind of bear" were sent to Paris Museum for identification. Only after careful studies wer made at the museum was the understandable mistake straightened out. This was not a new kind of bear, but a new kind of animal. The giant panda had been discovered. In all the years no one ever succeeded in capturing a living panda.

Goals: To determine causes and solutions  
To avoid problems

### DOWN TO THE SEA

Nathaniel Bowditch was pleased to be appointed clerk and second mate on the Henry, a ship sailing on a trading voyage from Salem, Massachusetts to Bourbon, a French-owned island in the Indian Ocean. Although Nat had never been on a voyage before, he knew a great deal about ships. However, he found he had a lot more to learn. As a second mate, Nat was in charge of half the crew and responsible for the ship during alternate watches. To try to please the captain, Nat decided to use his skills at navigation to determine the ship's longitude, a particularly difficult problem on a ship with no chronometer. Nat's willingness to answer the cabin boy's questions about navigation soon led him to spend the dog watch teaching navigation to the whole crew.

But teaching them wasn't so easy. Time and again Nat explained something in the simplest words he could think of - only to see a blank look on the man's face. He wanted to shout, "Can't you see?" "Can't you understand anything?" But he remembered his friend, Elizabeth Boardman who told him that his brain is too fast, that he stumbles on other people's dumbness like a chair in the dark.

Nat would bite back his impatience. Slowly, carefully, he'd explain again and again. At least he'd see the man's eyes brighten. He would hear the happy remark, "Oh yes! Simple." When he got back to his cabin he would write down the explanation that he had finally made sense to a man. After three weeks, he had a stack of notes. His notebook said everything he had to say to explain things to the men who sailed before the mast.

Goals: To make relevant observations  
To make objective judgments

### LET THE WILD ONES STAY HOME

Far to the southwest of New Zealand's South Island lie the Macquarie Islands. Rabbits were once released there. Those who turned them out hope this European animal would provide food for the people. Soon the rabbits were eating up the grass the sheep needed. To solve this problem, farmers brought in cats to eat the rabbits. Then the cats began eating the sea birds that came to the rocky shores to make their nests. The people didn't want this to happen either because they wanted to gather sea-bird eggs for their own food.

Maybe the dogs would control the cats. The farmers brought in more dogs to chase cats. But instead, the dogs spent most of their time chasing the seals that lived on the rocky shores, and the seals were also a source of wild food for the people. Everything seemed to go wrong. All those good ideas were filled with nasty surprises. And the strange animals were much harder to remove than they had been to release.

Although animals have been moved to new lands for thousands of years, we still run a risk each time we try to rearrange the world's wild creatures. Some of the moves have been good, such as the taking of trout to many parts of the world where there were no trout in the waters before and the moving of bass to new waters across America. The pheasant is considered a good bird to have and its success in part of the world has been hailed as a good thing. The muskrat, although a pest in parts of Europe, became a valued burbearer in Finland and Northern Russia. Many imported animals have proved to be serious mistakes but every year we bring millions of new ones into the United States.

Today the United States Government keeps track of the animals that come into the country. Some animals are kept out, and among them are the fruit bats, mongooses, red-whiskered bulbuls, and different kinds of rats, mice, and wild dogs. All of those that do gain the right to enter must be brought in under special government permits. And they do come by the thousands.

Goals: To establish credibility  
To make an objective and value judgment  
To explain an inference

### ELIZABETH CADY STANTON: FIGHTER FOR WOMEN'S RIGHTS

Elizabeth Cady's independent spirit surfaced early in her life. She resented the stiff neck ruffles proper young ladies were supposed to wear, and once she boldly jumped onto a millpond raft and plunged over the dam. She was the only one among the four daughters of Judge and Mrs. Cady who echoed their father's wish that she had been born a boy. Elizabeth's resistance to unequal treatment of women extended beyond herself. She became interested in the inequities of nineteenth century law and vowed to work for freedom of Negro slaves and the legal equality of women. Elizabeth learned the "ladylike arts" taught at a woman's school and took charge of the household after her mother's illness, but her real interest was discussing the problems of the times. In 1840, she married the abolitionist Henry Stanton. In the following years, Elizabeth Cady Stanton was as devoted to raising her children and managing a household as she was to writing and crusading for the abolition of slavery and for women's suffrage. She worked with Lucretia Mott to organize a women's rights convention at Seneca Falls, New York, in 1848 and joined forces with Susan B. Anthony to start a newspaper, organize speaking tours and garner support for the women's movement.

The Civil War brought their activities for women's rights temporarily to an end. In 1867 after the war was over, they went back to women's suffrage work. That year Kansas was putting to the vote a new constitution which would if passed allow Negro men and also "the less muscular sex" both negro and white to vote. Cady and Susan made speeches throughout Kansas. They did not really expect the new constitution to win, but they were pleased when one-third of the voters put it on record that they wanted votes for women. Mrs. Stanton and Miss Anthony started a newspaper they were joined by Lucy Stone who also believed that a woman should keep her own name after marriage.

During the next twelve years, Cady Stanton worked with the Women's Suffrage Association and also went on speaking tours into distant parts of the country. She traveled in carriages and sometimes in wagons when there were no railroads available. Country hotels at that time were dirty, cold, or stifling hot and the food was bad. She endured all these as well as the jeers and insults of hostile crowds. More and more women were coming silently to listen to her and their presence in the crowd meant more than the mocking laughter of the rowdy men who were there also.

As years passed Elizabeth Cady Stanton and Susan B. Anthony came to be respected. Mrs. Stanton was elected president of the Woman's Suffrage Association until she was seventy-eight years old. She gave

it up to devote time to writing. With Susan B. Anthony, they both wrote, *History of Woman Suffrage*. By 1896, they had the joy of knowing that several states had given women the right to vote.



Goals: To establish credibility  
To make an objective and value judgment  
To explain an inference

### DRUM MAJOR FOR JUSTICE

Martin Luther King Jr. was born in Atlanta, Georgia on January 15, 1929, to a black minister and his wife. He grew up well loved by his family, treated sometimes kindly, sometimes roughly, by his friends. Unlike many children, Martin learned early what it meant to be black - a descendant of slaves. When he was six years old the mother of two of his best friends told him that her boys were no longer playing with him. When Martin asked their Mother, she finally told him, "Because you are colored." Hurt and bewildered, Martin ran to his Mother for reassurance. Tearfully, his mother confirmed the white mother's statement. "But," she said, "you're just as good as anyone, and don't you forget it!"

Martin's parents expected their children to grow up to become useful citizens. He expected to be useful and important. Within his mind, Martin always worked hard at his studies. He graduated from high school when he was fifteen years old. Graduation from Morehouse College in Atlanta, Georgia came at age nineteen. When he entered Crozer Theological Seminary in Chester, Pennsylvania, there were only five other black people in a student body of about a hundred. He became quite self-conscious about being a black person in a predominantly white school. After graduation from the seminary, he went to Boston University where he earned the degree of Doctor of Philosophy.

Dr. King's career as a brilliant advocate of civil rights began when he was only twenty-six. One day Mrs. Rosa Parks riding on an overcrowded bus in Montgomery, Alabama, would not give up her seat to a white man who had entered the bus. When the driver asked her to stand, Mrs. Parks refused because her feet hurt. She was then arrested. Dr. King, then a minister of a large church learned of the incident and planned to attack the custom. His plan was a bus boycott. He felt that black people should not ride the bus until they are assured of courteous and just treatment. Dr. King urged his people to be prepared to take any abuse peacefully. His plan was the beginning of a nonviolent attack on segregation or separation of the races. The bus boycott was the forerunner of freedom rides, sit-ins, and prayer marches. Together, they came to be known as the Civil Rights Movement. "We Shall Overcome" became a byword. People sang as they were beaten and sometimes as they were killed.

Goals: To identify important facts in a problem  
To determine causes and solutions

### THE LADY IN BLACK BOSTON HARBOR

Fort Warren, on George's Island in Boston Harbor is said to be haunted by the Lady in Black. She was the bride of Andrew Lanier, a Georgian who had been drafted into the Confederate Army. Less than a month after their marriage, he was captured and imprisoned in Fort Warren. Mrs. Lanier decided to rescue her husband. With courage she managed to get to Boston and then into Fort Warren carrying tools and a pistol. Eager as she was to be united with her husband, she made plans slowly and carefully. With a telescope she studied Fort Warren, noting the guard posts, the paths the guards patrolled, the height of the prison walls and their distance from the shore. Finally, on a windy January night, her friends rowed her across Hingham Bay, into Boston Harbor and then into George's Island. She had cut her hair and put on a man's dark suit to make it easier to scale the prison walls and slip unnoticed through the night. Once ashore she crouched in the surf waiting for the guards to pass out of sight. She clocked their patrol once again to make sure she had not made a mistake. In ninety seconds she must slip from the shore to the bushes around the fort. Then in the second minute and a half, she clambered up the rough stone walls and dropped. Now only the prison walls separated her from her husband.

There was a song that the two of them sung since their childhood. She thought if she whistled a few bars her husband will recognize it and then will whistle a reply. She whistled loudly and more loudly until finally it was heard. When she looked up she saw an opening of the wall. She grabbed hold, crawled through and the next instant she was in the arms of her husband trembling and tearful. Her plan was to help her husband escape, but the prisoners decided to try to capture the fort for the confederacy rather than to escape. Week by week, inch by inch the prisoners dug their tunnel until they reached their mark, the center of the parade ground from which they would stage their attack on the armory. But as the pick swung up it struck the wall of the main building. The guard knew instantly what happened. He sent for the soldiers to the jail cells. Their plans failed. In their confusion Mrs. Lanier's pistol misfired and killed her husband. She had to be hanged as a spy. She had dressed in men's clothing throughout her adventure, but asked to be hang in a dress. She was allowed to make one out of an old black robe.

APPENDIX C

Reciprocal Teaching Holistic Evaluation Form

Instructions: The following passage descriptors are to be rated using a four point scale. "1" is defined as "High"; "4" as "Low:

- |   |   |   |   |   |   |
|---|---|---|---|---|---|
| 1. Ideas/Events explain problem clearly                                     | 1 | 2 | 3 | 4 | Nothing explains problem                                    |
| 2. Ideas/Events are believable  | 1 | 2 | 3 | 4 | Ideas/Events unbelievable                                   |
| 3. Passage brings back something I know to help me understand               | 1 | 2 | 3 | 4 | Not related to anything I know; difficult to understand     |
| 4. Information from passage helps in making decisions or judgment           | 1 | 2 | 3 | 4 | Nothing in the passage can help make a decision or judgment |
| 5. Ideas/Events all lead to conclusion                                      | 1 | 2 | 3 | 4 | Ideas/Events do not lead to conclusion                      |
| 6. Can verify conclusion/judgment from passage                              | 1 | 2 | 3 | 4 | Unable to verify conclusion/judgment from the passage       |
| 7. Words used are easy to read and understand                               | 1 | 2 | 3 | 4 | Words too difficult to read and understand                  |
| 8. Spelling of words well-done  | 1 | 2 | 3 | 4 | Spelling of words poor                                      |
| 9. Very interesting   | 1 | 2 | 3 | 4 | Very dull   |
| 10. Rules in writing used correctly e.g. indention, punctuation marks, etc. | 1 | 2 | 3 | 4 | Correct rules in writing not observed                       |

Part II: Summary Description:

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## APPENDIX D

## Sample Episode

## Training Session on the 5th Day

- Student 1: Okay, the first question in this evaluation form is, Does the event in the paragraph explain the problem clearly?
- Student 2: I think our teacher did not want us to do it this way.
- Student 1: But how will I ask this question? Here, why don't you do it for me. (Handing over to Student 3.)
- Student 3: Let me try. Okay - Is the main problem in the passage Why Andrew Lanier and his bride forced to separate so soon after their marriage?
- Student 4: I think you are right - then our next question will be Does this passage explain this clearly?
- Teacher: Those are all good questions. I think you are all beginning to understand what I want us to do. Who would like to be the next teacher now?
- Student 5: Let's talk about this passage some more - I think this passage was not written well.
- Student 3: What made you say so - it is well organized - all the events that led to the problem are mentioned in the right order. No, I don't agree with you.

## Sample Episode

## Training Session on the 10th Day

- Student 1: Do you think the main problem in this passage is about what happened when a plant or animal is moved to a new environment? When a plant or animal is moved to a new environment the whole ecosystem must change. What does this mean?
- Student 2: Yes I think this is the problem - Let's clear this up in our reading book. Here are some examples of ecosystem changes that have produced good results.
- Student 3: That's correct - this passage had explained the problem clearly. It should really have a number 1 rating. And also number 1 for items 4, 5, and 6.
- Student 5: Not only on those items it should get number 1 for all the other items. Don't you all agree?
- Student 4: That's neat. I like to have all 1s in my compositions. I can write a very good comment on this passage now.
- Teacher: You are all proceeding very well. I think I can move on to the other groups.

**APPENDIX E**



Sample Episode of Reciprocal Teaching  
(Use Session - About the Sixth Day)

- Student 1: My question is, what does this passage tell us?
- Student 2: About drugs.
- Student 3: About alcohol too.
- Student 4: Why did you include alcohol?
- Student 3: Because alcohol does the same thing that drugs do - confuse you.
- Teacher: These are all good answers. Nice job. I have a question too? Why does the title need to be expanded? Should we change it?
- Student 5: It is only saying, "Say No to Drugs." There are many other things that are sold now to confuse our minds and cause us a lot of problems. Like this word here, make us crazy.
- Student 1: Good for you, but I think we should change the word crazy. Let's look at the dictionary or the thesaurus so we can use a better word.
- Student 3: I found it -- lack of sanity - not sane, senseless, dmented, bizarre. Let's read this sentence again and decide which of these words will fit better.
- Student 2: I think we need to clarify the points in our passage before we write our passage over.
- Teacher: Let's listen and then we can decide. Who would like to be the teacher now?

## Sample Episode

Use Session  
(About the 15th day of the Session)

- Student 1: Your composition is certainly very interesting, but you did not organize the ideas we... I think what you wrote in paragraph 3 could be included in paragraph 2.
- Student 2: That's right! I think there's a need for you to reorganize a couple of these sentences. Let me see, how can we help you with this. Everybody, look at paragraphs 2 and 3, see how we can put some of the ideas together. I also found a couple of misspelled words - try using the dictionary to look up the right spelling. I found that very helpful to me.
- Student 3: You explained the title of your paragraph well. I think you are right - for item 1 of this evaluation form, this composition should be rated 1. What you all are saying belong to items 5 and 6.
- Student 4: Thank you for all your suggestions. I will look into that and make those changes.
- Student 5: Now, can we move on to my composition?
- Student 2: Before we go on to the next composition - why don't we all write our comments now so he can remember them.

## Sample Episode

## Use Session on the 18th Day

- Student 1: This is a very good composition. I wanted to write about this topic on too much telephone gossip but I was worried about my Mom.
- Student 2: (writer) Why should you? My Mom didn't mind when I told her about writing about it. In fact we talked about it first before I wrote it. She gave me a lot of ideas. She didn't mind me writing about her too.
- Student 4: Well, now I understand why all your ideas are very relevant. You have them all organized properly. I think this composition should get all 1s in this evaluation form.
- Student 3: Not too fast! I see a couple of misspelled words here. The dictionary said this word should be spelled this way - behavior - u can be included but without it - this is more acceptable.
- Student 5: Oh, that's only minor - she can use it both ways. Now, let's evaluate this composition now.
- Student 2: Don't forget to write your comments.

**APPENDIX F**

## Sample Summary Comments of Students

## Training Session

## Sample 1:

I think the passage was very interesting because it got right to the point and gave very good sentences.

## Sample 2:

This passage was well done. The events explained the problem clearly. I did not understand a few words but I used the dictionary while reading to help me understand the meaning. Also, at first I thought some of the words were misspelled but after checking them out they were correct. They just seemed wrong to me.

## Sample 3:

This is a very dull passage. I didn't particularly care for it. However, the information given on how to recognize propaganda techniques was very interesting. I learned about it. I think it will help me evaluate some of those advertisements on T.V. now. This is a very good model passage.

## Sample 4:

I was very interested in this passage about Dr. Martin Luther King. This passage explained in clear and concise manner the reason he became a hero. The words were very easy to understand. I wish all stories will be written this way so I won't have to read it several times in order to get its message. This is indeed perfect.

## Sample Summary Comments

## Use Sessions

## Sample 1:

I think Rosemary, this composition is very interesting. You gave many good examples on why we need a good education. You came right to the point. You did not beat around the bush.

## Sample 2:

Steven, this is an excellent composition. However, there are a couple of misspelled words and some of your sentences are too long. You are trying to put many ideas in one sentence. It is well organized.

## Sample 3:

I think Auyuma you explained very clearly why we should say no to drugs. You have a good understanding of the topic because you discussed about alcohol too, and those other bad things that will confuse our minds. This is a perfect composition and I marked them all 1 and I agree with you.

## Sample 4:

This is an unbelievable composition. There are too many details but not correctly organized. All your information are pertinent to the topic but people will not understand what you wrote because the sentences are either too long or don't make sense at all.

**APPENDIX G**

## Evaluative and Directive Phrases Used to Facilitate Revision

### Use Session

#### Evaluative Phrases

This is not important. I don't see that it is needed.

It is not believable. Try another one.

No one will be interested in this part.

This is good. People will be interested.

This is a useful sentence.

You can say this part of the sentence more clearly.

You are getting away from the point.

Even I am confused about what you are trying to say.

This doesn't sound right. Check your source once again.



## Directive Phrases

### Use Session

(Students using these statements on their own compositions)

I think I will leave it this way.

That's correct, I should give examples here.

Yes, this is correct, I will cross out this sentence and I will say it in another way.

I will change the wording of this sentence here.

I think I can say this idea better by saying more about it.

APPENDIX H

## Teacher Evaluation for Scoring Students' Essays/Compositions

### A. Mechanical Component

#### 1. Handwriting (i.e. penmanship)

a. Letter Formation	0	1	2	3	4	5
b. Spacing	0	1	2	3	4	5
c. Slant	0	1	2	3	4	5
d. Line Quality	0	1	2	3	4	5
e. Letter size and alignment	0	1	2	3	4	5
f. Fluency (Rate)	0	1	2	3	4	5

### B. Productive Component (Content Productivity)

1. Use of words (at least 2 or more letters in the word)	0	1	2	3	4	5
2. Use of sentences (thought units simple sentences, number of words)	0	1	2	3	4	5
3. Highly productive in factual content essential to meaningful essay/composition	0	1	2	3	4	5
4. Utilize various styles/structure for writing essay/composition (i.e. narrative, expository, expresses moral theme, definite ending, etc.)	0	1	2	3	4	5

### C. Conventional Component

1. Spelling	0	1	2	3	4	5
2. Punctuation marks properly placed	0	1	2	3	4	5
3. Use of capital letters	0	1	2	3	4	5
4. Indention of the first sentence between paragraphs	0	1	2	3	4	5
5. Uses of appropriate title for essay/composition	0	1	2	3	4	5

### D. Linguistic/Cognitive Component

1. Selection of appropriate word tenses	0	1	2	3	4	5
2. Selection of appropriate pronouns, adjectives, adverbs, etc.	0	1	2	3	4	5
3. Content easily understood	0	1	2	3	4	5
4. Content adequately conveys	0	1	2	3	4	5
5. Paragraphs written in organized units of thoughts, into identifiable segments	0	1	2	3	4	5

Source: Informal Assessment of Written Language in Test of Written Language by Donald D. Hammill and Stephen C. Larsen (Austin, Texas, Pro-Ed, 1983, 35-55).

APPROVAL SHEET

The dissertation submitted by Virginia Serrano Sison has been read and approved by the following committee:

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The dissertation is therefore accepted in partial fulfillment of the requirements for the degree of Doctor of Education.

April 27, 1988  
Date

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