A STUDY OF REMEDIATION OF LANGUAGE ARTS OBJECTIVES USING AN EXPERIMENTAL CURRICULUM

DISSERTATION

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By

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The purpose of this study was to determine if students who participated in language arts remediation which was infused with critical thinking activities and metacognition would make greater gains in skills and achievement than those students who were remediated with a regular language arts curriculum. The population for this study was a group of at risk students who were fourteen to sixteen years old and who were participants in the 1987 summer Youth Opportunities Unlimited project at the University of North Texas. Their progress was measured with California Achievement Test and Iowa Test of Basic Skills pretests and posttests.

The organization of the study includes a statement of the problem, a review of the literature, the methods and procedures used to collect the data, the analysis of data, and a summary of the findings, conclusions, educational implications, and recommendations for additional research.

Data from the eight hypotheses were treated with an analysis of covariance.

The analysis of data revealed the following:

1. The infusion of critical thinking activities and metacognition did not improve students' skills or achievement

in the following areas: spelling, capitalization, and punctuation.

2. The infusion of critical thinking activities and metacognition did not improve students' skills in usage and expression as tested with items focusing on subject/verb agreement, verb tense, pronoun case, and pronoun degree.

3. The critical thinking activities and metacognition made a significant difference in students' achievement in language expression.

The education implications are that lessons designed with mechanics objectives such as capitalization and punctuation should include independent practice. However, lessons designed with objectives focusing on usage, subject/verb agreement, double negatives, verb tense, and pronoun case and degree should include critical thinking activities and metacognition.

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CHAPTER I

INTRODUCTION

Along with the public charge for excellence and accountability in education in the 1980s has come the educational institutions' responsibility to remediate those students who do not pass the required standardized tests at each grade level. A major recommendation of the National Commission on Excellence in Education in "A Nation at Risk: The Imperative for Educational Reform" is that a student's grades and grade level placement reflect his level of academic achievement rather than his effort or his age. Within two years after the commission's report, the majority of states had passed minimum graduation requirements to be measured with minimum competency tests (Archer, 1986). The Texas Legislature passed House Bill 72 in 1984 requiring competency testing in mathematics and language arts at grades one, three, five, seven, nine, and eleven. An inevitable result of such required competency testing is the need to remediate those students who fail the tests so that they do not become at risk and drop out of school.

Historically, remediation has meant reteaching the lesson that was not learned in the same way that it was not learned the first time. In cases where special remedial

classes have been established, they too often have been designed to go through the same curriculum at a slower pace than the regular classes. Taylor (1980) attributes this approach to Jerome Brunner and Benjamin Bloom who identified education as "the process of breaking the subject down into short, manageable segments and providing lots and lots of practice." This concept seems at odds with Piaget's stages of cognitive development, and it has not been effective.

Although there is no identified model for effective remediation, research does clearly show some findings:

1. Repeating the same lessons that a student has failed does not significantly increase learning. (Hobbs & Robinson, 1982)

2. Carefully designed programs for remediation can be effective as late as high school and early adulthood. (Hobbs & Robinson, 1982)

3. Low aptitude students are characteristically careless and superficial in their problem solving. (Nickerson, 1984)

4. Teaching cognitive skills to low aptitude students can reduce their developmental deficits. (Nickerson, 1984)

5. Adolescence may be a prime time for remediation since students that age have shifted from Piaget's concrete operational stage into the formal operational stage, but their intelligence as it is measured by conventional tests

has not begun to level off. (Hobbs & Robinson, 1982)

6. Remedial classes should be small. (Garton, 1984)

7. Communication skills are strengthened in classrooms where students are stimulated to think and to verbalize their ideas. (Educational Planning & Research, Boston, MA, 1982)

When these findings are considered, a viable method for remediating at risk students and thus reducing the dropout rate appears to be a plan that would remove the adolescents from their traditional learning setting and involve them in a carefully designed curriculum in small groups. This study was designed to remediate language arts skills in just that way. The Texas Education Agency English I objectives were used, and strategies aimed at identifying cognitive processes and improving those skills were added. Students were encouraged to verbalize their metacognition.

Statement of the Problem

The problem of this study was to determine if students who were remediated with an experimental curriculum which was infused with critical thinking skills activities and metacognition made significantly higher gains on their language usage objectives than students who were remediated with a regular curriculum.

Purpose of the Study

The following are the purposes of this study:

1. To identify the level of mastery of language skills

as measured by the Iowa Test of Basic Skills (ITBS) in the University of North Texas Summer (1987) Youth Opportunities Unlimited program at the beginning of the remediation in language arts and again at the end to determine if there was a significant difference in the final progress of those who experienced the regular curriculum and those who experienced the experimental curriculum.

2. To identify the language achievement level as measured by the California Achievement Test (CAT) of those same students at the beginning of the study and again at the end of it to determine if there was a significant difference in the achievement of those students who experienced the regular curriculum and those who experienced the experimental curriculum.

Hypotheses

1. Students who experienced the experimental curriculum will show a significant increase in spelling skills over those who experienced the regular curriculum.

2. Students who experienced the experimental curriculum will show a significant increase in capitalization skills over those who experienced the regular curriculum.

3. Students who experienced the experimental curriculum will show a significant increase in punctuation skills over those who experienced the regular curriculum.

4. Students who experienced the experimental curriculum will show a significant increase in language and expression skills over those students who experienced the regular curriculum.

5. The increase in achievement level in capitalization will be significantly higher for those students undergoing the experimental curriculum than for those in the regular curriculum.

6. The increase in achievement level in punctuation will be significantly higher for those students undergoing the experimental curriculum than for those in the regular curriculum.

7. The increase in the achievement level of word usage will be significantly higher for those students undergoing the experimental curriculum than for those in the regular curriculum.

8. The increase in the achievement level of spelling will be significantly higher for those students undergoing the experimental curriculum than for those in the regular curriculum.

Background and Significance

When the National Commission on Excellence in Education recommended in 1982 that high schools, colleges, and universities hold more rigorous and measurable standards, many states, including Texas, established required competency

testing in mathematics and language arts. Texas requires all students except special education students who have been exempted by their Admission, Review, and Dismissal Committee to pass the Texas Assessment of Minimal Skills (TEAMS) in order to receive a high school diploma. The exit level exam is given in October of their junior year, and students who fail it can retake it in May of that year and in October and May of their senior year. Failure to master the test requires that remediation be provided in the classroom and documented by the school. The school must review the individual student data and develop an individual profile of each at risk student. That profile must include ways to monitor the student's progress. The school must send home written notification describing the programs or services that are being used to assist the student. As a result of this education reform, at risk students are becoming the center of attention for many public school administrators. In describing the effect of minimal competency testing on public schools in North Carolina, Richman and Brown (1986) say "Failure has become costly. Considering the price of failure, it becomes imperative to assess training techniques and to identify remediation methods that will improve the students' chances for acquiring the minimal academic competency required for high school graduation."

U. S. Commissioner of Education William Bennett focused attention on the necessity of effective remediation when he ordered a lowering of the dropout rate in public schools. Texas Education Agency responded to that order with a ruling (News, April 11, 1987) targeted at reducing the statewide dropout rate from 35 percent to 24 percent within four years and to 5 percent by 1997-98. The ruling requires that school districts and individual campuses develop plans aimed at identifying, assessing, and remediating at risk students. Remediation for English language arts and mathematics has become so much a part of the secondary school curriculum that it has been called a "discipline" in its own right (Escoe, 1982).

This study is significant because it is a remediation plan that focuses on specific language arts objectives for adolescents and allows for easy monitoring and documenting of students' progress with those objectives. It very simply develops self monitoring of cognitive processes, so it can easily be replicated in any language arts classroom where there is a relatively small student/teacher ratio. Although the lessons used in this study followed Madeline Hunter's Principles of Effective Teaching and Learning, the critical thinking strategies could be used in any lesson design. The curriculum does not require special facilities or expensive equipment.

Wilson (1985) points out that with the exception of reading research, few empirical studies have been devoted to metacognitive processes in adolescents and adults. However, reading for comprehension, summarizing, and synthesizing--activities common to the language arts classroom--are sophisticated intellectual tasks and an awareness of these processes should help the student accomplish the tasks. If these critical thinking skills are enhanced, there should be some carry over into other academic areas, but there will be no attempt here to document that carry over.

Terms

At Risk Student-identified by TEA as a student in grades 7-12, under 21 years old who meets one or more of these conditions:

1. has not been promoted one or more times on the basis of academic achievement
2. is two or more years below grade level in reading or mathematics
3. has failed at least two courses in one or more semesters and is not expected to graduate within four years of the time he or she entered the ninth grade
4. has failed one or more of the reading, writing, or mathematics sections of the

most recent TEAMS test beginning with the seventh grade test

Critical Thinking-the mental processes, strategies, and representations people use to solve problems, make decisions, and learn new concepts

Metacognition-most commonly defined as thinking about thinking

- "knowledge concerning one's own cognitive processes and anything related to them" (Flavell 1976)
- "predicting, checking, planning, asking questions, self-testing, and monitoring ongoing attempts to learn or solve problems" (Flavell 1976)
- "awareness and regulation of cognitive activity" (Palencsar and Brown 1987)

Principles of Effective Teaching and Learning-PETL Madeline Hunter's lesson design model: (1) anticipatory set, (2) input and modeling, (3) check for understanding, (4) guided practice, (5) independent practice, and (6) closure

Teams-Texas Educational Assessment of Minimum Skills-a criterion-referenced test whose objectives are the essential elements in the English and mathematics curricula in Texas public schools.

Collection and Treatment of Data

The population for this study was the students who participated in the Youth Opportunities Unlimited (Y.O.U.) program at North Texas State University during the summer of 1987. Y.O.U. is an eight week residential, university-based education and work experience summer program for fourteen and fifteen year old at risk students who are economically disadvantaged and who meet Junior Training Partnership qualifications. Participants work one half day and attend classes in mathematics and English language arts one half day. They are also provided tutoring, career awareness, study skills, photography, journalism and other enriched experiences. The population was stratified by grade and the samples were randomly selected. There were two classes in the control group: a morning class with eight students and an afternoon class with fifteen. The experimental group was comprised of two classes also: a morning class with eleven students and an afternoon class with eight.

The California Achievement Test, which was used to measure the pre-program language achievement levels and the post-program language achievement levels, was administered by Y.O.U. teachers in classroom settings. There was a teacher aide in each test site. The tests were machine scored and the raw scores were converted into grade equivalents for each of the four sections and for the total language battery. The

pretest grade equivalents of each section were compared with the posttest grade equivalents of each section and the total language battery pretest and posttest scores were compared. The statistical procedure used to determine if there was a significant difference in the gains of the two groups was an analysis of the covariance.

The Iowa Test of Basic Skills, which was used to measure the pre-program language skills and the post-program language skills, was administered by the researcher in the English I classrooms. A teacher aide was present. These tests were hand scored and the raw scores were converted to grade equivalents. These pretest grade equivalents for each of the four sections were compared with the posttest grade equivalents. The grade equivalents for the total batteries were also compared. Once again the statistical procedure used to determine if there was a significant difference in the gains of the two groups was the analysis of covariance.

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CHAPTER II

RELATED LITERATURE

The literature that relates to this study includes information on remediation, critical thinking, and metacognition. It can be clustered around the seven premises upon which this experimental curriculum has been built. These premises can be labeled in this manner:

1. Traditional Remediation
2. Possible Effectiveness
3. Characteristics of Remedial Students
4. Developmental Deficits in Cognitive Skills
5. Adolescents as a Target
6. Remedial Class Size
7. Metacognition in the Classroom

Traditional Remediation

The concern for low achieving students surfaced around 1848 with the introduction of grade-level textbooks and the development of distinct grade levels (William and Walker, 1973). At that time, teachers addressed the problem by retaining the students who did not demonstrate mastery of each grade's skills. Retention remains a common form of remediation today; however, its effectiveness is not clear. A review of literature conducted at Indiana University

(Harkness, 1984) concluded that a majority of studies indicate that low-achieving students will do just as well, if not better, if they are promoted rather than retained. In either case, the students remain below grade level and in need of remediation. Repeating a grade too often means just that: the student repeats the same failures without significantly increasing his learning. This same student may continue to fail as long as he is in traditional settings (Hobbs & Robinson, 1982).

Educators who discredit retention policies argue that underachievement is not usually the result of poor motivation, but rather the result of class background, racial discrimination, sex, level of intelligence, family conditions, test invalidity, or other such causes. If fear of retention is supposed to provide motivation for students to learn, it works only to the degree that students find retention distasteful. Plummer (1985) concedes that although retention may motivate the low-achieving student, it will not motivate the average or above average student to improve his grades. The inconclusive findings on the value of retention lie in the design of the studies. One kind--the kind that compared students retained with students promoted under normal school policies--was biased toward social promotion. Even after attempting to match students by age, grade level, sex, grades, IQ, achievement, test scores, economic status,

etc., the researcher could not dismiss the fact that the students' retention indicated a more severe problem. Another type of research--that which compared outcomes of students before and after retention--was biased toward retention. Any student could logically be expected to make some gain during a year. There were almost no true experimental designs where students were randomly promoted or retained and then compared, and most studies involved some form of remediation, not just retention (Harkness, 1984).

Possible Effectiveness

Although there is no obviously superior model for bringing students up to grade level, there is hope that remediation can be effective as late as high school and adulthood. Educators have sometimes doubted that fact. In the late 1960s and 1970s, psychologists emphasized the importance of the early years' experiences so much that policy makers concentrated resources on compensatory programs for young disadvantaged children. However, in 1982 Hobbs and Robinson from Vanderbilt published positions that these were erroneous assumptions and supported an expanded national investment in teaching cognitive skills to adolescents and young people in schools, business, industry, and the military. They cite studies which indicate the real possibility for "repairing developmental deficits."

Additional positive hope for successful remediation comes from the evaluation (1978) of the National Institute of Education Title I programs of the Elementary and Secondary Education Act of 1965. These reports indicate that students who seem destined to fail in traditional settings can succeed when they are placed in imaginative, carefully designed settings. This study demonstrated that academic skills can be taught efficiently at any age up through adolescence (Hobbs & Robinson, 1982). A project designed to bridge the academic gap between minority and majority high school students' performances on standardized exams confirmed that point when the students who had experienced eight weeks of training in analytical reading showed significant improvement (Thurman, 1986). Thurman summarized these findings by saying "Perhaps we are on the verge of finding out how to teach it [intelligence] or at least how to teach students to show their intelligence through standardized examinations." Another work frequently noted in literature on remediation is that of Reuven Feuerstein, an Israeli psychologist, who researched the cognitive development of older children, adolescents, and adults. Feuerstein (1980) reports that unless there is genetic or organic impairment, students' cognitive abilities can be modified at all ages and stages of development. Marzano and Arredondo (1986) refer to that modification as cognitive restructuring. In their plan for

cognitive restructuring, they call for giving students the confidence and skills for completing academic tasks through verbal mediation, that is talking through a task.

Characteristics of Remedial Students

The belief that low aptitude students are more careless and superficial in their problem solving than high aptitude students is undisputed in literature. According to Nickerson (1984), one major difference between expert and novice problem solvers is that the performance of experts has more metacognitive aspects than that of novices. Another source lists the preliminary activities of expert problem solvers as conceptualizing a problem, finding alternative ways of representing it, and planning an approach (Larkin, McDermott, Simon and Simon, 1980). The expert thinkers generally plan more effectively and monitor their performances more carefully. They understand their own capabilities and limitations in the problem solving domain. On the other hand, Bloom and Broder (1950) point out that low aptitude students typically spend very little time considering a question. They may choose an answer on the basis of a few clues, a feeling, an impression, or a guess. Bloom and Broder call this process "one-shot thinking." Two patterns that Rath, et al. (1966) pointed out as inappropriate behaviors in thinking substantiate Bloom and Broder. Rath told teachers to look for impulsive students who seem to act

without thinking. These students will make decisions quickly and impulsively without advance planning or without considering alternatives. The second pattern to watch for is the anti-intellectual student who condemns thinking as a waste of time and effort. According to Whimbey (1984), these students not only engage in one-shot thinking but also allow gaps of knowledge to exist. They are indifferent toward achieving an accurate or complete comprehension of situations or relationships. In contrast, high aptitude students will analyze a new problem, determine what they know about it, find other information to clarify it, and progress through steps to a solution. The contrast in the two types of performers is consistent.

Perkins (1986) recognizes the differences in the performances of students with an equation: Intelligence = Power + Tactics + Content. He acknowledges the importance of tactics when he says that "intelligence is a matter of tactical repertoire." He points out that students who have been identified as retarded or slow learners usually lack strategies for memorizing and problem solving. These reasoning techniques do not necessarily come naturally, but they can be taught with direct instruction.

Developmental Deficits in Cognitive Skills

Although the interest in critical thinking had its beginning before Glaser's An Experiment in the Development of Critical Thinking Test, it is now gaining attention as a matter for classroom instruction (Paul, 1984). Glaser (1984) affirms the possibility of moving students to a higher level of cognitive application with the use of current research and development. He says that cognition improves when the classroom produces "a changed environment for learning--an environment in which there is a new relationship between students and their subject matter, in which knowledge and skill become objects of interrogation, inquiry, and extrapolation." Brown (1978) refers to these same skills in a simpler way: he calls for (1) knowing what one knows and does not know, (2) predicting the outcome of ones performance, (3) planning ahead, (4) efficiently apportioning time and cognitive resources, and (5) monitoring and editing one's efforts to solve a problem or to learn. These processes make a difference in achievement. Bloom estimates that "cognitive entry behavior can account for up to one-half of the variance on relevant cognitive achievement measures, while affective entry characteristics and quality of instruction may account for approximately one-quarter of the variance on academic achievement measures" (Hall, Griffin, Cronin, & Thompson, 1985). If the cognitive process is so

important to learning, improving it should enhance remediation. This belief is upheld in the report from Orange County Department of Education in Santa Ana, California. Remedial students who participated in Project Impact, a project focusing on critical thinking, showed growth equivalent to more than a year in a seven month period while their comparison students averaged half a year's growth in reading. In math the project students showed almost two years' growth while the comparison group showed a seven month gain (Orange County Department of Education, 1981). Other reviews of the various programs which teach thinking indicate seven types - all of which could be used with the remedial student (Nickerson, 1984).

1. Teaching cognitive processes such as comparing, classifying, inferring, and predicting

2. Teaching heuristics or strategies to be used in problem solving

3. Focusing on formal thinking which follows concrete operations or stage development

4. Manipulating language and symbols to represent ideas and relationship

5. Thinking about thinking (metacognition)

6. Teaching learning strategies such as mnemonic techniques

7. Combining the acquisition of knowledge with the the acquisition of thinking skills.

Although Nickerson admits that the evidence regarding the effectiveness of specific programs for teaching thinking is limited, he holds that the enhancement of thinking ability is at least implicitly a major objective of the educational process.

Adolescents as a Target

The belief that adolescence is an appropriate time for repairing cognitive deficits is well founded in literature. Nickerson (1984) uses Piaget's stages to explain that the ability to perform formal or abstract operations must follow the ability to perform concrete operations. This shift should have occurred or be ready to occur by adolescence. "The adolescent becomes capable of formal thought, that is the ability to treat events abstractly, to subordinate the real to the possible, to use metaphor in construing the world, to engage in hypothetico-deductive thought, to manipulate combinatorial systems, to use internalized speech, to think about thinking, to use nameable strategies for problem solving, and to monitor his own thought" (Hobbs & Robinson, 1982). Hobbs and Robinson also note that intelligence as it is measured by conventional tests continues to rise in early adolescence but begins to level off in later adolescence and early adulthood. Other

researchers who associate the development of the cognitive process with adolescence are Cantwell (1982) and Day (1979). Both claim that adolescence is a critical time for a person to develop and nurture general cognitive competence. Another major work which concluded with a call for experimental curricula that would assess and teach cognitive skills was that conducted by Feuerstein. Feuerstein worked with Israeli adolescents who were behind in their intellectual development because of their cultural disadvantage or their disrupted lives, and he reported that those cognitive deficits could be remedied with a formal instructional program (1980). Literature supports the premise that adolescence is a good time for remediation of cognitive skills.

Remedial Class Size

The recommendation that remedial classes should be small is common to much literature relating to remediation. The nature of the at risk student necessitates a great deal of personal attention and flexibility. Reviews of the programs started in the Houston Independent School District to prevent dropouts resulting from minimal competency testing report the most success with programs that have a small pupil-teacher ratio (LeCompte, 1985). Reports from North Carolina show similar findings: the most improvement in both math scores and reading scores occurred where there was either individual or small group instruction (Parramore, 1980). The

recommendation that remedial classes should be small has been made by practically every advocate of the economically disadvantaged (Garton, 1984). Disadvantaged students benefit from contact and interaction with the teacher because they often lack self-confidence.

Recent research on the effects of class size has been a part of the education reform movement and confirms the value of small pupil/teacher ratios at all levels. When researchers in Chicago studied government funded kindergarten classes, most of which serve low income families, they found that "the strongest influence in kindergarten achievement . . . appeared to be the pupil/teacher ratios." Students in those classrooms with low pupil/teacher ratios achieved higher scores on standardized achievement tests than did students with larger pupil/teacher ratios (Bain & Achilles, 1986).

In another project, Program Prime Time in Indiana, the findings make a strong case for reducing class size in primary classes with three kinds of evidence. First, the small class teachers perceived significantly more improvement than did the large class teachers. Second, the parents of children in small classes reported that their children's school progress was above their expectation significantly more often than did the parents of children in large classes. Third, achievement test scores were significantly

higher for small class students than for large class students (Mueller, Chase, & Walden, 1988). These reports indicate that small classes are important to student learning in kindergarten and primary grades.

The recommendations are the same for high school classes. While discussing his five year study of adolescent education, Ted Sizer said that one important way to insure intellectual development in high school students is to get the pupil/teacher ratios down. He suggests that no high school teacher ever be responsible for more than eighty students.

Metacognition in the Classroom

Literature supports the premise that remedial students benefit from verbalizing their thinking processes in the classroom. Indeed in reporting on a Chapter I Higher Order Thinking Skills program (HOTS), Stanley Pogrow (1988) suggests that many at risk students have not "internalized a cultural sense of what understanding is." They have not had opportunities to have "understanding conversations" with parents and teachers. They have not been required to evaluate ideas based on given information. These students do not know how to have ideas about issues. Teachers in this program were encouraged to have "understanding conversations" with their students. Communication skills are strengthened in any classroom where students are stimulated to think and

to verbalize their ideas. The research on teacher effectiveness describes an environment where students attain high academic standards as a place that provides "a clear organizing structure for verbal learning" (Glatthorn, 1985). Intellectual growth occurs best when a person interacts with the environment so an effective teacher will structure communication contexts that provide students with problems to solve. The first recommendation in the evaluation of Boston's Title I Secondary Reading/Language Arts and Math Programs for 1980-81 was that the program strengthened the communication skills within the classroom. The evaluators observed that the students who entered the classroom, located their folders, and started to work did not make as much progress as students who were a part of a language rich environment. They concluded that "silent classrooms do not motivate students to acquire strong reading and communication skills" (Educational Planning and Research, Boston, MA, 1981).

This same kind of verbal exchange appears to be a critical factor in teaching critical thinking. Instead of looking at thought as something that originates inside the individual and is then expressed socially, psychologists have recently come to realize that much thought is a social process which is only internalized after it has been socially expressed (Sternberg, 1987). This concept makes class

discussion essential to a thinking skills program. Outside the classroom the proliferation of think tanks and political task forces supports the belief that thinking together most often results in better thinking (Thompson & Frager, 1984).

Wassermann (1987), points out another benefit to students who verbalize their ideas. These students originate their own ideas after a mental exercise; therefore when they present their ideas, they take ownership of those ideas. Ownership of information may be a new relationship for the remedial student. Another way in which students can benefit from verbal participation in the classroom is with metacognition-thinking about thinking. Wilson (1985) defines metacognition as "learning about learning." Flavell (1979) defines it as "knowledge and control of one's own cognitive processes." Other definitions from Baker and Brown (1984) are similar. When students learn to plan, monitor, and evaluate their thinking processes aloud, they are engaging in verbal metacognition and Paul (1984) claims that the crucial part of teaching a skill is "discussing its operational procedures." Wiens (1983) says that learning disabled adolescents can become more active learners if they learn metacognitive strategies. A major reference for these strategies is Whimbey and Lochhead's book Problem Solving and Comprehension: A Short Course in Analytical Reasoning (1979). This book suggests that students work in pairs with

one student solving the problem aloud and the other serving as a listener. Thurman (1986) reports success in a project that used a modified version of the Whimbey technique. The program was an honors high school curriculum for minorities in the health sciences and the major method of instruction was modeling thinking processes by thinking or reading aloud. The students' scores on verbal tests like the Nelson-Denny Reading and the SAT did improve.

In a study with learning disabled students, Bos and Filip (1984) report that learning disabled seventh graders could perform as well as average seventh graders on a reading comprehension test when the disabled students were taught to monitor their comprehension. The average students automatically looked for text inconsistencies when reading confusing passages, but the disabled students did not even realize that the passages did not make sense until they were told to look for test inconsistencies. This study concluded that an awareness of one's own cognitive processes appears to be important for many academic problem solving situations.

Baer (1988) recently affirmed the importance of an awareness of cognitive processing by saying educators need to "influence thinking at a different level and . . . shape the processes that underlie these more superficial strata of cognition." However, he cautions against three possible dangers: (1) Teaching thinking skills must not formalize the

educator's concept of thinking as diagraming sentences and memorizing rules has sometimes formalized writing; (2) teachers must remember that good thinking may occur unconsciously; (3) teachers must not evaluate thinking skills with tests that require students to report on their thinking processes. Baer's conclusion is that there is a place for direct instruction on critical thinking, but it must be done by sensitive, trained people.

The literature that is available to evaluate the effectiveness of metacognition in the classroom is scarce. Ron Brandt (1988) introduces Educational Leadership: Teaching Thinking Throughout the Curriculum in his "Overview" by pointing out that the most controversial and least understood element in teaching thinking is the "attempt to teach particular mental skills and processes such as summarizing the decision making" because we do not have a body of knowledge that can provide us a sure sense of direction. However, in reporting the results of investigations of metacognitive instruction, Palincsar and Brown (1987) indicate that instructional time can be enhanced with metacognition in four areas: (1) memory skills, (2) text comprehension, (3) written expression, and (4) math performance. Indeed the literature strongly suggests that teaching metacognitive skills in the classroom offers real hope for remediation.

More specific evaluations were given by Sternberg and Bhana (1986) after they reviewed the research on five diverse but popular thinking skills programs: (1) Instrumental Enrichment, (2) Philosophy for Children, (3) SOI (Structure of the Intellect), (4) Problem Solving and Comprehension: A Short Course in Analytical Reasoning, and (5) Odyssey. Their conclusion was that the success of any program depends on several factors such as "quality of teaching, administrative support, appropriateness of the program for the student population, and the extent to which the program is implemented in the intended manner." When these factors are appropriate, instruction in thinking skills can be very effective.

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CHAPTER III

METHODS AND PROCEDURES

The Population

The purpose of this project was to study the effect of verbal metacognition on the performance of at risk students on TEA language arts objectives. The at risk students were those fourteen to sixteen year old participants in the 1987 summer Youth Opportunities Unlimited project at the University of North Texas. These students were recommended for the program by their school counselors from rural and large city schools throughout North Texas. They were identified as at risk because they met one or more of the following conditions: (1) They had not been promoted one or more times on the basis of academic achievement. (2) They tested two or more years below grade level in reading or mathematics. (3) They were not expected to graduate in the scheduled four years for high school. (4) They had failed one or more sections of the TEAMS test beginning with the seventh grade test. In addition to meeting these academic requirements, the students came from homes that met the Junior Training Partnership requirements for being economically disadvantaged.

The director of Y.O.U. randomly assigned students to one of the four English I classes taught by the researcher. After the classes were formed, the researcher designated a morning and an afternoon class as the control group and the morning and an afternoon class as the experimental group. That decision was based on equalizing the number of students in each group as nearly as possible. The control group became the 7:30 a.m. class with eight students and the 3:00 p.m. class with fifteen; the experimental group became the 9:30 a.m. class with eleven students and the 1:00 p.m. class with eight.

The participants' daily lives were structured similarly while they were participating in the Y.O.U. program. Each student attended a two hour language arts class and a two hour mathematics class each day and worked four hours a day. All students were eligible for incentive bonus points for good performance and good citizenship. These bonus points could be collected and exchanged for tangible rewards such as cameras or radios. Other incentives were free weekend visits to places such as Six Flags or Wet N' Wild for students who were passing their classes and who had no bad citizenship reports. All students had similar daily routines and similar incentives to perform.

The Evaluation

The student gains were measured for skills and for

achievement. The California Achievement Test was used by the Y.O.U. administrators to determine student gains during the program. The California Achievement Test is recognized as a test that relies heavily on items which require only a knowledge of rules and a familiarity with grammar terminology (Post, 1959). Spelling achievement is checked in sentence format with four words underlined. The student marks the letter of the misspelled word or the choice labeled "none." The Language Mechanics test is divided into two subtests. In the capitalization subtest, test items are also in sentence format. The student marks the letter of the part of the sentence that has a capitalization error, or he marks "none." The punctuation subtest has sentences that may or may not need one of the four punctuation marks listed. The fifth choice is "none." The Language Expression Section has two parts: Usage Sentence Structure and Paragraph Organization. Usage is tested by students choosing the correct pronoun, verb, modifier, or connector to fill in the blank in a sentence. Students' understanding of clarity is measured by their identifying which sentence in a set of three is most clearly expressed. To test knowledge of paragraph organization, students choose the correct order for sentences in a paragraph.

The test provides norms for percentile, grade, and age. The Fourth Mental Measurements Yearbook reports that the

standardization and norm samples are sufficiently large and that the single-grade reliability coefficients which range from .83 to .96 with a median of .90 are satisfactory (Findley, 1953). The subtotal and total scores have progressively high reliabilities. Both the CAT pretest and the posttest were administered by Y.O.U. teachers in the classroom settings. There was a teacher aide in each test site. The tests were machine scored and the raw scores were converted into grade equivalents for each of the three sections (Spelling, Language Mechanics, Language Expression) and for the total battery. The pretest grade equivalents of each section and the total language battery pretest and posttest scores were compared. The statistical procedure used to determine if there was a significant difference in the gains of the two groups was an analysis of covariance.

The evaluation instrument for the growth in language skills was the Language Skills section of the Iowa Test of Basic Skills: Form G for the pretest and Form H for the posttest. The researcher chose this test because it focuses on generalized intellectual skills, not on content achievement. Reviews from Burros's The Fifth Mental Measurements Yearbook by Herrick and Morgan establish that fact. Morgan adds that the skills measured are educationally the most important. His main criticism of the language tests is that they "lack width and imagination"--the price paid for

technical efficiency in objective response form. Herrick says that the language tests tend to emphasize the editorial aspect of language use and not the "dynamic, functual, creative aspect." In the spelling test, the student chooses the one misspelled word from a list of four words, or he marks the number labeled "no mistakes." The capitalization items consist of one or more sentences which cover three lines. The student marks the number of the line which has a capitalization error in it, or he marks "4, no mistakes." Capitalization items are grouped in major categories such as names and titles, organization groups, linguistic conventions, and overcapitalization. The punctuation section is arranged in much the same way. The sentences cover three lines and the fourth line is labeled "no mistakes." The student marks the number of the line which contains a punctuation error, or he marks "4, no mistake." These punctuation errors may be the incorrect use of terminal punctuation, commas, apostrophes, quotation marks, colons, semicolons or overpunctuation. The section on usage and expression measures the students' ability to use words according to the standards of correctly written English. The usage items measure skills with use of verb, personal pronouns, modifiers, and context items such as double negatives, redundancies, homonyms, and plural forms. The expression items measure conciseness, clarity,

appropriateness, and organization. The format for this section is similar to the capitalization and punctuation sections in that there are three lines of text and a fourth line marked "no mistakes." The students find the error in the text or mark "4, no mistake."

The validity and the reliability of the tests are unquestioned. Remmers reports that no other battery of tests has been constructed with greater technical sophistication, greater adequacy of statistical base, or greater use of previous research. Reliability coefficients are high; they range from .84 to .94 for the major tests and from .70 to .93 for the subtests. Two types of norms are provided--grade equivalent norms and percentile norms within grade.

Both the ITBS pretest and posttest were administered by the researcher in the English I classrooms. A teacher aide was present. These tests were hand scored and the raw scores were converted to grade equivalents. These pretest grade equivalents for each of the four sections (Spelling, Capitalization, Punctuation, Usage and Expression) were compared with the posttest grade equivalents. The grade equivalents for the total batteries were also compared. Once again the statistical procedure used to determine if there was a significant difference in the gains of the two groups was the analysis of covariance.

The Lesson Design

Each two hour class was planned using Madeline Hunter's Principles of Effective Teaching and Learning (PETL) as the lesson design model. This model breaks the lesson into six parts (1) anticipatory set, (2) input and modeling, (3) check for understanding, (4) guided practice, (5) independent practice, and (6) closure. The components of the control lesson and the experimental lesson were the same for parts one, two, three, four and six. The only difference was the fifteen to twenty minutes spent on part five. The control classes engaged in independent practice of the day's objectives. For example, when the lesson's objective was for students to learn to use end marks and commas correctly in series, the independent practice was the students working independently at their desks punctuating the sentences on a work sheet and generating their own sentences with words, phrases, or clauses in series. The teacher and the teacher aide monitored the students' work. The same lesson in the experimental classes had activities in verbal metacognition rather than independent practice. Cartoon strips were projected on the screen and the students took turns generating sentences with items in series. They talked through their mental process with dialogue such as this: "In the first frame Garfield is doing something. He is waking up. In the second frame, John is talking to him.

In the third frame Garfield goes back to sleep. Let me compare the frames. Garfield wakes up, John talks to him, Garfield goes back to sleep. The second one is different. John (not Garfield) is doing something. I'll change it. Garfield wakes up, listens to John, and goes back to sleep. Remember the rule that says phrases in series must be separated with commas. I know that. I comprehend that. I have phrases in series, and I apply the rule."

The members of the experimental group had to be trained to identify their thought processes and to verbalize them. The first experience that they had with this process was with something tangible--cardboard puzzles. This exercise from NCTE's Activities to Promote Critical Thinking is designed to promote open ended thinking instead of one-way thinking (Golub, 1986). Each student was given the same cardboard puzzle pieces and told to put them together to form a square. After they completed the task, they were asked to explain their thinking process. Some looked for right angles; some started with the big pieces; some looked for similar shapes; some just pushed the pieces around until they found something that fit. Students discussed the merits of each method. The next task was to use the same puzzle pieces to form a cross. Each student talked about his thinking process again. There was less frustration the second time because they understood some steps that they could use to

achieve their goal. When transferring this metacognition to language skills, students were reluctant to admit to thinking. The researcher had to work slowly to build their confidence that they could think and even identify the process.

The students in the experimental group were familiarized with the six levels of Bloom's taxonomy. The terms--knowledge, comprehension, application, analysis, synthesis, and evaluation--were discussed. Then the researcher read the story "Goldilocks and the Three Bears" to the students. The following questions were put on the overhead and students were asked to decide which cognitive level was used to answer each content question.

1. Where had the three bears gone when Goldilocks came? [knowledge]

2. Role play Goldilocks taking the porridge and Papa Bear seeing her. [application]

3. What did Goldilocks mean when she said, "just right"? [analysis]

4. Make up a character and write a story in which the character visits an animal's home. [synthesis]

5. Do you think Goldilocks was a thief? Why or why not? [evaluation]

6. For each of the characters in the story, list five words that would describe the characters. [comprehension]

The next day students were asked to answer the following reasoning skills questions.

1. Name the five senses. [knowledge]

2. Tell the function of each of the five senses. [comprehension]

3. If you were lost in the woods, how would you use your five senses? [analysis]

4. Categorize the word list from question six above under the most appropriate function of the five senses. [analysis]

5. Write a story about a person who loses one of his senses. [synthesis]

6. Which sense do you feel is the most important? Justify. [evaluation]

This exercise gave students some comfort using the cognitive terms.

On a composition assignment another exercise was used to develop the skill of generalizing. Students were assigned a paper to be written using the contrast method. The topic was to contrast the person that they really were with the person that they would like to be. They already had the skill to write a topic sentence, but they could not write a generalization about the real person and one about the ideal person. The researcher put the following groups of words on the overhead:

1. books, trees, flowers
2. knives, scissors, grass
3. fingers, houses, toes
4. dogs, seals, trees
5. clocks, joggers, cars
6. kittens, waves, track stars

Together they could generalize the categories: (1) things that have leaves, (2) things that have blades, (3) things that have nails, (4) things that have bark, (5) things that run, (6) things that lap. At that point students were divided into groups of three and told to make their own sets of words and to write them on a transparency. One student from each group displayed the list, and the entire class determined the generalization. The next day students got back together in groups and wrote two lists of three words each: one list described the real student, and one list described the ideal. They helped each other with generalizations. Finally, on the third day, they wrote their papers with topic sentences, generalizations, and specific details. In each of the activities, students talked about synthesizing so that they were aware of their cognitive process.

In order to establish appropriate student participation, the researcher established a reward system with all four classes. Students started with twenty-five citizenship

points each day. These points were assigned to five types of behavior and students lost all five points in any category if they did not follow the rules in that category. The categories were posted on the classroom wall:

1. Students will arrive at class on time and will have books and materials with them.

2. Students will listen to the teacher or teacher aid when he or she is talking.

3. Students will be courteous at all times.

4. Students will complete all classwork or arrange to do it outside of class.

5. Students will participate orally in the class.

As students left the room each day, they were told how many points they had retained that day. Points accumulated for a one-week period. Everyone who had eighty points at the end of the class period on Thursday received a package of M & M candy.

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CHAPTER IV

ANALYSIS OF DATA

The purpose of this study was to determine the effect that the treatment--the experimental curriculum--had on the gains that the at risk students made in an eight week program in their language arts skills and in their language arts achievement. The Iowa Test of Basic Skills pretest and posttest scores were compared within each of the four sections of the language battery, as well as by the total language scores. Likewise, the California Achievement Test pretest and posttest scores were compared within its three sections and by the total language scores. An analysis of co-variance was used to compare the scores based on the correlation between the pretest scores and the posttest scores. The level of significance for this study was set at .05.

For each hypothesis two tables are presented: (a) a table of means and standard deviations for the dependent variable and co-variate, including a column for the adjusted mean (posttest adjusted by pretest), and (b) a table presenting the results of the ANCOVA.

Table 1a shows that in spelling skills which were tested, the experimental group made a lower posttest score (7.14) than the control group would have made (adjusted mean, 7.75) had they been equal on the pretest.

Table 1a

	ITBS Spelling pre-test		ITBS Spelling post-test			
	Mean	S.D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	7.33	2.54	7.14	7.34	2.13	19
Control	7.81	2.42	7.96	7.75	2.44	23
All	7.59	2.46	7.59	7.59	2.31	42

Table 1b

Source of variation	SS	DF	MS	F	Sig of F
Within cells	40.71	39	1.04		
Regression	171.27	1	171.27	164.07	.000
Constant	5.83	1	5.83	5.58	.023
Group	1.79	1	1.79	1.72	.197

Table 2a shows that in capitalization skills which were measured by the ITBS, the experimental group made a lower posttest score (8.17) than the control group would have made (8.45) had they been equal on the pretest.

Table 2a

	ITBS Capitalization pre-test		ITBS Capitalization post-test			
	Mean	S.D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	7.30	2.48	8.17	8.55	2.72	19
Control	8.12	2.48	8.83	8.45	2.84	23
All	7.75	2.48	8.53	8.53	2.78	42

Table 2b

Source of variation	SS	DF	MS	F	Sig of F
Within cells	101.06	39	2.59		
Regression	210.34	1	210.34	81.17	.000
Constant	6.92	1	6.92	2.67	.110
Group	.11	1	.11	.04	.840

Table 3a shows that the ITBS posttest scores on punctuation skills for the experimental group were lower (8.22) than the adjusted mean punctuation scores for the control group (8.60).

Table 3a

	ITBS Capitalization pre-test		ITBS Capitalization post-test			
	Mean	S.D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	7.66	2.21	8.22	8.49	2.72	19
Control	8.37	2.56	8.87	8.60	2.88	23
All	8.05	2.41	8.58	8.58	2.59	42

Table 3b

Source of variation	SS	DF	MS	F	Sig of F
Within cells	132.59	39	3.40		
Regression	138.84	1	138.84	40.84	.000
Constant	18.33	1	18.33	5.39	.026
Group	.11	1	.11	.03	.857

Table 4a shows that the experimental group scored lower in usage and expression on the ITBS posttest (7.77) than the control group's adjusted mean score (8.37).

Table 4a

	ITBS Usage & Exp. pre-test		ITBS Usage & Exp. post-test			
	Mean	S.D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	7.55	2.41	7.77	7.71	2.22	19
Control	7.40	2.02	8.31	8.37	2.25	23
All	7.47	2.18	8.07	8.07	2.23	42

Table 4b

Source of variation	SS	DF	MS	F	Sig of F
Within cells	71.60	39	1.84		
Regression	128.61	1	128.61	70.05	.000
Constant	12.24	1	12.24	6.67	.014
Group	4.59	1	4.59	2.50	.122

Table 5a shows that on the total ITBS language battery, the experimental group made lower posttest scores (7.83) than the adjusted mean for the control group (8.28).

Table 5a

	ITBS Total pre-test		ITBS Total post-test			
	Mean	S.D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	7.46	2.12	7.83	8.06	2.01	19
Control	7.95	2.13	8.51	8.28	2.36	23
All	7.73	2.12	8.20	8.20	2.21	42

Table 5b

Source of variation	SS	DF	MS	F	Sig of F
Within cells	30.74	39	.79		
Regression	163.98	1	163.98	208.04	.000
Constant	2.02	1	2.02	2.56	.118
Group	.50	1	.50	.64	.429

Table 6a shows that the posttest scores in spelling as measured by the California Achievement Test (CAT) were lower for the experimental group (7.66) than the adjusted mean scores for the control group (7.76).

Table 6a

	CAT Spelling pre-test		CAT Spelling post-test			
	Mean	S.D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	6.89	2.12	7.66	8.11	1.90	19
Control	8.28	2.99	8.21	7.76	2.53	23
All	7.65	2.69	7.96	7.96	2.26	42

Table 6b

Source of Variation	SS	DF	MS	F	Sig of F
Within cells	89.37	39	2.29		
Regression	116.86	1	116.86	50.99	.000
Constant	39.22	1	39.22	17.11	.000
Group	1.19	1	1.19	.52	.475

Table 7a shows the CAT posttest scores for the language mechanics to be lower for the experimental group (6.70) than the adjusted mean scores for the control group (7.39).

Table 7a

	CAT Lang. Mech. pre-test		CAT Lang. Mech. post-test			
	Mean	S. D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	5.81	3.65	6.70	7.30	3.52	19
Control	7.15	3.99	7.99	7.39	4.37	23
All	6.55	3.86	7.41	7.41	4.01	42

Table 7b

Source of variation	SS	DF	MS	F	Sig of F
Within cells	169.40	39	4.34		
Regression	474.08	1	474.08	109.15	.000
Constant	24.92	1	24.92	5.74	.022
Group	.08	1	.08	.02	.892

Table 8a shows that the CAT language expression posttest scores were higher for the experimental group (7.00) than the adjusted mean scores for the control group (6.52).

Table 8a

	CAT Lang. Exp. pre-test		CAT Lang. Exp. post-test			
	Mean	S.D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	5.22	3.31	7.00	7.81	3.48	19
Control	7.03	4.21	7.33	6.52	4.22	23
All	6.21	3.89	7.18	7.18	3.86	42

Table 8b

Source of Variation	SS	DF	MS	F	Sig of F
Within cells	143.22	39	3.67		
Regression	467.70	1	467.70	127.36	.000
Constant	32.66	1	32.66	8.89	.005
Group	16.42	1	16.42	4.47	.841

Table 9a shows that on the CAT total language battery, the experimental group scored lower (6.84) than the control group's adjusted mean (7.03).

Table 9a

	CAT Total Pre-test		CAT Total Post-test			
	Mean	S.D.	Obs. Mean	Adj. Mean	S.D.	N
Experimental	5.39	3.49	6.84	7.51	3.50	19
Control	6.91	4.12	7.70	7.03	4.13	23
All	6.22	3.88	7.31	7.31	3.84	42

Table 9b

Source of variation	SS	DF	MS	F	Sig of F
Within cells	143.71	39	3.68		
Regression	452.72	1	252.72	122.86	.000
Constant	40.66	1	40.56	11.03	.002
Group	2.25	1	2.25	.61	.439

Hypothesis 1

Hypothesis 1 states that students who experience the experimental curriculum will show a significant increase in spelling skills over those who experience the regular curriculum. Table 1b shows the level of significance for this variable to be greater than .05; therefore, the hypothesis is rejected.

Hypothesis 2

Hypothesis 2 states that students who experience the experimental curriculum will show a significant increase in capitalization skills over those who experience the regular curriculum. Table 2b shows the level of significance for this variable to be greater than .05; therefore, the hypothesis is rejected.

Hypothesis 3

Hypothesis 3 states that students who experience the experimental curriculum will show a significant increase in punctuation skills over those who experience the regular curriculum. Table 3b shows the level of significance for this variable to be greater than .05; therefore, the hypothesis is rejected.

Hypothesis 4

Hypothesis 4 states that students who experience the experimental curriculum will show a significant increase in language and expression skills over those students who

experience the regular curriculum. Table 4b shows the level of significance for this variable to be greater than .05; therefore, the hypothesis is rejected.

Hypothesis 5

Hypothesis 5 states that students who experience the experimental curriculum will show a significant increase in total language skills over those students who experience the regular curriculum. Table 5b shows the level of significance for this variable to be greater than .05; therefore, the hypothesis is rejected.

Hypothesis 6

Hypothesis 6 states that the increase in the achievement level in capitalization will be significantly higher for those students undergoing the experimental curriculum than for those in the regular curriculum. Table 6b shows the level of significance for this variable to be greater than .05; therefore, the hypothesis is rejected.

Hypothesis 7

Hypothesis 7 states that the increase in achievement level in language mechanics will be significantly higher for those students undergoing the experimental curriculum than for those in the regular curriculum. Table 7b shows the level of significance for this variable to be greater than .05; therefore, the hypothesis is rejected.

Hypothesis 8

Hypothesis 8 states that the increase in the achievement level of language expression will be significantly higher for those students undergoing the experimental curriculum than for those in the regular curriculum. Table 8b shows the level of significance for the variable to be less than .05; therefore, the hypothesis is supported.

Hypothesis 9

Hypothesis 9 states that the increase in the achievement level of the total language battery will be significantly higher for those students undergoing the experimental curriculum than for those in the regular curriculum. Table 9b shows the level of significance for this variable to be greater than .05; therefore, the hypothesis is rejected.

The findings, conclusions, and implications developed from this analysis of data are found in Chapter V.

CHAPTER V

SUMMARY

The purpose of this study was to determine if students who participated in language arts remediation which was infused with critical thinking activities and metacognition would make greater gains in skills and achievement than those students who were remediated with a regular language arts curriculum. The students who participated were the participants in the University of North Texas Youth Opportunities Unlimited (Y.O.U.) program during the summer of 1987. The program lasted eight weeks, and the students attended two hour language arts classes four times a week for a total of thirty-two sessions. The California Achievement Test pretest and posttest and the Iowa Test of Basic Skills pretest and posttest were administered during this class time reducing the number of class meetings to twenty-eight.

The Y.O.U. participants were fourteen and fifteen year olds who were identified as being at risk. Although their pretest scores were at grade 7.73 on the ITBS and grade 6.22 on the CAT, they were ninth graders and were enrolled in English I classes. The lessons for the experimental and

control groups were the same except the experimental curriculum had critical thinking activities in place of the independent practice activities in the regular curriculum. The critical thinking activities involved students talking through their thinking processes (metacognition) and learning to identify their levels of thinking (knowledge, comprehension, application, analysis, synthesis, evaluation). These activities took fifteen or twenty minutes of each of the lessons.

Findings

The analysis of data in Chapter IV provides the following findings as they relate to the hypothesis of this study:

1. The infusion of critical thinking activities and metacognition did not improve the spelling skills of the experimental group over the control group. As a matter of fact, the combined scores for the two groups remained the same; no remediation occurred. However since no lessons were built around spelling objectives, any improvement would have been attributed to transfer.

2. Capitalization skills were not improved in students who experienced critical thinking and metacognition over those who experienced the independent practice although both groups experienced improvement from 7.75 to 8.53.

3. Students who experienced the critical thinking and metacognition did not gain punctuation skills significantly more than those who experienced the regular curriculum with independent practice. Collectively, the groups moved from an average score of 8.05 to 8.58.

4. On the ITBS Usage and Expression test, the experimental group with critical thinking and metacognition did not improve enough over the control group to be significant. The collective scores improved from 7.47 on the pretest to 8.07 on the posttest. This test measures usage and items such as subject/verb agreement, verb tense, pronoun case, and pronoun degree.

5. The ITBS total language scores for the experimental group with critical thinking and metacognition did not significantly improve over those of the control group with independent practice. The collective gain for the two groups was from 7.73 to 8.20.

6. The substitution of critical thinking activities and metacognition for independent practice did not increase the spelling achievement of the experimental group over the control group. The combined pretest score was 7.65 and the posttest score was 7.96.

7. The experimental curriculum with critical thinking and metacognition did not improve student scores on the CAT

Language Mechanics test over the improvement resulting from the regular curriculum. The combined scores of the two groups increased from 6.55 on the pretest to 7.41 on the posttest.

8. The critical thinking activities and metacognition made a significant difference in students' achievement in language expression over the achievement resulting from the regular curriculum with independent practice. The combined achievement for the two groups was from 6.21 to 7.18.

9. The group that experienced critical thinking and metacognition did not achieve significantly higher scores on the CAT total language posttest than did the group that experienced the regular curriculum. The two groups improved from 6.22 to 7.31.

Conclusions

The findings of this study suggest the following conclusions:

1. Overall language remediation does not improve spelling skills.

2. Improving capitalization skills can be achieved better with independent practice than with critical thinking activities and metacognition.

3. Punctuation skills improve more for students who experience independent practice than for students who experience critical thinking activities and metacognition.

4. Critical thinking activities and independent practice remediate usage and expression skills at about the same level.

5. On the total language skills tests, students who participate in independent practice improve scores more than students who participate in critical thinking skills and metacognition.

6. The spelling achievement of the two groups suggests no conclusions since the gains were very small and no lessons were directed to spelling objectives.

7. Increasing language mechanics achievement is achieved better with independent practice than with critical thinking and metacognition.

8. Students' achievement in language expression increases more when the remediation includes critical thinking and metacognition rather than independent practice.

9. Overall language achievement is increased more with remediation which includes independent practice rather than critical thinking and metacognition.

10. Remediation may occur faster for objectives that can be tested by rules and memory than for objectives that require the application of language skills. Students in both the experimental group and the control group made larger gains on the California Achievement Test than they did on the Iowa Test of Basic Skills.

Education Implications

The conclusions of this study have an obvious implication for educators who are concerned with providing language arts remediation for students. That implication is that remediation lessons should include independent practice as well as critical thinking activities. Lessons designed with mechanics objectives such as capitalization and punctuation should include independent practice. However, lessons designed with objectives focusing on usage, subject/verb agreement, double negatives, verb tense, and pronoun case and degree should include critical thinking activities and metacognition.

Another implication from this study that is less measurable but more significant than language arts objectives is the implication that all students do think. Because the students in this study were from socio-economically disadvantaged homes, their vocabulary was unsophisticated and much of their thinking was nonverbal rather than verbal. Identifying their thinking processes was unfamiliar to them. During the first week of class, one student responded to the question, "What do you think happened next in the story?" by saying "How do I know; I wasn't there." After a discussion and evaluation of possible story endings, the student was able to say that he could predict the story ending. By the end of the eight-week session, students were able to verbalize some of the thinking that had been nonverbal at the beginning of the summer.

Recommendations

The effect of critical thinking activities and metacognition on language arts remedial students' skills and achievement was the focus of this study and the findings are significant. However, those same findings suggest two further studies.

(1) A similar study which is longer would be useful in determining if critical thinking activities and metacognition can improve language skills. The small number of lessons limited the number of objectives that the researcher could address.

(2) The inclusion of an instrument to assess students' attitude toward the learning would provide valuable information for remediation. Based on the researcher's observations, there is enough evidence to suggest a significant improvement in the attitudes of those students in the experimental group over the attitudes of the students in the control group.

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