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READING INSTRUCTION AND LONG TERM
CHANGES IN READING TEST SCORES

By

Harriet Elizabeth Harbour Jackson

A Dissertation
Submitted to the Faculty of
Mississippi State University
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy
in Educational Leadership
in the Department of Instructional Systems, Leadership,
and Workforce Development

Mississippi State, Mississippi

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CHANGES IN READING TEST SCORES

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Teachers have long believed that helping struggling students make consistent improvements in reading achievement can be difficult, but with the right support, significant gains can be achieved. Major topics covered in this dissertation are the impact of literacy on the lives of students, individual learning styles in the classroom, using the learning styles of students to differentiate instruction, research related to learning styles and student achievement, and matching teaching and learning styles with adequate resources.

The purpose of this study was to analyze the Mississippi Curriculum Test (MCT) reading scores of a cohort of eighth grade students in an east central Mississippi school to determine if there was a statistically significant difference between the MCT reading scale scores of two groups of students (those taught by their learning style and those taught by a basal approach). Research in learning styles has demonstrated that the process of assessing and matching students' learning styles with activities or styles of the teacher results in significant increases on standardized tests of reading achievement. The learning

style of students impacts their learning. Students who prefer a conventional setting (i.e., most difficult classes in the morning, working alone, no intake such as food or water when studying, bright lights, and formal desks) are in the minority.

The research design used in this study was causal-comparative. Causal comparative was used because groups were already intact and the research was to explore the cause for existing differences in groups of students.

The learning styles group in this research study outperformed the basal group at every grade level. The learning styles group had a lower percentage of students scoring in the Minimal and Basic proficiency levels in every grade than the state average. The percentage of students scoring in the Proficient and Advanced proficiency levels for the learning styles group was higher in every grade than the state average. The learning styles group scored statistically significantly higher than the basal group over a six-year period from the 3rd grade to the 8th grade.

DEDICATION

This research is dedicated to my mother, Edna Harbour Ford, my husband, Tommy Jackson, my daughters, Jennifer Jackson Bond and Elizabeth Leigh Jackson, and to the memory of my father, R. A. Harbour. Without your support, Mom, I know this degree would not be a reality. Mere words cannot convey the admiration and respect in which I hold you and your contributions to education and to society in general. I have spent the last thirty-five years of my career trying to live up to your exemplary role model and legacy. I hope you are pleased with my efforts.

In the years since your death, Dad, I have wanted to share many experiences with you on countless occasions. I have often needed your counsel, but somehow I always felt your presence as decisions were made. I miss you and I think you would be proud.

And to my family, Tommy, Jen, and Leigh, forgive me for the hours that were taken from you while I traveled this journey. I hope my dedication to the task has helped you realize that all things are possible. Keep the faith. I love you all dearly.

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CHAPTER I

REVIEW OF THE LITERATURE

Teachers have long believed that helping struggling students make consistent improvements in reading achievement can be difficult, but with the right support, significant gains can be achieved. Increasing reading proficiency helps students experience learning and intellectual growth, emotionally, socially, and spiritually. Impressive gains in reading achievement can do something very significant for students-it can change their lives (McElroy, 2005).

This chapter presents a review of relevant literature that addressed increasing reading achievement. Major topics covered are the impact of literacy on the lives of students, individual learning styles in the classroom, using the learning styles of students to differentiate instruction, research related to learning styles and student achievement, and matching teaching and learning styles with adequate resources. The literature review concludes with a summary.

Additionally, this chapter contains the statement of the problem to be addressed and the purpose of the study. This chapter concludes with the research question.

Literature Review

Impact of Literacy on the Lives of Students

The ability to read is not only fundamental for understanding and mastery of every school subject students will encounter, but literacy also plays a critical role in students' social and economic lives (Snow, Burns, & Griffin, 1998). Manzo (2002) has found that teenagers around the world who read a variety of printed materials, who spend time reading for pleasure, and who find reading enjoyable are much better readers than those less engaged in such activities regardless of their parents' socioeconomic status.

Baker (2003) was convinced that the literacy development of children was highly dependent on the role of the parents. The intrinsic, extrinsic, and social aspects of reading are based on the curiosity, involvement and importance of the belief by the parent and teacher that reading is important.

Arnold (2003) found evidence that phonological sensitivity and knowledge of letters are high predictors of reading success in later years. Children need direct instruction to gain these skills; but they are best taught through fun, and interactive, age-appropriate activities. Modeling and explanation are ways that effective teachers use when presenting strategies for decoding words and understanding texts. Effective teachers stress higher level thinking skills more than they stress lower level skills. Primary-grade teachers who are proficient and accomplished in the classroom provide more small-group than whole-group instruction, interact with students through coaching rather than telling, and use higher level thinking skills related to reading to engage students (Taylor, Peterson, Pearson, & Rodriguez, 2002).

According to Humphrey (2002), simplistic solutions do not exist for the dilemma of strong middle school reading programs. Schools need to provide reading instruction at the appropriate levels for all students. In middle school, students have few opportunities to improve their reading skills. Reading achievement is the crucial link between middle school students and their future success. Schools must provide the time, personnel, and resources to ensure reading success. Middle school reading programs must include access to books, encouragement to value reading, time to read, skilled reader leaders, public library support, community agency support, family support, and reading role models.

Learning to read at an early age is necessary for school success. Using a sports metaphor, Dianis (2002) likened reading to football by noting the following:

In the game of reading, third grade graduation is the 50-yard line, the place where children cross over from learning to read to reading to learn. More than a third aren't ready. Their chances for reaching the end zone (high school graduation) are already diminished. They've barely begun the second quarter of their academic careers. Among fourth graders, 36 percent read below the basic level—a fact that has not changed significantly since the National Assessment of Education Progress reading assessment was first administered in 1992. Without some kind of intervention, 88 percent of our students who are poor readers in the first grade will still be poor readers in the fourth. (p.75)

It has only been in the last two decades that states, school districts, and schools have begun reporting student achievement data that is disaggregated by student categories. The failure of our schools to educate all children has been highlighted by the differences in student achievement. According to Vacca (2004), educational difficulties lead to correctional education. The guidelines that promote successful literacy education programs in prison advocate recognizing the different learning styles of inmates.

Successful programs meet the individual needs of inmates who have a wide range of literacy ability levels and recognize the cultural diversity of inmates.

Reading achievement is the critical link between children and their ultimate academic success. Parents must be made aware that, as their child's first teacher, a wealth of printed materials must be made available in the home. Their attitude toward reading strongly impacts their child's future, and the time they take teaching sounds and letters will pay future benefits.

Individual Learning Styles in the Classroom

According to Dunn, Beaudry, and Kiavas (1989), every person has a learning style and that learning style is as unique as is a signature. If we know a student's learning style, classrooms and instruction can be organized to respond to the individual needs for sound or quiet, for bright or soft lighting, for a warm or cool room, for mobility, for intake (need for eating and/or drinking while concentrating), or grouping preferences. Research with time preferences, for example, has found that most students are not morning alert. Many do not begin to be capable of concentrating on difficult material until after 10:00 a.m. and many are at their best after noon. At the elementary level, approximately 28% of the students appear to be "early birds." At the high school level, almost 40% are early morning learners, leaving a majority of elementary and high school students that remain most alert in the late morning and afternoon. For the first time, identifiable after early childhood, almost 13 % are "night owls," able to concentrate on difficult material in the evening. When a National Association of Secondary School Principals (NASSP) Task Force examined the characteristics that influence student

achievement, intake achieved the highest reliability. The terms left/right, analytic/global, and inductive/deductive are found interchangeably in the literature, and descriptions of these pairs of variables parallel each other. Lefts/analytics/inductives appear to learn successively, in small steps leading to understanding; rights/globals/deductives learn more easily by obtaining meaning from a broad concept or the big picture and then focusing on the fragmented parts that make up the details. Studies by Dunn et al. (1989) that investigated the similarities and differences between hemispheric style and other elements of learning style revealed that, when concentrating on difficult material:

High school students who were less motivated than their classmates and who preferred working with distracters (music, low lighting, casual seating, peers rather than alone or with the teacher, tactile rather than auditory or visual) scored right-hemisphere significantly more often than left hemisphere.

Left-hemisphere students in grades 5-12 preferred a conventional formal classroom seating design, more structure, less intake (food, water) and visual rather than tactile or kinesthetic resources during learning significantly more often than their right-preferenced classmates.

Right-hemisphere 5th through 12th graders disliked structure and were not adult motivated but were strongly peer motivated. Gifted and highly gifted students were significantly more often right or integrated than were left processors.

Right hemisphere community college adult math underachievers preferred learning with sound and intake. They wanted tactile and kinesthetic instructional resources and mobility significantly more often than their left-hemisphere counterparts, who preferred bright light and a formal design. (p. 56)

The learning style of students impacts their learning. Students who prefer a conventional setting i.e., most difficult classes in the morning, working alone, no intake such as food or water when studying, bright lights, and formal desks are in the minority.

Educators need to look at the way schools are structured to make them more compatible with the way students actually learn.

A person's reading style is his or her special learning style for reading. Reading style focuses on a person's needs and strengths during the act of reading. According to Carbo (1997), we can identify a person's reading style with a high degree of accuracy. Teaching grounded in the reading styles has brought about rapid results with many students. This increased student achievement is from teachers basing their styles of reading instruction on each student's strengths and needs. Students' needs drive instruction, not a commercial reading program.

Research in reading styles has demonstrated that the process of assessing and matching students' reading styles with activities or styles of the teacher results in significant increases on standardized tests of reading achievement. Larry Barber, director of the Phi Delta Kappa Center on Evaluation, Development, and Research, collaborated with Marie Carbo and Rebecca Thomasson on a national research study that concluded its two-year phase in 1993. Data for the study, which were analyzed by Dr. Barber, were drawn from 10 states, representing urban, inner-city, suburban and rural students in grades 1-9. The study also examined various ability levels, including students from a school for the severely handicapped. The multi-site replicated experiment concluded that it was defensible to conclude that if the reading styles program is implemented to at least a minimum criterion level (85%) and is carried out over a school year, one could expect the children in the reading styles program to obtain consistently higher achievement scores and gains than those children in the extant or control programs (Barber, Carbo, & Thomasson, 1996).

Using the Learning Styles of Students to Differentiate Instruction

Teaching to individual learning styles is one way to differentiate instruction. The designers of the Dunn and Dunn Learning-Style Model (Dunn & Dunn, 1978) categorized 21 unique elements into five major stimuli: (a) environment, (b) emotional, (c) sociological, (d) physiological, and (e) psychological. Dunn, Bruno, Sklar, and Beaudry (1990) determined through the environmental stimulus if students had a preference for sound, light, temperature, and seating design. In the emotional stimulus, students' level of motivation, persistence, responsibility, and need for structure are examined. In the sociological stimulus, students stated which way they learned best: alone, in pairs, in groups, with or without a teacher present. In the physiological stimulus, students' perceptual strengths (visual, auditory, tactual, or kinesthetic), time-of-day energy levels, and preferences for intake (water, food) and mobility are noted. Finally, in the psychological stimulus, the informational processing styles of the learners are surveyed. Many students are global and impulsive learners, while others are analytic and reflective. DeBello's (1990) model also includes identified assessments and responsive strategies for specifically teaching middle school students.

The power of evidence supporting the benefits of learning style methodology is compelling. Numerous studies (i.e., Bostrom & Lassen, 2006; DeBello, 1990; Dunn & Dunn, 1978) within the last 30 years reveal that sensory preferences influence the ways that students learn.

Classrooms can be organized so that students have the opportunity for mobility, intake, soft seating, and hands on activities. Inventories can supply teachers with the needed student information to put students in the best scenario for success.

Research Related to Learning Styles and Student Achievement

Armbruster and Anderson (1981) long ago determined that the techniques of underlining, taking notes, outlining, writing summaries, and asking questions have not been confirmed as effective in helping students to achieve. More recently, Farkas (2003) found that the achievement scores of students who had teachers that matched their preferred modalities with their instructional resources were statistically higher than were the scores by students who were not taught with their learning style methods. Not only were the achievement scores increased, but students demonstrated more positive attitudes when they were taught with multi-sensory activities rather than traditional activities.

Perrin (1990) gave rave reviews to the Learning Styles Project implemented at Amityville High School in New York. After completing the ninth grade, at risk students were selected for the program according to three criteria: excessive absences, scores in the fifth stanine or lower on a standardized reading test, and failure in two or more subjects. The teachers were trained in the Dunn and Dunn model of learning styles and the school used block scheduling to group the students for 10th grade English and reading. During the first few weeks, the teachers introduced the students to the concept of learning styles. The classes began to try alternative groupings, different instructional strategies, and individualized response activities. Students and teachers discussed different environments for learning and each student's personal study habits. After the students took the Learning Styles Inventory, teachers had individual conferences with them and interpreted the results of the inventory. At the end of 10th grade, all students passed their courses. The program continued during the junior year, and more than half of the students

applied to college, an increase over previous years. Perrin reported the gains in achievement were easy to calculate, but the gains in self-esteem were immeasurable.

The general idea of teaching and learning styles has been around for many years, but only in the last three decades has a more specialized theory been developed. Fantini (1980) found that once students understand their learning style, their educational environment must be matched to the learning style profile for optimal results in the academic realm. This is a valuable contribution to practitioners, as well as to scholars.

Research by Carns (1991) indicated that when teaching study skills, many variables may need to be considered, i.e., the students' self-efficacy, meta-cognitive skills, cognitive strategies, and the learning style of the student. Environmental influences and the individual learning style of the student may be used for diagnosing, teaching and creating successful learning environments. Carns believed that these practices may cause the student to become an active participant in the actual learning process.

Success of learning styles methodology in inclusive classrooms is documented by Hodgin and Wooliscroft (1997). The authors stated, "We feel especially successful when we see a frustrated child begin to relax and enjoy learning" (p. 43). Students are taught that to have the freedom to work in their own preferred space in their own style carries responsibility. Students know that they must attend to their lessons and not disturb anyone else. The goal is to help all students stretch their abilities and become the best readers possible.

Bostrom and Lassen (2006) indicated that an effective way to ensure student achievement and motivation is by teaching based on individual learning styles. Awareness of learning styles influences choice of relevant learning strategies and meta-

cognition. When they see the relevance of their own improvement, students are given new perspectives of their learning potential.

Using a student's learning style can increase productivity; but even more important, it can increase student self esteem. Students tend to enjoy learning when learning in their own unique style; and when they see their own academic improvement, they can see their increased potential for learning.

Matching Teaching and Learning Styles with Adequate Resources

According to Smith and Renzulli (1984), there are certain questions that are of particular interest when dealing with the concept of matching teaching and learning styles. Will matching learning styles enhance our effectiveness as teachers or will it just tie us down with more paperwork? Will it increase our students' motivation and learning or will it complicate a smooth instructional program? The concept of individualized instruction has become one of the cornerstones of educational practice. Through the use of interest inventories, questionnaires, and informal assessments, teachers can determine the content areas in which students have special interests (Smith & Renzulli, 1984). This information can build a curriculum that will have special "drawing power" (p. 44) and will cause greater commitment and exploration on the student's part. Even earlier, Jeter and Chavin (1982) found that educators have become keenly aware that each and every student possesses abilities, needs and interests that are unique, and that all children should have the opportunity to be involved in an instructional program that is interesting and challenging.

Duffy et al. (2003) found that experienced teachers of reading have gained understanding about the teaching of reading based on work with students, research theory, and what they believe really matters in reading instruction. Some of the messages about reading instruction that have been reported in the media cause concern about the control that is being exerted over reading instruction in some elementary schools. Duffy et al. noted that the public may have read that phonics is no longer taught in elementary schools, but a recent national survey of American elementary school teachers found that 99% of teachers of grades K-2 reported that phonics instruction was viewed as being essential or important. In addition, phonics was systematically taught in the vast majority of these teachers' classrooms. The authors stated the public may believe that children need to read decodable texts (such as "The fat cat sat on the mat") for reading success, but there is little research on the effectiveness of the use of decodable texts. Student success is prevalent when a teacher uses various genres (e.g., poetry, biography, folk tales, stories, informational books). Research-based reading programs are effective in successful reading classrooms, but the reality is that there is no one reading program that is the best. Effective programs depend on the quality of the teacher who uses the program, the home support that students receive, and the amount of instructional time that the students receive in actual reading. Duffy et al. believed it is the teacher who teaches reading, not the program. A successful teacher integrates various programs, material, and methods as the students and situations demand.

Miles (2001) stated that allocating resources to act on urgent priorities, such as teaching all students to read in public schools, requires administrators to take politically

difficult stands. According to Miles, union leaders, district administrators, and school board members need courage and strong community support to say:

Even though all subjects are important, literacy is most important. Even though all teachers are important, those who bring deep subject knowledge and can integrate across disciplines or programs are worth more. Even though band, sports, and other electives can be a crucial part of a balanced education, the community must find new ways to pay for and provide them. Even though student readiness and social health provide a base for student learning, schools cannot be held accountable for providing all services to students, and they are not staffed to do so. (p.56)

Investments in teacher professional development and technology may mean an extra student in the class, but we cannot build and sustain excellent schools without more of these investments.

Teachers must present students with a curriculum that is interesting, as well as challenging. Various genres should be implemented for increased student success. Many students are motivated by technology. Schools must, therefore, fund avenues to train staff in the use of technological activities that motivate students and enhance literacy instruction.

Summary of the Literature Review

Illiteracy is a growing problem in America's schools and teachers observe daily that students learn in unique ways. Learning styles inventories can be utilized to determine how students learn and how they are to be instructed and assessed. Whether in the majority or minority, students that have their learning style accommodated in the learning environment are increasingly motivated, and are more successful in reading than those that do not. Resources need to be allocated into replicating successful programs for enhancing student literacy.

Statement of the Problem

Analysis of the Mississippi Curriculum Test (MCT) reading subtests determined that the students of a public school in east central Mississippi had high proficiency levels through the fifth grade. However, beginning in the sixth grade, the number of students in the Advanced and Proficient levels began to decrease as determined by the reading subtest of the MCT. These results were found unacceptable by the district participating in this study. The researcher analyzed the MCT scores of students to determine whether the methodology and teaching strategies of the teacher played a significant role in the proficiency level that was earned by the students.

Purpose of the Study

The purpose of this study was to analyze the MCT scores of a cohort of eighth grade students in an east central Mississippi school to determine if there was a statistically significant difference between the MCT reading scale scores of two groups of students (those taught by their learning style and those taught by the basal approach). The special significance of this study is that increased learning styles instruction could possibly prevent the drop in test scores in the middle grades. As more state and local school district monies are allocated for school reform initiatives, it is critical that research such as this study be conducted to determine if school reading programs are successful. The Mississippi Department of Education (MDE) has made reading proficiency by the end of third grade a primary goal. It is imperative that students achieving proficiency in reading in the third grade sustain that proficiency throughout their educational experience. Superintendents, assistant superintendents, principals, and teachers play a

major role in the educational success of students. Their instructional leadership can make the achievement of reading proficiency the primary objective of the educational environment.

Research Question

This study addressed the following research question:

Is there a statistically significant difference between the MCT scores (reading) of two groups of students (those taught by their learning style and those taught by the basal/traditional approach)?

Definition of Terms

Teacher/Student Related Terms

1. Basal Teacher -The traditional/basal teacher in a classroom has each student with the same reading textbook. The teacher will introduce unfamiliar words (vocabulary words for the story) and have the students use the new words in a variety of activities. Typically, students read the story aloud and/or silently from the text, discuss the story, and answer questions about the text, orally and/or written.

2. Cohort – For purposes in this research study, the cohort is the intact group of 119 students that were divided into groups for the purpose of MCT score data analysis.

3. Learning Styles Teacher -A learning styles teacher differs significantly from a basal teacher. Learning styles teachers make determinations of the way students learn best, i.e., visual, auditory, tactile, kinesthetic, global, or analytic. Determinations of

students' learning styles were made through the observation of teachers and their administration of a reading styles inventory.

4. Teaching Style – The teaching style of the teacher is determined when he/she chooses to teach from the learning style of the student or from a basal.

Mississippi Curriculum Test Related Term

5. Mississippi Curriculum Test - The MCT is a criterion reference test that was developed by Mississippi teachers under the direction of the Mississippi Department of Education and CTB/McGraw Hill Publishing Company (MDE, 2006).

Mississippi Curriculum Test Level Related Terms

6. Advanced – Students scoring at the advanced level on the MCT consistently perform in a manner clearly beyond that required to be successful at the next grade. The content area knowledge and skills of students are assessed and reported in the categories of Advanced, Proficient, Minimal or Basic.

7. Proficient – Students scoring at the proficient level on the MCT demonstrate solid academic performance and mastery of the content area knowledge and skills required for success at the next level. The content area knowledge and skills of students are assessed and reported in the categories of Advanced, Proficient, Minimal or Basic.

8. Basic – Students scoring at the basic level on the MCT demonstrate partial mastery of the content area knowledge, and skills of students are assessed and reported in the categories of Advanced, Proficient, Minimal or Basic.

9. Minimal – Students scoring at the minimal level on the MCT are below basic, and do not demonstrate mastery of the content area knowledge and skills required for

success at the next grade. These students require additional instruction and remediation in the basic skills that are necessary for success at the next grade level.

CHAPTER II

METHOD

This chapter contains a description of the research method used in this study. The chapter presents the research design, the instrumentation, the procedures, and the data analysis.

Research Design

The research design used in this study was causal-comparative. As Fraenkel and Wallen (2003) noted, “In causal-comparative research, investigators attempt to determine the cause or consequences of differences that already exist between or among groups of individuals” (p. 368). Additionally, Fraenkel and Wallen noted, “the group difference variable in a causal-comparative study is either a variable that cannot be manipulated (such as ethnicity) or one that might have been manipulated but for one reason or another has not been (such as teaching style)” (p. 368). Groups are already formed in causal-comparative research designs.

Fraenkel and Wallen (2003) concluded that causal-comparative research is intended to determine the cause for or the consequences of differences between groups of students. Interpretations of causal-comparative research are limited, because the researcher cannot say conclusively whether a particular factor is a cause or a result of the behavior(s) observed. Despite problems of interpretation, causal-comparative studies are of value in identifying possible causes of observed variations in the behavior patterns of

students. The basic causal-comparative approach, therefore, is to begin with a noted difference between two groups and to look for possible causes for, or consequences of, this difference. Causal comparative investigations often identify relationships that later are studied experimentally. However, causal-comparative studies do have serious limitations. The most serious threats lie in the lack of control over threats to internal validity. Because the manipulation of the independent variable has already occurred, many of the controls cannot be applied. Thus, considerable caution must be expressed in interpreting the outcomes of a causal-comparative study. Relationships can be identified, but causation cannot be fully established. The alleged cause may really be an effect; the effect may be a cause; or there may be a third variable that produced both alleged cause and effect.

This study analyzed the Mississippi Curriculum Test (MCT) reading subtest scale scores of a cohort of students who were enrolled in an east central Mississippi school from the time they entered the third grade in 2001 until they completed the eighth grade in 2006. The style of teaching reading used by the teachers the students had in 3rd, 4th, and 5th grade was categorized. The two categories of teachers' styles were: based on students' learning style, or traditional/basal reading instruction. The MCT data were analyzed to determine which teaching style resulted in greater reading success (higher scale scores on the MCT reading subtest) as the students moved through middle school grades 6-8. The causal-comparative design was selected since intact groups were used and experimental manipulation was not present.

Instrumentation

The MCT reading subtest scores were the dependent variable in this study. The MCT was administered in the spring of each year from 2001-2006. Personnel from the School District administered the MCT. Test administrators were elementary and middle school certified educators who had received training on administration procedures for the MCT. The MCT is a criterion reference test that was developed by Mississippi teachers under the direction of the Mississippi Department of Education (MDE) and CTB/McGraw Hill Publishing Company (MDE, 2006).

In the fall of 1998 (MDE, 2003), an *Ad Hoc* Committee was formed to consider the recommendation of the Norm Reference Test and High School Exit Exam committees and provide direction for Mississippi's new assessment and accreditation systems. The committee was composed of 5 State Board of Education (SBE) members and the new State Superintendent of Education, Richard Thompson. In January of 1999, the committee issued a paper identifying characteristics for the new criterion-referenced testing program (that was to be known as the Mississippi Curriculum Test). The paper established the content areas and grade levels for which tests were to be developed – reading, language, and mathematics at grades 2-8. The administration time for the MCT was to be during the spring. The *Ad-Hoc* Committee reviewed the Request for Proposal developed by the Mississippi Department of Education and evaluated the proposals received from test vendors. The committee selected CTB/McGraw-Hill as the test vendor and negotiated a contract that was finalized in December, 1999 (MDE, 2003).

The first part of the process was the selection of representative committees of exemplary teachers for each content area and grade span (2-4, 5-6, and 7-8). District

superintendents throughout Mississippi were asked to nominate, by grade level, their most exemplary teacher(s) in each of these subjects. From this nominee pool, the MDE selected members for each committee. Each committee consisted of approximately 24-30 teachers to maximize overall excellence, as well as representation by ethnicity, district levels of accreditation, and congressional district. In June 1999, the committees began meeting to review the Mississippi curriculum framework for each of the relevant content areas. A list of specific skills and objectives for each content area was compiled into a survey including questions of whether it was taught in their classrooms and the degree of emphasis they believed the new test should place on the list. Next the committee formed consensus ratings of the items on each survey. Finally the committees compared and discussed the ratings. In addition, a technical committee of six members was formed to address technical issues. Technical issues included test design, scoring and equating, and standard setting. During February and April 2000, teacher committees met to review items for test tryout. The majority of the items were from the CAT-6 (Forms A & B), some were developed by CTB for the Mississippi Curriculum Test, and some items were from other published test forms. All items for potential use were reviewed by the test development committees for emphasis, appropriateness, and match to the curriculum. From the teacher committee work, a test blueprint was developed (MDE, 2003).

In September 2000, items were tried out in an administration. The items included open ended questions and multiple choice items. The item tryout forms were administered to rising students at the next higher grade level since the MCT was to be a spring testing program. After the item tryout, potential bias and item statistical analysis were reviewed. Items found to have strong bias were eliminated from the bank of items

for constructing operational test forms. Archived information containing pilot item statistics include 4166 items and 102 variables (MDE, 2003).

Based on the test blueprints, three operational test forms were developed. In spring 2001, all three forms were administered. The grade 2 forms (Level 12) were administered in three strategic samples of school districts while statewide spiraling of the three forms was used for grades 3-8 (Levels 13-18) (MDE, 2003).

Raw score statistics for each form administered in spring 2001 and for the Mississippi Curriculum form administered in spring 2002 are included in Appendix A. The statistical information includes the mean and standard deviation for the raw score, and the percentage of students scoring in the chance range (MDE, 2003).

A table comparing the Mississippi Curriculum Test raw score means on the spring 2001 administration appears in Appendix A. Appendix A also contains a table presenting statistics for Form A (research sample and total student population) from spring 2001. The statistics for the research sample include scale score statistics, percentile locations (in Scale Score points), and standard error at various points (MDE, 2003).

The MCT is a criterion reference group test that is administered to students in grades 2-8. The test is not timed, allowing students as much time as needed to complete each subtest. Its subtests are designed to measure reading, language, and mathematics skills. For the purpose of this study, the reading subtest category was studied. The reading category includes the following subcategories: context clues, word structure, word patterns, vocabulary, main idea and details, and expanded comprehension. Student scores are reported in scale scores and are assigned a proficiency level based on the scale

score. There are four proficiency levels: Minimal, Basic, Proficient, and Advanced.

Definitions of each of the categories by the MDE (2006) are:

Minimal – Students at the minimal level are below basic, and do not demonstrate mastery of the content area knowledge and skills required for success at the next grade. These students require additional instruction and remediation in the basic skills that are necessary for success at the next grade level.

Basic – Students at the basic level demonstrate partial mastery of the content area knowledge, and skills of students are assessed and reported in the above mentioned categories.

Proficient – Students at the proficient level demonstrate solid academic performance and mastery of the content area knowledge and skills required for success at the next level. The content area knowledge and skills of students are assessed and reported in the above mentioned categories.

Advanced – Students at the advanced level consistently perform in a manner clearly beyond that required to be successful at the next grade. The content area knowledge and skills of students are assessed and reported in the above mentioned categories. (p.1)

The two types of teaching styles (Carbo, 1997) that this study will analyze and interpret have distinct differences. The basal/traditional approach in a classroom has each student with the same reading textbook. The teacher will introduce unfamiliar words (vocabulary words for the story) and have the students use the new words in a variety of activities. Typically, students read the story aloud and/or silently from the text, discuss the story, and answer questions about the text, orally and/or written. A learning styles classroom differs significantly from a traditional classroom. Teachers make determinations of the way students learn best, i.e., visual, auditory, tactile, kinesthetic, global, or analytic. Determinations of students' individual learning styles are made through teacher observation and the administration of a learning styles inventory.

According to Carbo (1997), the environment of the classroom can accommodate different learning styles by including in the classroom: soft cushioned seating and dimly lit reading areas, learning centers, and a variety of reading materials, including books on tape, a well-stocked classroom library, and hands-on materials. The teacher should consider using a variety of approaches to teaching reading, and the children can work in many different groupings, as well as reading alone. A student's learning style is that student's special learning style for reading. A student's learning style focuses on the student's needs and strengths during the act of reading. Learning styles consider how a student's ability to learn to read is affected by the (a) reading environment, (b) the reader's emotional make-up, (c) sociological preferences, (d) physical needs, and (e) style of processing information. Not only does every person have a distinctly different learning style, but every reading method, resource, and strategy demands particular learning style strengths of the learner.

Twice in each academic year, once in the fall semester and once in the spring semester, teachers in the east central Mississippi school district in this study were evaluated with the district evaluation form. Principals visited in the teachers' classrooms and monitored the activities with written documentation of the teaching style as well as the learning style activities of the students. The teaching methodology (learning styles or basal/traditional) of the teacher was noted on the evaluation/observation form. In addition, drop-in teacher observations were conducted weekly by the principal using the criteria checklist of the learning styles training. The observation forms were used to determine if the teacher was a learning styles teacher or a basal/traditional teacher. Beginning in the summer of 1998, teachers and principals had extensive training in

organizing, implementing, and recognizing learning styles classrooms. Teachers and principals visited learning styles classrooms in Victoria, Texas, and Talladega, Alabama, to see learning styles strategies being implemented and how the teaching style of the teacher was adjusted for different learning styles in the classroom. After formal learning styles training, a checklist for starting the year was given to each teacher. The list included: room design (formal and informal areas), lighting (bright and dimly lit areas—these two elements affect 70% of the learners), listening centers for recorded books (at risk students must listen and read back daily), practice modeling reading methods daily (sustained silent reading, paired reading, choral reading, neurological impress, echo reading, recorded books, and shared reading), and accommodation of both global and analytic tendencies in lesson plans. A timeline of implementation was also provided to the teachers. Teachers and principals were involved in five technical assistance days each year from 1998 through 2004 by a National Reading Styles Institute consultant. The consultant visited classrooms to confirm implementation of learning styles strategies, to evaluate tapes made by the teacher for student listening, and to lead “make and take” workshops for learning styles materials to be used in classroom activities. Parents were given learning styles orientation workshops, and students were given the learning styles inventory to determine how they best learn and what strategies would work best with their learning style. The principal and teachers from this school have presented at the National Reading Styles Institute (NRSI) Conference. The elementary school in this district was named a National Reading Styles Model School.

After training, principals indicated to teachers that specific activities to accommodate different learning styles would be required as part of the lesson plans and

would be evaluated in formal evaluations and drop in observations. Required reading for each principal was a book (Carbo, 1997) that discussed what principals should know about teaching reading through learning styles. It discussed what principals would note in a classroom that was accommodating different learning styles of children. Principals were taught specific types of activities that could be successful with specific learning styles of students. The NRSI consultant made joint evaluations with the principal to aid the principal in noting required activities by the teacher and students. The learning styles training received by the principals assured a valid assessment of the teaching style of the teacher on the evaluation. The training also assured that the principal could recognize when different learning styles of students were being accommodated in the classroom activities.

Procedures

This study involved student level data collected in an east central Mississippi school. The superintendent of the district expressed concern that MCT scores declined after students entered the middle school and requested that district data be analyzed to determine what skills were most adversely impacted. He also requested recommendations for elimination of this decline. Approval to conduct the study was granted by the Mississippi State University Institutional Review Board for the Protection of Human Subjects in Research (See Appendix B). Information was obtained on the teaching style of the teacher at grades 3, 4, and 5. The style was categorized as based on instruction that accommodated students' learning style or a basal approach. The style of the teacher was determined from documented observations that are on file as part of the annual evaluation

process. Data analysis determined if a specific style of instruction is associated with higher scale scores on the reading subtest of the MCT.

The MCT reading test data was retrieved from the testing tab that is placed yearly on the cumulative folders of each student. The tab includes the subject, scale score, and the achieved proficiency level. Students who were not in the system for all the years of the study were omitted from the data base. Existing data was checked by the Mississippi Grade Level Testing Program Curriculum Test Score Reports for the students in the examined cohort.

Data Analysis

The first step in data analysis was to code the teachers' teaching style (learning styles or basal) when the students were in the 3rd, 4th, and 5th grades. Next the students were divided into three groups. The three groups consisted of students who had a learning styles teacher all three years, students who had a basal styles teacher all three years, or students who had a combination of both. The mean of each category scale score was determined. Curriculum Test Score Reports were compiled and analyzed using the SPSS 13.0 software program to determine if there was a significant difference between the groups who had a learning styles teacher all three years and those who had a basal teacher all three years. The students were categorized as 1= learning styles, 2 = combination, and 3 = basal. Once the students were linked to the teachers, data were coded so that all identifiers were removed.

The researcher sought to answer the following research question through the use of the Analysis of Variance (ANOVA) and Analysis of Covariance (ANCOVA)

techniques: Is there a statistically significant difference between the MCT scores (reading) of two groups of students (those taught by their learning style and those taught by the basal approach)?

ANOVA (analysis of variance) was an appropriate procedure to use with this research. Frankel and Wallen (2003) indicated that when researchers desire to find out if there are significant differences between the means of two or more groups, they commonly use ANOVA. It is actually a more general form of the *t*-test (used to see whether a difference between the means of two samples is significant). Variation both within and between each of the groups is analyzed statistically, yielding what is known as an F value. As in a *t*-test, this F value is then checked in a statistical table to see if it is statistically significant. It is interpreted quite similarly to the *t* value, in that the larger the obtained value of F, the greater the likelihood that statistical significance exists.

CHAPTER III

RESULTS

The purpose of this research study was to analyze the Mississippi Curriculum Test (MCT) scores of a cohort of eighth grade students in an east central Mississippi school to determine if there was a statistically significant difference between the MCT reading scale scores of two groups of students (those taught by their learning style and those taught by the basal approach). This chapter presents the results of the study. First, a description of the data is presented and then the research question is addressed. The chapter concludes with a discussion of the findings.

Descriptive Data

Student data for this study were the reading subtest score reports of the MCT for school years 2001, 2002, 2003, 2004, 2005, and 2006. The data included the scores of 119 students (see Table 1). The students whose scores were used contained more females (62) than males (57). The majority of the students whose scores are used were white (81%). The 119 students whose scores were used in the study were the students who were enrolled in 3rd grade and remained continuously enrolled in the school system through the 8th grade. The original enrollment of the grade was 229, but only 119 were in enrollment the full six years of the study. The other 110 students transferred out of the system, were retained in a grade, etc.

Approximately 60% of the students represented received free or reduced lunches. This is a close reflection of the district's overall free or reduced lunch percentage which is 58%. The students' abilities ranged from gifted to learning disabled.

Table 1 Distribution of Students in the Research Cohort by Race and Sex

	Male (%)	Female (%)	Total (%)
White	47 (82%)	49 (79%)	96 (81%)
Black	8 (14%)	9 (15%)	17 (14%)
Indian	2 (4%)	4 (6%)	6 (5%)
Total	57	62	119

Scores on the MCT are reported in scale score points. The scale score is the score the student receives for each content area (reading in this research study). This score is based on the number of points earned on the test. The total number of score points is translated to a scale score (MDE, 2007).

In addition to the reading subtest score, the teaching style of the teachers in grades 3-5 was categorized as learning styles or basal (no learning styles). The teaching style of the teacher was determined by the evaluations/observations that the principal made of the teacher. Teachers and principals had extensive training in organizing, implementing, and recognizing learning styles classrooms. The scale scores of students were then assigned to the categories of the teacher's style of teaching.

The minimum scale score achieved, the maximum scale score achieved, the mean scale score achieved, the difference in the mean from the previous grade, and the standard

deviation of student scale scores were noted for this entire cohort of students at each grade level in Table 2.

Table 2 Descriptive Statistics for Cohort

Grade	N	Minimum Scale Score Achieved	Maximum Scale Score Achieved	Mean Scale Score Achieved	Difference in Mean from the previous grade	Standard Deviation
3	119	396.00	604.00	501.9160	-	42.75721
4	119	399.00	652.00	520.2521	18.3361	42.71570
5	119	427.00	674.00	543.1849	22.9328	48.21421
6	119	410.00	730.00	545.2269	2.042	51.53647
7	119	440.00	667.00	561.2605	16.0336	42.06501
8	119	465.00	760.00	571.0840	9.8235	45.29631

The Mississippi average scale score for 3rd graders on the reading subtest was 478.6 (MDE, 2001). The mean for the research cohort was 501.92, exceeding the state average by 23 points.

In Table 2, the difference in means between grade levels showed erratic growth. The mean scale score differences ranged from a high of 22.9328 in the 5th grade to a low of 2.042 in the 6th grade.

The students in this district enter the middle school in the 6th grade where teachers and administrators have had no training in learning styles. Learning styles methodology is not used in grades 6, 7, or 8. The largest standard deviation was in the scores of the 6th grade students.

The student data were assigned to one of three groups for data analysis. The first group was the data of the 27 students who had a learning styles teacher all three years of elementary (grades 3, 4, and 5). The second group was the data of the 15 students who did not have a learning styles teacher in grades 3, 4, and 5. The third group was the data of the 77 students who had a combination of both learning styles and basal teachers (see Table 3).

Table 3 Number of Students in the 3 Teaching Styles Groups

Total Cohort	Learning Styles	Basal	Combination
119	27 (22%)	15 (13%)	77 (65%)

The majority of students (N=77, 65%) had a combination of learning styles and basal teachers. The smallest group was the Basal group with 15 (13%).

Table 4 shows that the three groups of students were of equivalent academic standing in reading when they completed the second grade. The MCT was not administered in 2000 statewide or to this cohort of students; therefore, end-of-year grades were analyzed for equivalency. The MCT is a criterion reference test that is administered statewide to meet the requirements of the No Child Left Behind federal legislation. It is not comparable to the norm reference tests that were administered prior to 2001. The end-of-year grades were based on the state curriculum framework and would show that mastery of the curriculum was equivalent for all three groups in the research study.

Table 4 2nd Grade End-of-Year Reading Grades

Group	2 nd Grade End of Grade Average Reading Score
Learning Styles	93
Basal	94
Combination	93

Although the basal group had a higher end-of-year grade point average than did the learning styles group or the combination group, the grades were sufficiently close to indicate that the groups were equivalent before entering third grade when some teachers began teaching using learning styles methodology. This indicates differences in outcome measures should not be attributable to initial group differences. If anything, based on the initial group differences, one might expect the basal group to score higher than the learning styles group or the combination group.

The following three tables (5, 6, and 7) show the percentage of students in each category (Minimal, Basic, Proficient, Advanced) for the state of Mississippi and for the research groups. Students scoring Minimal on the MCT do not demonstrate mastery of the content and skills required for success at the next grade. Students scoring Basic on the MCT demonstrate partial mastery of the content and skills needed for success at the next grade. Students at the Proficient level on the MCT demonstrate solid mastery of the content and skills for success at the next grade, and students scoring at the Advanced level on the MCT consistently perform in a manner beyond that required to be successful at the next grade (MDE, 2006). Table 5 compares the proficiency level percentages of the learning styles group with the proficiency level percentages of the state of Mississippi. Table 6 compares the proficiency level percentages of the basal group with the proficiency level percentages of the state of Mississippi and Table 7 compares the

proficiency level percentages of the combination group with the proficiency level percentages of the state of Mississippi.

Table 5 Comparison of the Percentages of Each Proficiency Level of the Learning Styles Group (LSG) and the State of Mississippi (MS)

READING								
Proficiency Level Comparison of Learning Styles Group with the State of MS								
Grade	Minimal		Basic		Proficient		Advanced	
	MS	LSG	MS	LSG	MS	LSG	MS	LSG
3	10.5%	0%	13.3%	4%	57.3 %	55%	18.9%	37%
4	10.2%	4%	7%	4%	64.2%	55%	18.6%	37%
5	10.2%	0%	11%	7%	53.4%	44%	25.4%	48%
6	17.1%	4%	16.8%	15%	54.2%	56%	11.9%	26%
7	21.8%	4%	23%	11%	41.1%	52%	14.1%	33%
8	25.8%	7%	24.5%	26%	40.1%	33%	9.6%	33%

As shown in Table 5, the learning styles group had a lower percentage of students scoring in the Minimal and Basic categories in every grade than the state percentage. The percentage of students scoring in the Proficient and Advanced categories for the learning styles group was higher in every grade than the state percentage. The Minimal and Basic categories had only 7% in 5th grade as compared to 21.2% for the state of Mississippi. That same group scored 19% in the Minimal and Basic categories the following year in 6th grade. The Minimal and Basic categories grew to 33% in 8th grade for the learning styles group. It is interesting that the Advanced learning styles percentages stayed consistent except for a distinctive drop (26%) in the 6th grade.

Table 6 Comparison of the Percentages of Each Proficiency Level of the Basal Group (BG) with the State of Mississippi (MS)

READING								
Proficiency Level Comparison of Basal Group with the State of MS								
Grade	Minimal		Basic		Proficient		Advanced	
	MS	BG	MS	BG	MS	BG	MS	BG
3	10.5%	7%	13.3%	7%	57.3 %	53%	18.9%	33%
4	10.2%	13%	7%	0%	64.2%	60%	18.6%	27%
5	10.2%	7%	11%	13%	53.4%	53%	25.4%	27%
6	17.1%	20%	16.8%	20%	54.2%	53%	11.9%	7%
7	21.8%	20%	23%	27%	41.1%	40%	14.1%	13%
8	25.8%	33%	24.5%	20%	40.1%	33%	9.6%	13%

As presented in Table 6, the basal group had a higher percentage of students scoring in the Minimal and Basic categories in grades 6, 7, and 8 than the state percentage. The percentage of students scoring in the Proficient and Advanced categories for the basal group was lower than the state in the 6th, 7th and 8th grades. The basal group's percentage of Minimal and Basic scores was higher than for the learning styles group (see Table 5). The Minimal and Basic categories for the basal group had 20% (7%+13%) in 5th grade, but that same group had 40% (20%+20%) of the students in the Minimal and Basic categories in 6th grade, as compared to 33.9% (17.1%+16.8%) for the state. The Minimal and Basic categories for the basal group grew to 53% (33% +20%) in the 8th grade. The Advanced group was a consistently lower percentage in the basal group than in the combination group or the learning styles group.

Table 7 Comparison of the Percentages of Each Proficiency Level of the Combination Group (CG) with the State of Mississippi (MS)

READING								
Proficiency Level Comparison of Combination Group with the State of MS								
Grade	Minimal		Basic		Proficient		Advanced	
	MS	CG	MS	CG	MS	CG	MS	CG
3	10.5%	4%	13.3%	5%	57.3 %	61%	18.9%	30%
4	10.2%	1%	7%	4%	64.2%	61%	18.6%	34%
5	10.2%	5%	11%	3%	53.4%	49%	25.4%	43%
6	17.1%	1%	16.8%	16%	54.2%	69%	11.9%	14%
7	21.8%	4%	23%	17%	41.1%	56%	14.1%	23%
8	25.8%	10%	24.5%	23%	40.1%	53%	9.6%	13%

As shown in Table 7, the combination group had a lower percentage of students scoring in the Minimal and Basic categories in every grade than the state percentage. The percentage of students scoring in the Proficient and Advanced categories for the combination group was higher than the state in all grades. The Minimal and Basic categories of the combination group had only 8% in 5th grade, but that same group scored 17% Minimal and Basic the following year in 6th grade, showing reason for concern. Addition concerns are raised as the Minimal and Basic categories for the combination group grew to 21% in the 7th grade and to 33% in 8th grade. The combination group's Advanced category was a consistently lower percentage than the Advanced category for the learning styles group. Comparing the data presented in Tables 5, 6, and 7 shows that the students in the learning styles group had fewer students in the Minimal category of the MCT and more students in the Advanced category in every grade than did the students in the basal group. The combination group had fewer students in the Minimal category in every grade than the basal group. The combination group had more students than the basal group in the Advanced category in all grades except 3rd grade (where it's

possible that many of the combination group had no learning styles instruction in this grade). In the 8th grade, the percentages of Advanced in the combination group and the basal group (13%) were identical. Percentages show that the students with instruction in learning styles consistently outperformed all other students.

Table 8 presents the mean scale scores for students in each of the three research groups. The research cohort makes up the cumulative total of all three research groups.

Table 8 MCT Mean Scale Score of Students by Group

Grade (Year)	Total for students in the Research Cohort (*gain)	Students in the Learning Styles group	Students in the Basal Group	Students in the Combination Group
3 (2001)	501.91	509.15	491.20	501.47
4 (2002)	520.25 (+18.34)	522.22 (+13.07)	505.00 (+13.80)	522.53 (+21.06)
5 (2003)	543.18 (+22.93)	549.81 (+27.59)	527.80 (+22.80)	543.86 (+21.33)
6 (2004)	545.23 (+2.05)	545.96 (-3.85)	535.40 (+7.60)	546.88 (+3.02)
7 (2005)	561.26 (+16.03)	567.11 (+21.15)	551.93 (+16.53)	561.03 (+14.15)
8 (2006)	571.08 (+9.82)	583.22 (+16.11)	556.07 (+4.14)	569.75 (+8.72)

*The number in parentheses is the positive or negative gain made from the previous year for that group.

What is interesting to note in Table 8 is that while the learning styles group outscored all others in 3rd, 5th, 7th, and 8th grades, the students in the combination group matched the scale score average of the learning styles group in the 4th grade and were slightly higher in the 6th grade. The 6th grade, again, is an area of concern. The students in

the basal group (those who never had a learning styles teacher) had the lowest average score each year.

The largest scale score gain of the research cohort was in the learning styles group in the 5th grade (27.59 SS points) while the only loss was in the learning styles group in the 6th grade (-3.85 SS points). The sixth grade, again, is a red flag. In this school district, the students enter middle school in the 6th grade where the teaching styles do not accommodate the different learning styles of the students. The change in the teaching style could account for the drop in this group that was accustomed to having their learning style accommodated.

Students in the learning styles group and the combination group outscored the students in the basal group every year. This would indicate that the learning styles methodology is more effective for increasing students' achievement test scores. Student scores in the combination group were comparable each year to the scores of the total research cohort.

Comparison of MCT Scores

This study addressed the following research question: Is there a statistically significant difference between the MCT scores on the reading subtest of two groups of students (those taught by their learning style and those taught by the basal approach)?

The first question to be answered is the question of equal variance of the samples. Levene's test is used to test if samples have equal variances. Equal variance across samples is called homogeneity of variance. Some statistical tests assume that variances are equal across groups or samples and the Levene test can be used to verify that

assumption. Levene’s test for equality of variance showed that equal variances are assumed ($F = 0.27$), but there is no statistical significance ($\text{Sig.} = .870$). The learning styles group had a higher mean score (9.2 points) than the basal group, but it is not statistically significant. Non-significance indicates homogeneity of variance. (See table 9)

Table 9 Levene’s Test for the Differences in Mean Scale Scores of the Learning Styles Group and the Basal Group

Diff. score	Levene’s Test		t	Df	Sig. (2-tailed)	Mean Difference	t-test for Equality of Means		
	F	Sig.					Std. Error difference	95% Confidence Interval of the difference	
								Lower	Upper
EVA *	.027	.870	.793	40	.433	9.2074	11.61495	-14.26728	32.68210
EVNA*			.786	28.377	.438	1 9.2074 1	11.70786	-14.76070	33.17551

*EVA = Equal variances assumed

*EVNA = Equal variances not assumed

Independent samples tests were analyzed and equal variances were assumed at each grade level using Levene’s Test for Equality of Variances. Table 9 showed equality of variance for the difference in the scores of the learning styles group and the basal group and Table 10 shows the equality of variances for the learning styles group and the basal group at each grade level. In the Levene’s test, there is no significant difference in the reading scores of the learning styles group and the basal group for each grade level.

Table 10 Levene's Test for the Learning Styles Group and Basal Group for Grades 3-8

		Levene's Test	Levene's Test
Grade		F	Sig.
3	Equal var. assumed Equal var. not assumed.	1.759	.192
4	Equal var. assumed Equal var. not assumed	1.619	.211
5	Equal var. assumed Equal var. not assumed	.170	.682
6	Equal var. assumed Equal var. not assumed	.000	.993
7	Equal var. assumed Equal var. not assumed	.284	.597
8	Equal var. assumed Equal var. not assumed	.745	.393

It is interesting to note in Table 10 that with equal variances assumed, there is no significant difference between the learning styles group and the basal group. Significance ranges are from .192 in third grade to .993 in 6th grade. The high significance (.993) of the 6th grade scores should be noted. Sixth grade is the grade these students entered middle school and had teachers that did not accommodate their learning styles.

When researchers desire to find out if there are significant differences between the means of two or more groups, they commonly use ANOVA (Frankel & Wallen, 2003). It is actually a more general form of the *t*-test (used to see whether a difference between the means of two samples is significant) that is appropriate to use with two or more groups. Variation both within and between each of the groups is analyzed statistically, yielding

what is known as an F value. As in a *t*-test, this F value is then checked in a statistical table to see if it is statistically significant.

The results of the ANOVA (see Table 11) showed no significant difference between the learning styles group and the basal group. Scores were compared for each grade level. There is, however, another way to analyze the data collected for this research study. The students entering third grade were of equal academic proficiency in reading. We can conclude that the groups were equal when they entered the third grade. In third grade, some students had a learning styles teacher and some had a basal teacher. After one year of instruction in classrooms of teachers that accommodated their learning style, the learning styles group outperformed the basal group. After the sixth grade, the learning styles group's average scale score dropped an average of 3.85 scale score points, but was still an average of 10 scale score points higher than the basal group. The combination group had significant gains in the 4th and 5th grade. Analysis of the MCT scores clearly shows that students in classrooms that had their learning styles accommodated outperformed students in the basal group and the combination group. Data analysis also showed that the scores of the combination group were consistently higher than the scores of the basal group. It can be concluded that some learning styles instruction made a difference in scores, and the more that students have teachers that will accommodate their learning styles, the higher their test scores will be.

Table 11 Analysis of Variance of Grade Level Reading Scores

Grade		Sum of Squares	Df	Mean Square	F	Sig.
3	Between Groups	3150.183	2	1575.092	.860	.426
	Within Groups	212574.976	116	1832.543		
	Total	215725.160	118			
4	Between Groups	3994.601	2	1997.301	1.096	.338
	Within Groups	211311.835	116	1821.654		
	Total	215306.437	118			
5	Between Groups	4772.030	2	2386.015	1.027	.361
	Within Groups	269531.903	116	2323.551		
	Total	274303.933	118			
6	Between Groups	1674.363	2	837.181	.312	.733
	Within Groups	311734.511	116	2687.366		
	Total	313408.874	118			
7	Between Groups	2233.376	2	1116.688	.627	.536
	Within Groups	206563.548	116	1780.720		
	Total	208796.924	118			
8	Between Groups	7497.248	2	3748.624	1.853	.161
	Within Groups	234609.912	116	2022.499		
	Total	242107.160	118			

The data for each grade level was analyzed to see which group had a higher end of year score. Significance of .05 was established. From Table 11, it is noted that there is no significant difference in the reading scores of grades 3-8, but it is interesting to note that the 6th grade had a mean square of 837.181, and F of .312, and Sig. of .733. The 6th grade scores are so far from significance (.05) that a red flag again must be acknowledged. An additional concern would have to be noted of the group sizes. It would have been beneficial for the study if the basal group could have been larger.

ANCOVA (Analysis of Covariance) is an extension of ANOVA that provides a way of statistically controlling for the effects of continuous or scale variables that raise concern about but that are not the focal point or independent variable(s) in the study. These scale variables are called covariates. The covariate in this study is the 3rd grade MCT scores since that is the first year data from the MCT was collected. The problem with the scores being used as the covariate was that the third graders had already had either a year of learning styles or a year of basal style teaching before the MCT was administered. The statistical significance of the learning styles group could have been greater if there had been results of a pretest (for analysis) at the beginning of third grade. The ANCOVA analyzes the differences between the learning styles group and the basal group from 3rd grade to 8th grade.

Table 12 ANCOVA of 8th Grade Scores with 3rd Grade Scores as the Covariate Tests of Between-Subjects Effects

Source	Type III Sum of Squares	df	Mean Square	F	Sig.
Corrected Model	81610.216	3	27203.405	24.763	.000
Intercept	7780.159	1	7780.159	7.082	.011
Teaching method	7003.768	1	7003.768	6.736	.016
MCT 3 rd Grade Scores	68394.318	1	68394.318	62.260	.000
Method/MCT 3 rd Grade Scores	7720.081	1	7720.081	7.028	.012
Error	41744.261	38	1098.533		
Total	13938396.0	42			
Corrected Total	123354.476	41			

Looking at the results of the ANCOVA in Table 12, ($F = 6.736$, and $S = .016$), there is a significant difference for teaching method. Significance was established at .05. This study addressed the following research question: Is there a statistically significant difference between the MCT scores on the reading subtest of two groups of students (those taught by their learning style and those taught by the basal approach)? The answer to the research question is yes, there is a statistically significant difference between the MCT reading scores of the learning styles group and the basal group. The learning styles group had a statistically significant higher scale score average than the basal group.

As seen in the MCT 3rd Grade Scores, there is a statistical difference in the 3rd and 8th grade reading scores of the learning styles group and the 3rd and 8th grade scores of the basal group. The gain for the learning styles groups from in the six years from 3rd grade to 8th grade was greater than the gain for the basal group in that same time period.

Discussion

The data in this study has shown that students who have their learning style accommodated outperformed those who do not. The downward spiral of the 6th grade is a definite dilemma for this district, but the results of the ANCOVA showed the statistically significant difference of the learning styles group from 3rd grade to 8th grade over the basal group.

Manzo's research (2002) found that students who enjoy the reading process are much better readers than those less engaged in reading and that socioeconomic status plays no significant role. This is in agreement with the philosophy of learning styles that

says that if a student's learning style is known, the teacher can respond to the individual needs of the learner and make the learning process more successful (Dunn, et. al., 1989).

Carbo (1997) found that teaching grounded in the learning style of the student has brought about test score gains with many students and the students in the learning styles group were taught by teachers trained in the strategies that Carbo has researched. The learning styles group in the study showed test score gains after one year of learning styles methodology and even greater gains after years two and three.

Additional research by Barber, Carbo, and Thomasson (1996) has found that one could expect the children in the learning styles classrooms to obtain consistently higher achievement scores and gains than those children in control programs and this was the result of the learning styles group in this study. The learning styles group had a 17.95 higher scale score average than the basal group after one year of learning styles teachers. After two years of learning styles methodology the learning styles group had a 20.94 higher scale score average than the basal group and after three years the difference had spread to 35.09 points higher average for the learning styles group.

Farkas (2003) reported that the achievement scores of students who were in classrooms that had teachers that matched their preferred modalities with their instructional resources had statistically higher achievement scores than those students who were not taught with learning styles methods. This research of teaching methodology again supports the findings of the learning styles group in having higher reading test scores than any other group.

Bostrom and Lassen (2006) and Carns (1991) indicated that student achievement and motivation are enhanced when teaching is based on learning styles and that they

create successful learning environments. The reading achievement scores of the learning styles group support these findings as they consistently outperformed all other groups in the study.

Research by Humphrey (2002) verifies that simple solutions are nonexistent for the problems surrounding middle school reading programs. Students' future success depends on their reading achievement during the middle school years. There is concern in this district about the effectiveness of the middle school reading program, especially in sixth grade. Scores of the sixth grade were lower than at any other grade level in the study.

Much work has been done in this district to stop the trend of declining scores of middle school students. A computerized intervention program has been implemented for students scoring Minimal or Basic in all three grades (6th, 7th, and 8th). All tested objectives are taught by the end of the third nine weeks. Pretests are administered each nine weeks to see what skills need the most instruction and post tests are administered to see what skills need re-teaching. In March, a mock test of the MCT is administered to all students to see which skills need additional review during the 4th nine weeks prior to state testing. After school tutoring has given at-risk students additional instructional time. A new reading intervention program will be implemented in the 2007-2008 school year for 7th graders scoring at the Minimal or Basic level on the MCT. Those students will be in a 90 minute block of intensive reading instruction.

The problem with middle school reading is not just a local problem. Mississippi has a problem with low student scores in the middle grades across the entire state. The solution to this problem could lie beyond this school district.

McElroy (2005) found that gains in reading achievement can do something very significant for students-it can change their lives. If teachers learn to accommodate students' learning styles and make their learning experience successful, higher achievement scores in reading can be expected.

CHAPTER IV

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter consists of three sections: (a) summary, (b) conclusions, and (c) recommendations. The recommendations will include recommendations for the school and recommendations for further research.

Summary

A review of relevant literature that addressed increasing reading achievement found five major areas of review: the impact of literacy on the lives of students, individual learning styles in the classroom, using the learning styles of students to differentiate instruction, research related to learning styles and student achievement, and matching teaching and learning styles with adequate resources. The first area of literature reviewed was the impact of literacy on the lives of students. Literacy plays a critical role on the financial impact of students' lives as well as the social arena. Reading is the fundamental component that impacts comprehension and mastery of every school subject (Snow, et. al., 1998). Research by Baker (2003) concluded that the role of the parent plays such an important role in the literacy development of their children. He was convinced that reading is based on the curiosity, involvement, and importance of the belief by the parent and teacher that reading is important.

The second area of literature reviewed was the individual learning styles in the classroom. Every person has a learning style and that learning style is as unique as a signature (Dunn, et. al, 1989). The learning style of students impacts their learning. Educators need to look at the way schools are structured to make them more compatible with the actual learning mode of students. According to Carbo (1997), a person's learning style is his or her special way of learning to read and it focuses on that person's needs and strengths during the act of reading. Many students taught by their learning style have seen rapid results because students' needs drive instruction, not a commercial program.

Using the learning styles of students to differentiate instruction was the third area of literature reviewed. Studies by Bostrom and Lassen (2006), DeBello (1990), and Dunn and Dunn (1978) have revealed that sensory preferences do influence the way that students learn. DeBello's model includes specific strategies and assessments for increasing the achievement of middle school students.

Literature review in the fourth area was related to learning styles and student achievement. According to Farkas (2003), students who had teachers that matched their preferred learning style with their instructional resources have consistently higher achievement scores than those who were not taught by their preferred learning style. Carnes (1991) believed that teaching to a student's learning style may cause the student to become more actively involved in the learning process. Carnes further stated that more engagement in the learning process can cause students to enjoy the learning process and achieve at a higher level.

The final area of literature review was matching teaching and learning styles with adequate resources. Research by Smith and Renzulli (1984) found that if teachers find the

areas in which students have special interests, we can build a curriculum that will draw students to it. Duffy (2003) found that effective programs depend on the quality of the teacher who uses the program, home support, and the amount spent in instructional time and resources.

The recognized problem in this school district was declining reading test scores as students move into the middle grades 6-8. The district had implemented learning styles training in the elementary school in hopes of increasing reading test scores by teaching according to the learning styles of the students. The purpose of this causal comparative study was to analyze the MCT scores of a cohort of eighth grade students in an east central Mississippi school to determine if there was a statistically significant difference between the MCT scores (reading) of two groups of students (those taught by their learning style and those taught by the basal approach). This study addressed the following research question: Is there a statistically significant difference between the MCT scores (reading) of two groups of students (those taught by their learning style and those taught by the basal approach)? A causal-comparative design was used in this study. Fraenkel and Wallen (2003) noted: “the group difference variable in a causal-comparative study is either a variable that cannot be manipulated (such as ethnicity) or one that might have been manipulated but for one reason or another has not been (such as teaching style)” (p.368). Groups are already formed in causal-comparative research designs.

This study analyzed the MCT reading scores of a cohort of students from the time they entered the third grade in 2001 until they completed the eighth grade in 2006. The style of teaching reading used by the teacher whom the students had in 3rd, 4th, and 5th grade was categorized. The two categories of teachers’ styles were: (a) based on students’

learning style and (b) basal approach. The MCT data were analyzed to determine which teaching style was the best predictor of reading success (higher scale scores on the MCT reading subtest) as the student moved through the middle school grades to the 8th grade. The causal-comparative design was selected because intact groups were used and experimental manipulation was not present.

The 119 students in the research cohort included 47 white males, 8 black males, 2 Native American males, 49 white females, 9 black females, and 4 Native American females. The learning styles group (N=27) composed 22% of the research cohort. The smallest group was the basal group with 15 (13%). The majority of the students (N=77, 65%) had a combination of basal and learning styles teachers.

Descriptive statistics for the entire group showed an average mean scale score of 501.92 in the 3rd grade and 571.08 in the 8th grade. Scores began to drop in the middle grades (grades 6, 7, and 8) where teachers did not accommodate for the differences in students' learning styles. End-of-grade averages at the end of 2nd grade showed that all three groups were of equal academic proficiency, but the learning styles group had higher scale score means in every grade than did the basal group. The learning styles group also had lower percentages in the Minimal and Basic proficiency categories than did the basal group.

Analysis of the MCT scores showed that students in the classrooms that had their learning styles accommodated outperformed students in the basal group. The MCT reading data analysis of the students in grades 3-8 revealed that the students taught by a learning styles teacher in grades 3, 4, and 5 were statistically higher than those of the basal group.

It can be concluded that the students taught by learning styles instruction had higher test scores. Learning styles methodology outperformed basal methodology at every grade level.

Conclusions

Based on the study's findings, there was an overall higher reading achievement gain for the students in the learning styles group. The learning styles group had a lower percentage of students in the Minimal and Basic categories in every grade than the state of Mississippi percentage. The percentage of students in the Proficient and Advanced categories for the learning styles group was higher in every grade than the state percentage. Students in the learning styles group outscored the other groups every year. Students in the learning styles group and the combination group outscored the students in the basal group every year. A statistically significant difference was found with the ANCOVA between the scores of the learning styles group and basal group. This would indicate that the learning styles methodology is more effective for increasing student's achievement test scores than basal instruction.

The scores in the middle grades showed a decline. The learning styles group had low percentages in the Minimal and Basic categories in the elementary grades (3rd grade-4%, 4th grade-8%, 5th grade-7%). As the students moved into middle school, the percentages in the Minimal and Basic categories grew larger (6th grade-19%, 7th grade-15%, 8th grade-33%). It must be concluded that the lack of teachers using learning styles methodology had a significantly negative impact on the reading scores of the middle grade students.

The literature supports the conclusion that the use of learning styles methodology was a major variable that influenced increased student achievement. The research of this study would indicate that all teachers need to be trained in assessing the learning styles of students. Further training in strategies for accommodating students' learning styles in the classroom would seem to be beneficial. Research indicates and supports that increased student motivation and achievement would be the result if learning styles methodology was implemented wide scale.

Recommendations

The following are recommendations for the school based upon the findings of this study:

- It is recommended that the east central Mississippi school district increase the implementation of learning styles methodology to include all classrooms in the elementary school. The study showed that student achievement increased when students were exposed to instruction that accommodated their learning styles.
- It is recommended that learning styles training be given to teachers of the middle grades (grades 6, 7, and 8). Test scores declined in the middle grades, and it would seem that learning styles training and methodology in the middle grades would prevent the decline.
- It is recommended that the school system design a research study to determine whether all students that were exposed to learning styles methodology had increased reading scores. If it is found that all students with learning styles

methodology had increased reading scores, it would further confirm the need for learning styles training and methodology in all grades.

The following are recommendations for further research based upon the findings of this study:

- This study focused on learning styles teachers in grades 3, 4, and 5. Further research could be conducted which replicates this study with various other grades to determine if the results of this study are consistent with findings related to other grade levels.
- Further research should determine if the learning styles group has a lower high school drop out rate than the basal group. Research supports the premise that students who enjoy the learning environment are more successful and therefore remain in school longer. Students who have their learning style accommodated enjoy school more than those that do not. It is indicated that the learning styles group would have a lower drop out rate.
- It is recommended that research and evaluation be fully planned when new programs are initiated into the school district. Planned studies can provide positive results. If the evaluation component is not planned prior to implementation, educators can end up with data that serves little or no purpose.

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APPENDIX A
EXAMPLES OF MISSISSIPPI CURRICULUM TEST
RESULTS

Mississippi Curriculum Test (MCT) Form Statistics –

READING

Test Level	Test Form	Year*	Max.# Pts.	St. N-Count	Raw Score Mean/SD	Mean p-Value	Reliability	SEM(RS)	% Chance
12	A	2001	51	3852	39.06 / 8.06	0.77	0.89	2.62	0.32
12	A	2002	51	37017	39.67 / 7.69	0.78	0.89	2.6	0.22
12	B	2001	53	4025	40.53 / 8.49	0.76	0.9	2.71	
12	C	2001	52	4102	38.05 / 8.98	0.73	0.9	2.79	
13	A	2001	54	4143	37.41 / 8.69	0.69	0.88	2.98	1.75
13	A	2002	54	37252	37.99 / 8.52	0.7	0.88	2.91	1.03
13	B	2001	53	3849	36.07 / 9.25	0.68	0.9	2.92	
13	C	2001	53	3720	34.77 / 8.62	0.66	0.88	2.96	
14	A	2001	53	3972	35.63 / 8.60	0.67	0.88	2.99	1.23
14	A	2002	53	37120	36.32 / 8.64	0.69	0.88	2.97	0.98
14	B	2001	56	3916	38.70 / 9.21	0.69	0.89	3.06	
14	C	2001	55	3864	37.95 / 9.04	0.69	0.89	3.04	
15	A	2001	52	3993	37.18 / 8.81	0.71	0.89	2.91	0.96
15	A	2002	52	36937	37.42 / 8.99	0.72	0.89	2.92	0.86
15	B	2001	53	3909	36.24 / 9.83	0.68	0.9	3.09	
15	C	2001	53	3888	34.81 / 9.61	0.66	0.9	3.06	
16	A	2001	53	3829	36.24 / 9.31	0.68	0.89	3.06	1.24
16	A	2002	53	36354	37.75 / 8.60	0.71	0.88	2.99	0.62
16	B	2001	54	3789	36.87 / 10.26	0.68	0.9	3.17	
16	C	2001	53	3753	32.47 / 10.16	0.61	0.9	3.15	
17	A	2001	53	3805	35.58 / 8.80	0.67	0.89	2.97	1.08
17	A	2002	53	35485	36.56 / 8.47	0.69	0.88	2.93	0.66
17	B	2001	54	3814	36.13 / 10.14	0.67	0.9	3.22	
17	C	2001	55	3729	36.58 / 9.83	0.67	0.89	3.29	
18	A	2001	53	3540	35.43 / 8.83	0.67	0.89	2.93	1.32
18	A	2002	53	33212	35.94 / 8.56	0.68	0.89	2.89	1.06
18	B	2001	53	3494	37.00 / 9.13	0.7	0.89	2.97	
18	C	2001	53	3458	36.23 / 8.39	0.68	0.88	2.85	

*All 2001 values except for chance score percentages are based on research samples.

Mississippi Curriculum Test (MCT) – Spring 2001
 Comparisons of Raw Score Means Across Test Forms

Test Level	Reading Form A	Reading Form B	Reading Form C
12	40	39	38-39
13	36-37	37	35
14	38	36	38
15	36	37	34*
16	37	36-37	33*
17	36	36	37
18	37	35-36	36

*This form was more difficult than the other two forms at the same test level (differed by 3-4 raw score points).

Mississippi Curriculum Test (MCT)
Scale Score Statistics for READING (Research Sample – Form A)

Test Level*	#Samples	Scale Score Statistics	Percentile Locations (SS Points)	SE at Various Levels
		Mean / SD / Median	P10 / P25 / P75 / P90	P25 / P50 / P75
12	3852	455.7 / 47.6 / 455	399 / 426 / 482 / 511	12 / 13 / 16
13	4143	480.7 / 47.5 / 481	424 / 453 / 510 / 536	13 / 14 / 16
14	3972	500.2 / 45.8 / 502	443 / 472 / 529 / 555	14 / 14 / 16
15	3993	518.4 / 48.0 / 518	462 / 488 / 549 / 575	13 / 14 / 16
16	3829	524.0 / 49.2 / 526	465 / 495 / 556 / 583	14 / 14 / 16
17	3805	535.4 / 51.6 / 538	474 / 506 / 568 / 594	15 / 14 / 16
18	3540	548.8 / 49.1 / 550	491 / 519 / 581 / 606	13 / 15 / 16

* The corresponding MCT test levels and grade levels are: Level 12 = Grade 2, Level 13 = Grade 3, Level 14 = Grade 4, etc.

APPENDIX B
MSU IRB APPROVAL



March 14, 2007

Elizabeth Jackson
590 County
Line Road
Preston, MS
39354

RE: IRS Study #06-317: Reading Instruction and Long Term Changes in Reading Test Scores

Dear Ms. Jackson:

The above referenced project was reviewed and approved via administrative review on 3/14/2007 in accordance with 45 CFR 46.101 (b)(4). Continuing review is not necessary for this project. However, any modification to the project must be reviewed and approved by the IRS prior to implementation. Any failure to adhere to the approved protocol could result in suspension or termination of your project. The IRS reserves the right, at anytime during the project period, to observe you and the additional researchers on this project.

Please refer to your IRS number (#06-317) when contacting our office regarding this application.

Thank you for your cooperation and good luck to you in conducting this research project. If you have questions or concerns, please contact Christine Williams at cwilliams@research.msstate.edu or 325-5220.

Sincerely,

Christine Williams
IRS Compliance Administrator

cc: Dwight Hare