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# The Relationship Between Response to Intervention Implementation and Student Achievement

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# THE RELATIONSHIP BETWEEN RESPONSE TO INTERVENTION IMPLEMENTATION AND STUDENT ACHIEVEMENT

by

Carla Moran McCaleb

Abstract of a Dissertation
Submitted to the GraduateSchool
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ABSTRACT

THE RELATIONSHIP BETWEEN RESPONSE TO INTERVENTION IMPLEMENTATION AND STUDENT ACHIEVEMENT

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The purpose of this study was to determine if there was a relationship between Response to Intervention (RTI) implementation and student achievement in reading. The study used primary data derived from the winter STAR reading diagnostic screener collected from third, fourth and fifth grade students in the RTI process. These scores were then compared to the archival data collected in the fall STAR reading diagnostic screener from the same students.

Paired-tests were performed in order to determine if there was a relationship between RTI implementation and student achievement in reading.The study sample represented in this investigation was 125 students who were given the STAR reading diagnostic screener in the fall and winter months during the 2010-2011 school year. The participants were chosen from three elementary schools and one fifth grade school from a coastal school district. The schools are similar in socioeconomic status and have approximately 40% free and reduced lunch participation. Minority groups from each school represent 20% of their respective populations. The three elementary schools that were selected have a similar grade size of approximately 150 students per grade with an average class size of 26 students. The fifth grade school has an enrollment of approximately 430 students with an average class size of 26 students. All four schools combined have a population of approximately 1,600 students. All students selected had been identified as being below

benchmark in reading and had been placed in the RTI process for remediation. Only students who attended third, fourth and fifth grades in the district during the 2010-2011 school year and who were assessed in fall and winter using the STAR Reading diagnostic screener, were selected for the study.

Results indicated that RTI implementation did make an overall difference. The frequency of the intervention (tier 2) made no significant impact on grades three and four. However, grade five made significant gains. Based on the results, it appears as the interventions became more intense (tier 3); the results were significant with grades three and four, but not significant with grade 5. This could be an indication that younger students who struggle with reading fluency may benefit more from an intense level of intervention.

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# DEDICATION

This dissertation is dedicated to my late father, Hilton Moran, who valued education more than anyone I have ever known. His high expectations led me to believe that there was nothing I could not achieve if I worked hard and long enough to make it happen. Through his actions, he taught me the meaning of unconditional love and allowed me to learn through my mistakes as well as my successes. Although he is no longer here with me in a physical sense, I have sensed his ever present love throughout this process. As I accept my doctorate diploma, I will say a prayer of thanks to both my earthly father and my Heavenly Father as well. I know they will gather together to witness the completion of one of the most treasured accomplishments and incredible journeys I have ever known.

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# CHAPTER I

## INTRODUCTION

This chapter introduces the study and provides a purpose for the study and a statement of the problem. Background information is given to establish the need for this study. The research questions, the delimitations, and assumptions of the study will be addressed in this chapter. Definitions of related terms will be given to assist the reader, justification for the study and the chapter will conclude with a summary for the study.

"Teachers and schools can do little to affect children's home lives and certainly even less to affect their biology, but there is evidence that they are able to make a very substantial difference in children's achievement" (Spear-Swerling & Sternberg, 1996, p. 153). For instance, in their longitudinal study of the achievement of a group of low-income youngsters, Snow, Barnes, Chandler, Goodman, and Hemphill (1991) found that a wide range of variables, both in the home and at school, contributed to gains in reading comprehension. A strong educational program could compensate to a considerable degree, though not completely, for weaknesses at home. Every day, schools all over the world deal with the problem of recognizing children who have authentic learning disabilities and they must decide how to help them (Spear-Swerling et al., 1996). According to Cornoldi and Oakhill (1996), some disorders such as mental retardation are easy to recognize however, the school must consider much larger populations of children with learning difficulties, who cannot always be readily classified. These children present high-level learning difficulties that affect their performance in a variety of school tasks. A typical characteristic of such children is often their difficulty in understanding a written text (Cornoldi & Oakhill, 1996). In many instances, despite intellectual abilities, some children cannot find their way in the written texts and do not seem to grasp the most

important elements, the connections between the different parts, or search out the pieces of information they need to find. Sometimes these difficulties are not immediately detected by the teacher in the early school years. This may be because the most obvious early indicators of reading progress in the teacher's eyes do not involve comprehension of written texts or maybe because the first texts a child learns to read are simple and only reflect the difficulty level of the oral messages with which the child is already familiar. However, as years go by and texts get more and more complex, comprehension difficulties will become increasingly apparent and increasingly detrimental to effective school learning (Spear-Swerling & Sternberg, 1996).

## Purpose of the Study

The purpose of this study was to conduct quantitative research on the relationship between RTI and student achievement in third, fourth and fifth grade students in Mississippi public schools. The study determined whether there was a relationship between the implementation of Response to Intervention (RTI) and student performance in grades three through five in reading as measured by the STAR Reading diagnostic screener. The study followed The University of Southern Mississippi protocol in its organizational structure. Chapter I introduces the study, provides a purpose of the study, statement of the problem, background information, research questions, delimitations, assumptions, definitions of related terms, justification for the study and chapter summary. Chapter II is an extensive literature review that pertains to specific areas of interest addressed in the study, as well as the theoretical framework for the study. Chapter III describes the methodology, identifies the population, defines the procedures that will be used, the statistical tests that were conducted and the instrument that was used.

Chapter IV presents the results and data analysis of the statistical tests. Chapter V discusses the findings, conclusions, and any implications for policy, action and future research.

## Statement of the Problem

As we move into the 21st century, there are a significant number of students in the United States that are not performing at levels needed to meet the demands of this new era. According to data from the National Assessment of Educational Progress (NAEP) reading and writing assessments indicate little improvement in development of literacy skills for the nation's 13 and 17 year olds. The most recent NAEP data indicate that 36% of fourth graders and 27% of eighth grade students in the United States scored at the below basic level of proficiency, which is defined as partial mastery of the knowledge and skills that are fundamental for proficient work at any grade level ("Adolescent Literacy," 2008).

The publication of *A Nation at Risk* by the National Commission on Excellence in Education (1983) helped lead the way to a much needed educational reform efforts across the nation. The publication created a sense of urgency and highlighted a growing concern that other nations were surpassing the accomplishments of the American people. Later federal legislation such as *No Child Left Behind* (NCLB) of 2001 required state governments to set standards for student performance as well as teacher quality and qualifications. The *Individuals with Disabilities Act* (IDEA) of 2004 reauthorized IDEA and merged general education with special education initiatives. Educators have tended to assume we have quality classroom instruction rather than guarantee it and too many children are instructional casualties of failed or poor reading instruction (Mississippi

Department of Education (MDE), 2008). "A guaranteed and viable curriculum is the #1 school-level factor impacting student achievement" (Marzano, 2003, p. 15).

## Background

Teachers must be accountable for what students are taught. All students learn differently and some students need differentiated instruction in order to grasp the concepts that are being taught to them. Teachers must seek to find the best learning styles of their students and teach to that style. The procedure is termed *Response to Intervention* (RTI). RTI is a multilayered prevention system that identifies students' needs and puts them into tiers, based on their academic level. Fuchs and Fuchs (2006) noted, "RTI has been codified in federal law as an alternative to traditional methods of identification of learning disabilities, and practitioners are now struggling to build RTI models for their schools" (p. 623). The purpose of this study is to determine if RTI has an effect on student achievement in reading.

The Response to Intervention concept grew out of concerns expressed about the over-identification of Specific Learning Disabilities (SLD) (Kavale, Kauffman, Bachmeier & Lefever, 2008). While potentially dovetailing nicely with the No Child Left Behind Act, the use of Responsiveness to Intervention means major changes in the district-wide configuration for instruction in reading, math and other basic skills of all students (Zirkel, 2007). Some of the major shifts in education include going from teaching and instruction for *most* students to teaching and instruction for *all* students. Instead of being data reporters, teachers are now expected to be data driven. Instead of being professional loners, teachers are becoming members of a professional learning community (MDE, 2008). RTI is a general education initiative written into the special

education law - Individuals with Disabilities Education Act (IDEA) 2004. It is the practice of providing a systematic approach for assisting students, identifying struggling students before they fall behind and a support to struggling students throughout the educational process (MDE, 2008). RTI promotes high quality instruction and interventions that are matched to student need and monitors student progress to make changes in instruction when needed (MDE, 2008). It aims to support at-risk students by removing barriers to learning and is a strong component in the process of determining whether or not a child needs special education services.

Although originally focused on SLD identification as outlined in IDEA 2004, Kavale et al. states, "RTI was soon viewed as a means whereby schools do not wait for formal identification of a learning disability, but instead start providing targeted interventions early on" (p. 136). The scope of RTI soon expanded into a three-tiered model. Since Tier I requires all students to receive quality classroom instruction, all students are considered to be in Tier I. Tier II provides more focused and targeted supplemental amount of instruction in a smaller group setting. If students do not respond at a Tier II level, they could be placed in Tier III, which provides a more intensive amount of instruction in a small group setting such as three to one ratio or even one to one. If the student continues to fall short of making adequate progress, they could eventually be referred to a special education evaluation. Advocates of RTI maintain it is far better than the traditional approach of requiring a severe discrepancy between I.Q. score and achievement for eligibility of a specific learning disability (Zirkel, 2007).

Along with all of the positive sides to RTI implementation, there are also some negative ones. The federal government does not dictate how to implement RTI, so there

are many variations among states and districts in how RTI is implemented. This also means that classroom teachers need to be armed with facts. "RTI is best viewed as an instructional model, not an identification model" (Kavale et al., 2008, p. 136). It should not be the basis for SLD identification, but a means to keep from putting a label on students.

Models based on response to intervention use the quality of student responses to research-based interventions as the basis for decisions about needed services. Any model guiding decisions should be comprehensive and meet all legal requirements, provide a standard process for making sequential decisions about student needs, emphasize the importance of using scientifically based interventions, and have judgments about validity focused on significant student outcomes (Barnett, Daly, Jones & Lent, 2004).

Some benefits to RTI include higher graduation rates, fewer student retentions, improved discipline, increased awareness of specific professional development needs, ensures that all students receive appropriate instruction, provides critical information on student achievement and reduces the number of students referred for special education services (MDE, 2008).

## Research Questions

The purpose of this study was to conduct quantitative research on the relationship between RTI and student achievement in third, fourth and fifth grade students in Mississippi public schools. The study sought to determine whether there is a relationship between the implementation of RTI and student performance for each of grades three through five in reading as measured by the STAR Reading diagnostic screener. The study examined the following research questions:

1. After RTI implementation, is there a significant difference in Winter STAR Reading diagnostic screener scores compared to Fall STAR Reading diagnostic screener scores for each of grades three through five?

2. After RTI implementation, is there a significant difference in Fall STAR Reading diagnostic screener scores compared to Winter STAR Reading diagnostic scores by tier for each of grades three through five?

## Delimitations

Delimitations associated with this study include:

Selection of participants was limited to third, fourth and fifth grade students of reading in Mississippi public schools. Selection of students was limited to three elementary schools and one all fifth grade school, in the targeted district. Only students who attended third, fourth and fifth grades in the district during the 2010-2011 school year who were assessed using the STAR Reading diagnostic screener and who were in the RTI process, were selected for the study. This study was limited to this specific population and therefore, generalizations should be restricted to populations with similar demographics.

## Assumptions

The researcher assumed that all diagnostic screeners were administered with integrity and in a timely manner. The researcher also assumes that the students followed directions and completed the screener in a manner that is consistent with its intended use.

## Definitions

*Assessments*- Used to allow teachers to evaluate students' understanding or performance of a subject;

*At Risk Student*- A student who is a low performing achiever and in danger of falling below grade level;

*Curriculum*- A set of courses and their content offered at a school;

*Discrepancy*- A distinct difference between IQ and achievement;

*Implementation*- To put into effect or begin a new project;

*Initiative*- A plan or strategy designed to deal with a particular problem;

*Intervention*- The act of helping students who are not performing at grade level;

*Learning Disabilities*- A classification in which a person has difficulty learning in typical manner, usually caused by unknown factors;

*Reading Strategies*- An activity used to help increase reading ability;

*Research Based*- Research that involves the application of rigorous, systemic and objective procedures to obtain reliable and valid knowledge relevant to educational programs;

*Standards*- A general explanation for subject, grade and content to be taught;

*Supplemental Reading Programs*- Additional programs added to existing curriculum;

*Systematic approa*ch- A methodical approach repeatable and learnable through a step by step procedure; and

*Teacher Support Team (TST)* - The team in place at each of the targeted schools that determines a student's need for intervention as well as designs and monitors interventions.

*Teacher Support Team Folders*- students who are placed in RTI process have a folder that contains meeting minutes, diagnostic screener scores, grades, attendance records, and hearing and vision screener results.

*Three Tier Model*- Designed to offer instructional support at increased levels of intensity according to student need, and with specific features.

## Justification

In the 1980s and 1990s, the idea of classifying a student as learning disabled seemed cruel. Usually districts waited until a student was beginning third grade before determining if there was a disability in reading (Gersten & Dimino, 2006). Implementing RTI addresses the needs of individual students who are struggling as well as assists schools in meeting adequate yearly progress (AYP) (Cummings, Adkins, Allison & Cole, 2008). RTI involves students participating in effective general education instruction provided by their classroom teacher. Students' progress is monitored and students who do not respond to effective classroom instruction are then given additional or different remediation. These students are then progress monitored again and those who continue to struggle are evaluated for special education (Burns & Ysseldyke, 2005).

It is evident that there are many variables to student learning such as home-based values of education, genetics, and socio-economic status.

> Children living in poverty present a profound challenge to today's educators and counseling professionals. These children are significantly more likely than children from middle class background to report increased levels of anxiety and depression, a greater incidence of behavioral difficulties and a lower level of positive engagement in school. (Amatea & West-Olatunji, 2007, p. 82)

Despite all of these factors, the purpose of this study is to determine if additional instructional interventions can surpass these barriers and help students with reading fluency and comprehension and enable them to perform more efficiently in the classroom setting as well as on their standardized tests. Teachers are required to teach. It is the responsibility of all educators to find out works best for those students who need intervention. If the research indicates that RTI has a positive effect, it is probable that other schools will want to know about RTI implementation. *"Teachers who inspire know that teaching is like cultivating a garden and those who would have nothing to do with thorns must never attempt to gather flowers." Author Unknown*

## Summary

For decades, the procedure for identifying children with learning disabilities has involved documenting a discrepancy between a student's IQ and achievement. The problem with this approach is identification usually does not occur until fifth grade, so children must "wait to fail" before any serious interventions occur. For this reason, the 2004 IDEA (P.L. 108-446) permits states to discontinue the use of IQ- achievement discrepancy in favor of RTI for SLD identification (Fuchs & Fuchs, 2007). According to Shinn (2007) local education agencies are now given the choice of using a student's response to intervention as a major component to determine eligibility for special education under the category of specific learning disabilities. "The term learning disability was scarcely off the breath of early pioneers when a profession began questioning its own integrity" (Algozzine & Ysseldyke, 1987, p. 307).

Is RTI just another requirement that educators must fit into their crowded schedules, or is it really a change for the better? Response to Intervention is a promising

educational development but must be understood and implemented correctly in order to work. RTI is not a quick fix or a simple add-on. It is a different approach to looking at students and serving students with appropriate resources. RTI is fundamentally practical. It is not based on new theories or ideas, but is a way of putting into practice the things research has always taught educators to do (Fuchs & Fuchs, 2007).

# CHAPTER II

# REVIEW OF LITERATURE

The purpose of this chapter is to serve as an explanation of the information on theories related to education, as well as conditions to learning, and cognitive instructional strategies. It also outlines different reading approaches, and learning styles. It defines aspects of differentiated instruction, teacher knowledge and reading tutorial benefits. It also emphasizes the need for school reform and the importance of accountability. The discrepancy model for learning disabilities is defined along with reading components, and a background of the response to intervention model.

## Theoretical Foundation

### *Constructivism*

Many educators have come to define constructivism in a general, nonspecific way, such as the general notion that individuals construct their own knowledge or mental versions of the world (Harlow, Cummings & Aberasturi, 2006). Gordon (2008) explains that knowledge is attained when people come together to exchange ideas, articulate their problems from their own perspectives, and construct meanings that make sense to them. It is a process of inquiry and creation, an active and restless process that human beings undertake to make sense of themselves, the world, and the relationships between the two. In light of the insights of Piaget,Vygotsky, and Freire, a constructivist approach to education is one in which learners actively create, interpret, and reorganize knowledge in individual ways (Gordon, 2008).

Palmer (1998) was convinced that the capacity for connectedness is more integral to good teaching than technique and that when teaching is reduced to technique,

something fundamental is lost. Gordon (2008) emphasizes that when knowledge is constructed rather than discovered, implies that it is neither independent of human knowledge nor is it value free. Constructivists believe that what is deemed knowledge is always informed by a particular perspective and shaped by a specific ideological stance (Gordon). Constructivism has come under increased scrutiny in recent years in an era of testing and accountability and experienced its fair share of criticism. William J. Matthews (2003) explained that there is a lack of empirical evidence that demonstrates the effectiveness of constructivist teaching practices and that "employing this approach for which there is a lack of support, means not employing instructional practices for which there is empirical support" (p. 51).

John Dewey was a pioneer in constructivism and believed that the curriculum becomes actual subject matter to the learner when it is used in purposeful activities. He argued that it is the situation that makes subject matter of vital concern to the learner (Dewey, 1916). Dewey synthesized the liberal ideas of philosophers such as Rousseau, Herbert, and Frobel and added to pragmatic dimension. He believed pragmatism implied that education represents growth in the child's ability to deal with situations and is a continuous process which demands self direction as opposed to authoritarian rule (Wyett, 1998).

Constructivist Jerome Bruner (2004) said that two learning tasks are alike if mastering one makes mastering the other easier. This is called transfer criterion. He questioned if it was responses that were transferred or if one simply learns how to learn by practice. Bruner also argued that children should be allowed to explore concepts through manipulation of their surroundings (Slavin, 1991). In the lives of young

children, concept development and representations are formed as the result of experience, social interaction, and language development (Nelson, 1996; Vygotsky, 1978). Nelson's (1996) experimental theory emphasizes language development and the formation of representational models.

According to Piaget (1952), children construct knowledge out of their actions with the environment. These actions can be both physical and mental. The child learns first by encountering and then exploring an object or idea. First the child tries to assimilate new information into existing thought structures. If the idea does not match current schema, the child experiences cognitive disequilibrium and is motivated to mentally accommodate the new experience. Once the process of accommodation is complete a new schema is constructed into which the information can be assimilated and equilibrium can be reestablished. Each time the child encounters new experience that cannot be assimilated, disequilibrium reoccurs. Piaget believes this is how new construction of knowledge occurs (Harlow et al., 2006).

*Conditions of Learning*

Cambourne (2002) spent thousands of hours observing teachers who have tried to create classroom cultures that simulate the social and ecologically constrained conditions that seem to support complex learning degrees of success. He concluded that the more teachers simulate learning conditions in their classrooms, the more effective is their students' learning. He states, "Learning is what the brain does." (p. 758). Gardner (1985) described the Susuki method of learning the violin as "an intriguing experiment" (p. 4) that makes it possible for "an individual with apparent modest genetic promise to make remarkable strides in a short time" (p. 35). In this method, the child is exposed to violin

recordings daily for the first year of their life. The mother is crucial to the learning and is given a small violin similar to one that the child will later be given and she begins to perform each day. The child is constantly exposed to her practicing. Towards the end of the first year of life the child begins to hear, on a regular basis, the 20 short songs of the repertoire to be mastered once study with instrument begins. Six months before beginning lessons, around age two, the child begins to attend group lessons. Eventually, during these lessons, the child sees the big picture and they see what it means to be a violin player. The aim, said Gardner (1985) "is to produce an individual with a strong, positive, attractive character" (p. 375). Becoming proficient on the violin is a mere byproduct of the process, just as learning to talk is a byproduct of living with language (Camourne, 1995).

*Cognitive Strategy Instruction*

Many theorists view the child as an inherently active, self-regulating learner intelligently acting on a perceived world rather than passively responding to the environment (Meyers, Cohen & Schleser, 1989). Constructivists believe real understanding occurs only when children participate fully in the development of their own knowledge, and describe the learning process as self-regulated transformation of old knowledge to new knowledge (Poplin, 1988). A concept critical to teaching and learning, according to constructivist, Vygotsky's (1962) is the zone of proximal development, which is the area between what a learner can do independently and what can be accomplished with the assistance of a competent adult or peer.

Many precepts of constructivism have existed as a part of cognitive strategy instruction since its inception. Melchenbaum (1977) emphasized the importance of the

student playing an active role in the design of strategy interventions, and the gradual transfer of strategy ownership to the student. Melchenbaum noted, "the child is not passive, not merely the recipient of the thoughts and behaviors modeled" (p. 95). Give and take exchange between students and teachers, termed Socratic dialogue, suggests that the instructor ask the child how he or she would do the task and then provide feedback and build on that advice (Melchenbaum, 1983).

Strategy instruction permits teachers to expand the scope of their intervention and classroom approaches and should be used under the following conditions: when it meets the learner's needs and characteristics, a strategy can be identified appropriated to the child's problem, the strategy identified is likely to be more effective that alternative interventions, and teachers can meet the demands that strategy instruction creates (Harris, 1982).

As Deshler and Schumaker (1986) noted, no single intervention approach can address the complex nature of school success or failure. When used appropriately, cognitive strategy instruction is an exciting and viable contribution to the special educator's repertoire (Harris & Pressley, 1991).

## Reading Approaches

Fluent reading refers to the ability to read text not only accurately but also rapidly and with proper expression (National Reading Panel, 2000). Although teaching children how the alphabetic system works achieves accurate reading, large numbers of children remain unable to read fluently (Lovett, Ransby, Hardwick, Johns, & Donaldson, 1989; Shaywitz, 2003; Shaywitz, Morris, & Shaywit, 2008; Torgesen, Wagner, & Rashotte, 1997). The lack of fluent reading is observed clinically as reading that is effortful and

slow (Bruck, 1998; Lefly & Pennington, 1991; Shaywitz, 2003). In the field of education, researchers have recognized that reading is not just a subject area but a skill needed by students in order to be successful across academic disciplines, as well as one that affects personal and economic outcomes for students (Good, Simmons, & Smith, 1998). There are indicators suggesting that a significant difficulty with learning to read is not specific to students with disabilities, as almost 20% of students have these difficulties (Good et al., 1998).

The debate over which instructional reading approach best promotes reading comprehension continues. Historically, the debate has focused on traditional approaches versus holistic, student-centered approaches (Thames, Reeves, Kazelskis, York, Boling, Newel, & Wang, 2008). Holistic approaches for teaching reading are characterized by instruction that integrates "speaking, listening, writing, and reading into a unified approach to literacy instruction … to make conscious the connection between the student's emotional and personal life and the materials being presented" (Harris & Hodges, 1995, p. 108), while traditional approaches, center around the use of a commercially produced program such as a basal reading program, which usually includes graded student texts, workbooks, teaching manuals, and supplemental materials for use in developmental reading instruction.

Proponents for holistic, student-centered reading instruction view reading as a meaning-making process (Goodman, 1984; Weaver, 1990). Also, the National Reading Panel, who assessed the status of reading research as well as the impact of various approaches used to teach children to read, emphasized that reading is a meaning-making process since comprehension "requires an intentional and thoughtful interaction between

the reader and the text" (National Institute of Child Health and Human Development [NICHD], 2000, p. 13).

Assessment is critical for finding out what skills students currently have in order to design instruction appropriate to their needs (Cramer & Rosenfield, 2008). According to Shepard, (2000) teachers must utilize assessments to ensure that students have mastered the first skill in a series before building on it with the second skill in the series. In order for assessment to be tied to these ordered learning steps, the assessment must be moved from the end of the lesson to a central place in the teaching process (Shepard, 2000). Effective teachers determine what to teach through the use of assessments that track student progress and identify what skills might be getting in the way of their progress (Ehri, 2002). Accurate assessments allow teachers to pinpoint a student's individual skill deficits and to know what reading skills a student needs to learn (Cramer & Rosenfield, 2008).

## Learning Styles

According to Simon (2004), a learning style is the preferred way in which an individual approaches a task or learning situation. When teachers deliver content in ways that better match students' strengths, it can lead to increased academic performance and improved attitudes toward school (Lovelace, 2005). Favre (2007) argues that exposure to learning style requires recognition of the need for diverse strategies designed to complement individual differences. As a result, teachers make a concerted effort to eradicate the "one size fits all" approach and acknowledge the need to modify their classrooms, instructional practices and assessments. According to the International Learning Styles Network (2008), at- risk students are an international problem, as

evidenced by the participation of so many centers in the International Learning Styles Network; however, solutions have been available in the learning style literature for more than three decades. The American Association of Colleges for Teacher Education (2008) established thirteen essential knowledge bases to prepare pre-service and in-service teachers for culturally and linguistically diverse classes. Teacher training must accomplish clear processes for differentiating instruction on the basis of learning style so that each individual is taught effectively (Dunn, Honigsfeld & Doolan, 2009).

According to Gardner's (2006) multiple intelligences theory, an individual possesses at least eight discrete intelligences: linguistic, logical-mathematical, spatial, musical, bodily-kinesthetic, interpersonal, intrapersonal and naturalistic. Gardner's (2006) theory suggests that the manner in which subject matter is conveyed will influence that individual's ability to learn, and that teachers need to take all of these intelligences into account when planning instruction. According to a summary of current research, educational television and video helps reinforce reading and lecture material, aids in development of a common base of knowledge among students, enhances student comprehension and discussion and provides greater accommodation of diverse learning styles. It also increases motivation and enthusiasm in students and promotes teacher effectiveness (Corporation for Public Broadcasting, 2004). All students benefit from a variety of instructional methods and support and an appropriate balance between the challenge of instruction and the opportunity for success (Lawrence-Brown, 2004). Research suggests that students should have an opportunity to participate regularly in peer-mediated instruction such as peer-assisted learning strategies (Dion, Morgan, Fuchs & Fuchs, 2004). Students learn in diverse ways and knowledge of these different ways of

learning can offer the opportunity for teachers to build instructional activities that involve a number of varied capabilities (Bender, 2007). In terms of planning an individual unit of instruction, teachers can take the multiple intelligence concepts and devise an interesting and diverse educational activity (Bender, 2007). Bender (2007) suggests that giving students choices among assignments and having them base their choices on their learning strengths can result in students taking responsibility for their own work. When we teach students in a way that matches how they think, they perform better in school (Sternberg, 2006). Thames et al, (2008) explain that holistic, student-centered approaches, such as the integrated language arts approach to teaching reading, are often dismissed or ignored. This could be the result of pressure from high stakes testing and teacher overload. Student centered approaches are viewed as placing more demands on teacher preparation time and require more instruction time than do streamline, direct approaches (Thames et al., 2008).

## Differentiated Instruction

Although differentiated instruction has garnered increased attention over the past decade, the basic premise is not new (Tomlinson, 2003). After looking at the effects of curricular differentiation with between- and within-class grouping on student achievement, Tieso (2005) inferred that students with diverse abilities who received intervention experienced significantly higher mathematic achievement that students who did not receive differentiated instruction. Noble (2004) used a revised version of Bloom's Taxonomy to help teachers to differentiate instruction and found that the teachers expressed an increased level of confidence in their ability to meet students' differing

cognitive needs. These and other studies confirm that teachers can exercise a tremendous amount of creativity and flexibility in differentiating instruction.

VanScriver (2005) states that more and more nontraditional students are being funneled into schools' most rigorous classes. Teachers are now dealing with a level of academic diversity in their classrooms unheard of a decade ago and lawmakers, the business community, and parents are demanding results. There are many student differences within the classroom today as well as the challenges of K-12 teachers face in responding to the differing needs of students in a time of increased pressure of accountability and high-stakes testing (Anderson, 2007). Many argue that it is not unrealistic to think that teachers can differentiate instruction to meet the needs of all students while adhering to the standards and state performance testing (Lawrence-Brown, 2004). Instead of varying the learner objectives and lowering performance expectations for some students, teachers may differentiate the content by using texts, novels or short stories at varying reading levels. The teacher may choose to differentiate the content by using flexible grouping, affording students to work in groups using books on tape or the internet as a means for developing understanding and knowledge of the topic or concept (Anderson, 2007). Some other ways to differentiate the process aspect of a lesson include individualizing homework enrichment projects (George, 2005). As Tomlinson (2005) points out, if readiness levels in a class vary, so should must the complexity of work provided. Readiness can be addressed through small group sessions or the provision of one to one teacher and peer support or coaching.

Most teachers are always looking for new teaching ideas; however, it is important to keep in mind that all strategies or procedures should be research validated (Rock et al.,

2008). There must be a balance between instruction, remediation and enrichment (Abell, Bauder, & Simmons, 2005). Tomlinson (2005) refers to this process as "connecting kids and content" (p. 7). Even simple things such as meet-and-greet at the classroom door each morning, combined with a brief conversation about individual area of interest, help to promote a positive learning environment. In managing daily instruction, teachers could also find it useful to emphasize starts (e.g., acceptable behavior) rather that stops (e.g., unacceptable behavior) (Gable, Hester, Rock, & Hughes, 2007). Another aspect of differentiated instruction relates to questioning tactics. It is important to pose different types of questions to different students (e.g., convergent, divergent, high level, low level) depending on their instructional needs (Price & Nelson, 2007).

A report entitled *Failing Our Children* prepared by the National Education Association (Neill, Guisbond & Schaeffer, 2004) found that roughly 26% of all public schools did not make Adequate Yearly Progress (AYP) during the 2005-2006 school year. Thurlow, Moen, and Altman (2006), reported that in 2003-2004, only about 30% of students with Individualized Educational Plans (IEPs) performed at the proficient level on state-mandated reading and math assessments. Today more than 6 million school-aged students have IEPs, which means more than 4 million (or 70% of students lack proficiency in reading and math) (Rock, Gregg, Ellis & Gable, 2008). According to the 26$^{th}$ Annual Report to Congress on IDEA (U.S. Department of Education, 2005) roughly 96% of general education teachers have students with learning disabilities in their classrooms. Of the teachers, nine of 10 have at least three students with IEPs. However, the challenges that confront present day teachers are not limited to students with disabilities (Rock et al., 2008). Students come from diverse backgrounds in which

parental expectations and community norms may be at odds with traditional schooling (Lapkoff & Li, 2007). In addition, the high poverty rates that often exist in urban school districts increase the probability of a readiness gap among children beginning their schooling (Voltz & Fore, 2006). Many teachers "teach to the middle" (Haager & Klinger, 2005, p. 19) which means that the needs of a growing number of students will go unmet. Lipsky (2005) indicates that students with disabilities are vulnerable to a one size fits all approach to instruction. These students perform poorly on standardized tests and have high dropout rates, low graduation rates and high percentages of unemployment (Lipsky).

## Teacher Knowledge

Research has shown that there is evidence to support a direct relationship between teachers' knowledge and skill about essential components of effective literacy instruction and student literacy outcomes (Darling-Hammond, 2000; McCutcheon & Beerninger, 1999). When teachers are given targeted training and supports, their knowledge and skills improve in line with best practice, and these improvements have a positive impact upon student learning outcomes (McCutchen & Berninger, 1999). More and more states are moving toward adopting informed, systematic teacher preparation policies because it so strongly correlates with student achievement (Darling-Hammond, 2000). This finding along with the publication of the report of the National Reading Panel (2000) and the signing into law of NCLB, has resulted in states working to bring curriculum standards, teacher preparation policies, classroom screening, assessment, and instructional methodologies in line with best practice (McCombes-Tollis & Feinn, 2008).

## Class Size

Reducing class size to increase student achievement is an approach that has been tried, debated, and analyzed for several decades. This seems logical; with fewer students to teach, teachers can anticipate better performance from each student (Finn, 2002). The Center for Public Education 2005 found the following about reduced class size:

- Smaller classes in the early grades (K-3) can boost student achievement.
- A class size of no more than 18 students per teacher is required to produce the greatest benefits.
- Minority and low-income students show even greater gains when placed in small classes in the primary grades.
- Reducing class size will have little effect without enough classrooms and well-qualified teachers and supports.
- A program spanning grades K-3 will produce more benefits than a program that reaches students in only one or two of the primary grades.
- The experience and preparation of teachers is a critical factor in the success or failure of class size reduction programs.
- Supports such as professional development for teachers and a rigorous curriculum, enhance the effect of reduced class size on academic achievement.

Nye, Hedges, & Konstantopoulos (2001) conducted a study that explored the relationship between the number of years that students participated in small classes and

their level of achievement. After one year, the students in smaller classes had significantly high achievement scores on the Stanford Achievement Test reading and mathematics subtests than students in larger classes. The gap in scores widened after two years, indication that the effects of small classes are cumulative.

In another look, Nye, Hedges, & Konstantopoulos (2004) explored the long-term effects on reading and mathematics achievement for minority students who had participated in small classes. When the original experiment concluded, minority students in small classes had showed greater gains in reading and mathematics achievement than white students in small classes. In this study, the researchers found that students maintained these gains, to some extent, from up to five years, through grade eight. Both white and minority students who took part in small classes had statistically higher scores in reading and mathematics than students in larges classes. Minority students who participated in small classes for four years had higher reading achievement scores than white student who were in small classes for the same amount of time (Nye et al., 2004).

According to West and Woessmann (2003) school districts would do better to hire fewer teachers with better credentials than to hire more teachers without regard to the level of credentials and experience they have had. They argue that the quality of the teacher, rather than class size, drives student achievement.

## Reading Tutorial

Supplementing classroom teaching with individual tutoring can be a powerful intervention for underachieving students, even more effective than small group instruction (Wasik & Slavin, 1993). The individual attention within a tutoring relationship may lead to more engagement with the learning process, than small group

instruction within the classroom setting (Juel, 1996). Pinnell, DeFord, Lyons, and Byrk (1994) state that another hypothesis for the stronger effects for tutoring versus small-group instruction could be that the one-on-one setting allows for opportunities for the student to respond and receive immediate feedback, both of which are critical in guiding the struggling reader in the development of effective reading strategies. Morris (2003) argues that the interpersonal bond of mutual caring and trust that often develops between the tutor and student not only results in a supportive environment for nurturing learning but also may have a positive effect on self-esteem and self-confidence.

Research has consistently supported the effectiveness of adult-instructed, one-to-one tutoring programs in reading if the intervention were well designed and provided immediate and substantial assistance to elementary students identified at risk of reading failure (Elbaum, Vaughm, Hughes, & Moody, 2000). Tutoring interventions implemented by certified teachers yielded larger effects than by volunteer tutors (Elbaum et al., 2000), but the costs of providing enough certified teaches for students at risk could be high for most schools. Due to this fact, interest in volunteer tutoring has emerged (Invernizzi & Quellette, 2001; Morrow & Woo, 2001) as a cost effective way to provide the extra help needed by struggling readers.

## Reform

A primary objective of standards-based reform is the opportunity they provide for schools to develop consistent and uniform curriculum goals for all students (Smith & O'Day, 1993). The expectation is that this should improve the performance of all students, including Title I students. According to advocates of standard- based reform, curriculum frameworks are intended to provide direction and vision that will lead to an

improvement in curriculum content and instruction (Smith & O'Day, 1993). The goal is a structure where curriculum and assessment are aligned and state and district policies support reform at the school level. The development of an accountability framework is seen as a way to change student outcomes by changing what is taught and how it is taught (Sunderman, 2001), and assumes that relying on local decision makers to make decisions about curriculum has failed to improve student outcomes.

Recent studies on standards-based reforms have highlighted a variety of issues, including a focus on the characteristics of current reform efforts (Jennings, 1998; Ladd, 1996). Other research examines changes in teaching practice in the context of specific reforms, focusing on the implementation of content standards in mathematics (Spillane & Zeuli, 1999). There is little research that addresses how schools with Title I school wide programs organize instructional resources to meet the federal accountability mandates (Sunderman, 2001). According to Wong and Meyer (1998), research on the implementation of Title I school wide programs and resource utilization suggests that school wide programs have made important gains in reducing curricular and instructional fragmentation.

Since the publication of *A Nation at Risk* in 1983 (National Commission on Excellence in Education, 1993), the federal government has increasingly encouraged states to adopt standards and hold schools accountable for student performance. This direction has since been reinforced by the Bush and Clinton administrations (Jennings, 1998). During the Clinton administration, the passage of Goals 2000: Educate America Act in 1994 represented the formal adoption of eight educational goals. Under this

legislation, state and school district were encouraged to develop content and performance standards in exchange for federal school- reform grants (Sunderman, 2001).

## Accountability

O'Day (2002) states "Everywhere you turn-from Congress to the statehouse to local communities and parent groups- some people are trying to make other people more accountable for something in education" (p. 293). The cries for accountability should not surprise us because public education consumes over $400 billion in public revenues so it is reasonable that the public want to know where the money is going and what it is producing (O'Day, 2002).

It is imperative that school leaders understand both state and local assessments and interpret them accurately so school stakeholders have a clear understanding of what is needed in order to move forward. Fullan (2001) defines assessment literacy as the collective capacity of teachers and leaders in schools to examine data, make critical sense of it, develop action plans based on the data, take action and monitor progress along the way. According to Earl and Katz (2003), accountability does not produce productive schools if the purpose is to identify the culprits. The essence of accountability is looking forward, using data to inform judgments about current performance to formulate plans for reasonable actions.

According to Vandevoort, Amrein-Beardsley, and Berliner (2004), the quality of a teacher in the classroom is the single most important factor of determining how well a child learns. Schools are evaluated based on their students' performance on state mandated tests given each year. Most educators agree with the fact that holding teachers accountable is imperative in order for student learning to take place. There is a debate

surrounding the question of how accountability is established and about the place and value of professionalism in accountability (Bullough, Clark, & Patterson, 2003).

Vandervoort et al. (2004) found that students from classrooms of National Board Certified Teachers (NBCT) learn more than students whose teachers do not hold this credential. Increasing the number of teachers who earn National Board Certification will have an impact on raising student achievement levels in schools across the country. Gallaghar (2002) found that while students of NBCT out performed students whose teachers were not NBCT on curriculum assessments, there was no significant difference on external measures.

Ballard and Bates (2008) argue that regardless of the types of evaluation tools a school district implements for teachers, it ultimately the responsibility of the teachers themselves to be informed of educational practices and research that affects the instruction delivered to students.

It is imperative that teachers and other educators be familiar with NCLB and its policy and practice implications. Yet, by narrowly defining the use of federal dollars for research, the NCLB has significantly restricted the manner by which educators can be informed of effective practices (Simpson, LaCava, & Graner, 2004). Ballard and Bates (2008) state "Teachers are responsible for finding ways to educate all children and it is a teacher's duty to participate in professional development activities that foster this responsibility" (p. 562). Practices such as differentiated instruction, data driven instruction and identifying areas of weakness in students is vital for student success (Ballard & Bates, 2008).

Another important aspect of standards based reform and the change process is the establishment of a culture of inquiry. A culture of inquiry involves school based self-appraisal, meaningful use of external accountability data in an environment where there is a commitment to confronting the brutal facts (Collins, 2001). Storms and Gordon (2005) state "Developing skills and strategies for exploring what those test scores mean in terms of practices that are working and not working is increasingly becoming a focus in educational administration credential and degree programs" (p. 60).

The accountability system for the state of which study was conducted, includes an achievement component, a growth component, and a graduation/dropout component. It uses The Quality of Distribution Index (QDI) to measure achievement. The QDI measures the distribution of student performance on state assessments around the cut points for Basic, Proficient, and Advanced performance (Mississippi Department of Education, 2009). Advanced students are given a score of 3, proficient students are given the score of 2, and basic students a score of 1. To calculate the QDI, the total number of students in each proficiency level must be converted to percentages. Then the percentages are multiplied by the scale of 1, 2 or 3, depending on proficiency level. When all scores are calculated, they are added together to determine the QDI of each individual class.

The state growth model is an estimate of current performance based on past performance. It is a prediction of students' expected performance (Mississippi Department of Education, 2009). The growth composite is a measurement tool to ensure that a student receives at least one year's worth of learning in a single year. If students

on average in a school receive at least one year's learning in one year, then the entire school will have met growth (Mississippi Department of Education, 2009).

## Discrepancy Model for Learning Disabilities

Nearly 38% of the children in United States classrooms have been identified as reading below the basic reading level (National Center for Education Statistics, 1998). A large number of these students have been identified as having learning disabilities and receive special instruction in resource room. However, there is no educational policy for teaching the remaining poor readers, who are said to fall through the cracks (Aaron, Joshi, Gooden, & Bentum, 2008) and therefore the LD construct, when applied in its present form, leads to many poor readers being "left behind." The LD based policy has been implemented for nearly 40 years, and many studies have shown its diagnostic procedures to be ineffective. Researchers, educators and advocacy groups are trying to find better methods for the identification and treatment of reading problems (Aaron et al., 2008). The RTI model is one such approach (Bradley, Danielson, & Doolittle, 2005; Fuchs, Mock, Morgan, & Young, 2003) and the component model of reading is another approach. The existence of the condition known today as LD was recognized almost 100 years ago when it was noticed that some children who apparently were intelligent experienced a great deal of difficulty in learning to read. During the early period of its history, this condition drew the attention of many investigators, many of whom were physicians, who described it by label such as word blindness (Hinshelwood, 1895; Morgan 1896), strephosymbolia (Orton, 1937), dyslexia, attributed to Dr. Rudolph Berlin, and finally, learning disability (Kirk, 1963).

In the past, physicians have described reading difficulties in neurological terms, but educators viewed it as an educational problem. In spite of these early differences in orientation, reading difficulty came to be recognized as a serious pedagogical problem that affected many children (Aaron et al., 2008). The term learning disabilities (LD), was first introduced in 1963, by Samuel Kirk. The concept of LD gained official status in 1975 with the passing of the Education for all Handicapped Children Act (Aaron et al., 2008). Later in 1990, it was renamed as Individuals with Disabilities Education Act (Burns &Ysseldyke, 2005). It then became necessary to develop an objective means of identifying and diagnosing LD, particularly in children in the school system. The discrepancy model based procedure identifies the individual's IQ and compares their reading achievement score with their IQ scores. If the individual's IQ was in the average range but the reading achievement was noticeably lower, that individual was diagnosed as having LD (Aaron et al., 2008)

As the years passed, it became possible to take a closer look at the validity and utility of the discrepancy model and as a result, it has come to be realized that the model, as it is used for diagnosing and treating reading problems, has failed to deliver the expected academic benefits (Aaron, 1997). Lyon, Fletcher, Shaywitz, Shaywitz, Torgensen, and Wood (2001) emphasize that the disappointing outcome of the discrepancy model-based educational policy naturally impelled researchers to examine the potential reasons for its failure. The most formidable problem faced by the discrepancy model is that children who are identified as having LD and provided with instruction in resource rooms have failed to show improvement in their reading skills, as documented by several researchers (Bentum & Aaron, 2003; Carlson, 1997; Fuchs &

Fuchs, 1995; Haynes & Jenkins, 1986; Moody, Vaughn, Hughes, & Fischer, 1998; Wieklenski, 1993).

In a review study, Vaughn, Levy, Coleman and Bos (2002), synthesized studies conducted on students with LD and reported that the quality of reading instruction was poor, with excessive time allocated to seatwork and worksheets but limited time given to reading itself. After observing what went on in resource room, Haynes and Jenkins (1986) and Moody et al. (1998) noted that the quality of reading instruction provided was not based on a skills approach, but was driven by the whole-language philosophy and relied mainly on group work, which disregarded individual needs. These observations lead to question, "What are the needs of poor readers and which skills should be addressed in resource rooms?"

## Reading Components

Several studies have shown that not all poor readers are alike and that reading difficulties are varied in origin (Aaron, Joshi, & Williams, 1999; Swanson, Howard & Saez, 2006). The simple view of reading, as is true of most psychological theories, has not gone unchallenged. Duke, Pressley, Fingeret, Golos, Halladay, and Hilden (2006) have faulted the simple view of reading by noting that is has left out many variables, including vocabulary, knowledge, motivation, and the cultural background of the reader. Duke et al., (2006) also stressed that the speed of processing is another important element left out of the simple view of reading. After the publication of the report of the National Reading Panel (2000), this aspect of reading has received a considerable amount of research attention. Researchers agree that fluency is the hallmark of good readers. What is not agreed upon is whether speed of processing is a component that is independent of

decoding skill (Aaron et al., 2008). Studies by Adolf, Catts, Hogan and Little (2005), Cho and McBride-Chang (2005), and Vukovic and Siegel (2006) have shown that speed of processing adds little variance to reading performance that is not explained by word recognition and comprehension skills. This has led to the conclusion that all poor decoders are also slow readers and that slow readers in general, are also poor decoders (Aaron et al., 2008).

Frith and Snowling (1983) reported that some children with autism can read aloud much better than they can comprehend, whereas children with dyslexia can comprehend sentences better than they can decode non-words. Studies on children with dyslexia and hyperlexia also showed that comprehension and decoding skills are dissociable (Aaron, Franz, & Manges, 1990; Healy, 1982). The existence of children who can decode written words fairly well but cannot comprehend what they have read is less publicized, even though educators have recognized the existence of this type of poor readers for a long time and have described them as "word callers." Research has indicated that about 10% of poor readers fall into this category (Stothard, 1994; Yuill & Oakhill, 1991). According to Mirak, Scarborough, and Rescorla (2003), some children who had average word-level processing skills in earlier grades turned out to have deficits in reading comprehension when they reached fourth and fifth grades, probably because the ability to comprehend what is read emerges later in development. In August of 2001, the Office of Special Education Programs (OSEP) conducted a two-day summit to discuss LD practice and future policy. Gresham (2001) presented a model that used a response-to-intervention approach to diagnose LD in which children would be identified as LD only if problem behaviors did not significantly improve after implementing a validated intervention.

Soon the President's Commission on Excellence in Special Education (PCESE, 2001) endorsed an RTI diagnostic approach for LD (Burns &Ysseldyke, 2005). RTI has since been endorsed by a number of professional associations, including the National Association of School Psychologists, and appears to be the most prominent alternative to the discrepancy model (Fuchs, Mock, Morgan, & Young, 2003).

## Response to Intervention

The Individuals With Disabilities Education Improvement Act of 2004 (IDEA, 2004) intersects with the No Child Left Behind Act of 2001 (NCLB), and these two pieces of legislation set the stage for an approach to special education eligibility and school improvement called RTI. Both IDEA 2004 and NCLB call for improving the outcomes for all students by using scientifically based instructional practices (Cummings, Atkins, Allson, & Cole, 2008). RTI is linked to the concept of providing intensive early intervention to prevent later reading failure. Juel (1998) found that students who did not learn to read by the end of first grade tend to remain weak readers throughout the elementary grades. Stanovich (1986), labeled this phenomenon the Matthew effect, describing the mechanisms by which proficient readers continue to build vocabulary and fluency through reading, whereas weak, non fluent readers tend to avoid reading and read less, thus stunting their growth in vocabulary, basic word knowledge, and reading fluency. RTI supporters assume that if students become proficient readers by the end of first grade, then they will remain fluent readers (Gersten & Dimino, 2006).

Three advantages of an RTI approach include that children need not wait to fail (Vaughn & Fuchs, 2003) to be eligible for support, RTI avoids problems associated with process-deficit and discrepancy models, and RTI is instructionally grounded, enhancing

the ecological validity of the diagnostic process and more clearly grounding it in subsequent instruction (Mceneaney, Lose, & Schwartz, 2006). Burns, Appleton and Stehouwer (2005) recently conducted a study to examine the effectiveness of RTI on improved systemic and student outcomes. The findings indicate the "both systemic and student outcomes improved with an RTI model in use is a promising sign" (Burns et al., p. 389). The study also found that on average, "less than 2% of the student population was identified as Learning Disabled among studies examining field- based RTI models" (Burns et al., p. 389).

The Outcomes- Driven Model is one specific example of a useful framework for RTI implementation (Cummings et al., 2008). This model extends previous work from problem-solving models (Deno, 1989; Shinn, 1995; Tilly, 2008) and the initial application of the problem-solving model to early skills (Kaminski & Good, 1998). Yet the Outcomes-Driven Model is unique due to its focus on early intervention and universal screening (Cummings et al., 2008). The general questions addressed by a problem-solving model include: (a) What is the problem?, (b) Why is it happening?, (c) What should be done about it?, and (d) Did it work? (Tilly, 2008). The Outcomes- Driven Model accomplishes these goals through a set of four educational decisions: (a) identify a need for support; (b) validate the need for support; (c) plan, implement, evaluate, and modify support; and (d) review outcomes (Cummings et al., 2008).

When examining RTI practices, most models incorporate multi-tiered interventions. The intervention varies in terms of identification, intensity, and duration (Mellard, Byrd, Johnson, Tollefson, & Boesche, 2004). The majority of RTI models include a system for monitoring learner progress, leadership and professional

development, scientifically based practices in general education and in progressive tiers, and objective cut points for identifying student responsiveness (Mellard et al., 2004). The problem solving model does not use a standard program for all students. Instead, it relies on a system of increasingly intensive interventions that are planned and implemented by school personnel with increasing levels of knowledge and expertise that results in an effective program for a student (Mellard et al., 2004). The problem solving steps include problem identification, problem definition, designing intervention plans, implementing interventions, and problem solution (Rollins, Mursky, Shah-Coltrane, & Johnsen, 2009).

The standard protocol model requires the use of scientifically based classroom instruction for all students using the same curriculum, the same program, and or the same management strategies; regular administration of curriculum-based assessments' and frequent comparisons of at-risk students to normal growth (Fuchs & Fuchs, 2005). The goal of this model is to achieve mastery for the majority of students and to ensure the fidelity of the intervention so that students who meet the criterion for more intensive services actually need them and not because they received inadequate instruction (Rollins et al., 2009).

The School Social Work Association of America (SSWAA, 2006) expanded the scope of RTI by terming it "systematic, multi-tiered approaches to helping all students achieve school success" (p. 1). The National Association of School psychologists endorsed this view of the RTI process by indicating that it is a "provision of scientific research- based instruction and interventions in general education that provides an improved process and structure for school teams in designing, implementing, and evaluating educational interventions that may be part of the evaluation procedures for

special education eligibility" (Klotz & Canter, 2006, pp. 1-2). A group of 13 national organizations (Collaborative Project, 2006) issued a report entitled "New roles in response to intervention: Creating success for schools and children" wherein RTI is described as follows, "To meet the needs of all students, the educational system must use its collective resources to intervene early and provide appropriate interventions and supports to prevent learning and behavioral problems from becoming larger issues" (p. 2).

Most current definitions and classification systems for students with learning disabilities (LD) focus on within –student factors, excluding contextual issues such as the role of instruction (Keogh & Speece, 1996). The shift to a response-to-treatment approach to identifying students with LD requires professionals to abandon the aptitude-by-treatment interaction procedure of attempting to determine the precise needs of students through traditional assessment and then attempting to design effective intervention to match the identified needs (Grehsam, 2001). Instead educators would approach identification of students with LD from a risk perspective (Vaughn, Thompson & Hickman, 2003). Large numbers of students at risk for significant academic problems would be provided interventions and students whose response to treatment remained low would be identified as LD (Vaughn et al., 2003). Progress is monitored frequently to determine if students are making academic gains (Hilton, 2007).

*Multi-Tier Approach*

Layering instructional support based on the needs of students has been implemented for struggling readers by O'Connor (2000) and Dickson and Bursuck (1999). These researchers aimed to reduce reading failure in the early grades by

providing instruction across levels that varied in length (number of minutes per session), intensity (number of times per week and group size) and duration (number of weeks). Both research studies demonstrated high effect sizes for students at risk for reading failure who were placed in small group, intensive interventions. A common finding from these two studies as well as work conducted by Torgesen (2001) and Vellutino, Scanlon, Sipay, Small, Pratt, Chen, and Denckla (1996) is that a small percentage of students (5-7%) fail to make adequate progress even when intensive and explicit supplemental instruction is provided. The student whose response to treatment is significantly lower than expected, could be identified as a student with reading or learning disability (Vaughn et al., 2003).

*Teacher Efficacy*

According to Ashton (1986), the concept of teacher efficacy is the belief that teachers develop regarding their influence upon student learning and behavioral outcomes. Researchers have demonstrated the importance of this concept as related to several significant educational outcomes such as teacher persistence (Gibson & Dembo, 1984), enthusiasm (Guskey, 1984), behavioral management (Woolfolk, Rosoff, & Hoy, 1990), and willingness to initiate and maintain educational innovations (Guskey, 1998). As RTI is increasingly applied in our schools, research attention has turned to the impact that this process may have upon those at the front lines of its implementation, i.e., teachers and support staff in schools. As Nunn, Jantz and Bulikofer (2009) point out, effective interventions bring about effective teachers who are skilled and capable of dealing with difficult academic and behavioral concerns presented in their classrooms. There is a need to define and examine correlations between implementing RTI strategies

and teacher beliefs (Nunn et al., 2009). In the study by Nunn et al. (2009), a consistent finding indicated that increases in teacher efficacy were associated with perception of improved outcomes of intervention, satisfaction with results, collaborative team process, and data-based decisions.

Critical features of RTI are contained within the general education classroom and include the provision of high-quality, effective instruction in the general education curriculum and classroom, systematic instruction using differentiated instructional strategies for struggling students, and small group and individualized instruction (Drame & Xu, 2008). Intervention strategies are expected to be carried out by general educators in collaboration with a team of colleagues, including special educators (Coleman, Buysse, & Netizel, 2006). Students who struggle can only be successful if all stakeholders understand the implications of RTI and realized that the core component of RTI is evidence of high-quality instruction in the general education classroom (Drame & Xu, 2008).

The standard approach to RTI involves "the use of the same empirically validated treatment for all children with similar problems in a given domain" (Fuchs, Mock, Morgan, & Young, 2003, p. 166). Teachers who administer intervention treatments need to be trained to conduct the intervention with fidelity and accuracy. The treatment should be one that is validated by rigorous, empirical research and involves the administration of an intensive, small group or individualized instructional intervention for a specified period of time. Progress is measured by curriculum-based assignments against the overall classroom achievement and rate of growth in achievement over time (Drame & Xu, 2008).

## RTI Deficits

The advantages of an RTI approach are clear; RTI provides a direct focus on student learning and outcomes and increases accountability for all students regardless if they are eventually referred for special education (NJCLD, 2005). RTI also can result in earlier identification and intervention (Fuchs & Vaughn, 2005). It adds an important dimension to the screening equation (Speece, 2005) for areas of basic academic skills (e.g., reading decoding, spelling, and math computation). Simple assessments of curricular progress do not, however, help us evaluate the complex learning process for students with markedly different needs and learning profiles (Semrud-Clikeman, 2005). This is where understanding of cognitive processing, obtained through individual norm-referenced assessment instruments, along with behavioral observations and other relevant data gathering, is essential (Mather, 2006). Mather (2006) adds that "little research exists that compares the relative efficacy of RTI models to more traditional assessment methods in determining appropriate, differential instruction" (p. 831).

As RTI crosses the "research to practice" gap, it is feared that it is being presented as a narrow and constricted model instead of the flexible and variable set of principles that it is. Fuchs and Fuchs (2005) describe a two-tiered model of RTI, but there is little emphasis in their writing that RTI can look different in different locations. Brown-Chidsey and Steege (2005) describe another application of RTI, but they do not make clear that RTI may be implemented differently in different settings. Although such efforts to answer the question, "What is RTI?" are legitimate, the sole emphasis on what RTI "looks like" may leave schools without knowledge of the principles of RTI (Barnes & Harlacher, 2008).

Even if practitioners understand the principles of RTI, they may find varying descriptions of the essential features needed to implement an RTI model. Some authors describe three tiered models of RTI but others describe two (Fuchs & Fuchs, 2005) and four tiers (Ikeda, Grimes, Tilly, Allison, Kurns, & Stumme, 2002). Also, authors report a difference in the main features of RTI. Brown-Chidsey and Steege (2005) write that RTI's core features are high-quality instruction, frequent assessment, and data–based decision making, yet the National Association of State Directors of Special Education (NASDSE, 2006) describe its core features as multiple tiers of intervention, a problem-solving orientation, and the use of an integrated data collection system. Although there is much overlap among authors and a general agreement that RTI is valuable (NASDE, 2006; National Joints Committee on Learning Disabilities (NJCLD), 2005) such contrasting information may confuse practitioners about which features of RTI are needed and which description of RTI is correct (Barnes & Harlacher, 2008).

In considering the merits and potential problems inherent problems in RTI, Mastropieri and Scruggs (2005) posed an important question: "If RTI cannot discriminate, how can it classify?" (p. 528). RTI can only document the presence of low achievement or identify a pool of at-risk students; it cannot diagnose the existence of SLD (Kavale, 2005). RTI does not take into account the various linguistic and neuropsychological functions that underlie academic performance nor does it provide clear rationales for selecting alternative types of instruction or service delivery that may be more effective with an individual student (Mather, 2006).

Despite past and future problems with identification procedures, both history and clinical experience support the conclusion that SLD is a meaningful category of disability

(Mastropieri & Scruggs, 2005). Regardless of changes in legal mandates, students with SLD will still exist and challenge school resources with their need for intensive and systematic interventions.

## Problem Solving Approach

The problem solving approach is another variation of RTI. The most prevalent of the RTI approaches, problem-solving models, emerged from the prereferral intervention models (Burns, Vanderwood, & Ruby, 2005). Prior to referral for a formal evaluation to determine eligibility for special education, an interdisciplinary team of teachers and other school personnel work to identify strategies for adapting instruction in the classroom environment to increase the success of students who have academic or behavioral difficulties (Fuchs et al., 2003). The problem solving process includes the following: a) behavioral or operational definition of the problem, b) collection of baseline data for the problem, using various assessment and observation tools to determine severity, frequency and duration, c) development of an intervention plan, which involves collaborative goal setting based on analysis of a validated problem and identification of contributing factors to the problem, d) implementation of an intervention plan in the general educational environment, e) ongoing progress monitoring of a student's response to intervention in the general education to evaluate the effectiveness of the intervention, and f) revision of the intervention plan, based o students performance data (Fuchs & Fuchs, 2006; Prasse, 2006).

## Variables of RTI Implementation

According to Drame and Xu (2008), researchers must take into account the classroom, and teacher factors of RTI on student achievement and research has

acknowledged the effect of context on student learning. Keogh and Speece (1996) argued that the high numbers of students experiencing underachievement and the increasing numbers of students requiring special education services justified taking a closer look at procedures for identifying and helping children at a high risk for special education. "The eco- cultural context also shapes perceptions and responses to child characteristics. For example, individual differences in children's temperaments or behavioral styles may become risky or protective as children interact with adults and peers" (Keogh & Speece, 1996, p. 6). School and classrooms prepared for fostering learning and managing behavior join together to form educational environments that are significant contributors to student achievement. Students at risk are less likely to learn in classroom environments in which teachers exhibit poor instructional practices and or classroom management (Donovan & Cross, 2002). Vaughn and Fuchs (2005) note that if the child fails to respond to a program with which the vast majority of children learn, then the inference is that the deficit resides in the individual, not the instructional program.

Yoon (2002) found that factors such as teacher's level of stress, often caused by disruptive behaviors from students, was significantly related to negative relationships with students. Teachers experiencing negative relationships with their problematic students are potentially less likely to be positive and responsive or to provide encouraging, constructive academic feedback, due to their excessive focus on undesirable behaviors. In an ideal situation, RTI implementation should require that schools evaluate patterns of students who have qualified for special education and assess the quality of the school's culture and how well the climate is perceived to promote high expectations for leaning in diverse students (Drame & Xu, 2008).

*Instruction*

Most RTI models involve three tiers of instruction that are outlined to prevent inadequate instruction and to prevent possible disabilities from developing (Stecker, Fuchs & Fuchs, 2005). The first tier of the framework is general education instruction. Data used from an RTI process for potentially identifying students with SLD must show lack of adequate response to scientifically validated instruction, and Tier 1 must involve implementation of instruction practices that have been tested empirically (Steckler et al., 2005). Classroom observation by administrators is imperative in order to verify that instruction is occurring as expected and teachers need ongoing support, professional development or coaching (Vaughn & Chard, 2006). Shanahan (2008) suggests how reading specialists may be used within Tier I for providing professional support in literacy. Specific instruction content and instructional practices that are important in Tier I reading programs have been described by a variety of researchers (Foorman, 2007; Taylor, 2008) and generally focus on critical practices identified by the National Reading Panel (2000) as effective.

## Assessment

RTI examines the interaction of the child and the learning environment and measures potential for learning as opposed to only present performance (VanDerHeyden, 2005). Assessment data plays an integral role in Tier I practices. Students are screened at the beginning of the year to determine if they are on grade level The students whose scores fall below a certain criterion score, may be viewed as at risk for reading difficulties if quality instruction is not provided (Stecker et al., 2005). Progress monitoring is a system of brief assessments and is given weekly or monthly, to determine

whether students are progressing through the curriculum at a desirable rate. Progress monitoring scores provide the teacher with information about the level of student performance and rate of academic improvement (Stecker et al., 2005).

Compton, Fuchs, Fuchs and Bryant (2006) state that progress monitoring data is important for students who are performing significantly below their peers on initial progress monitoring assessments. Rather than immediately referring these students for Tier 2, the general education teacher could closely monitor whether or not they are responding to the core curriculum (Compton et al., 2006). Because Tier 2 can be costly to schools, progress monitoring on a consistent basis, could reduce the number of students targeted as needing extra assistance. If progress monitoring measures indicate that there is a need for supplemental instruction, then the student could be moved into Tier 2 for more intense assistance (Stecker et al., 2005). Researchers Vaughn and Roberts (2007) found that Tier 2 instruction would close the achievement gap between current performance and expected performance. Vaughn and Roberts (2007) found, "a minority, less than 10% of all secondary intervention students make little or no substantial progress when provided with a research based, standardized intervention" (p. 3). If a student is still progressing poorly after several weeks of Tier 2 instruction, they would be moved into a more intense, tertiary level. A tertiary level involves individualized instruction based on each student's unique needs (Fuchs & Fuchs, 2007). Frequently, tertiary level interventions involve special education teachers because of their expertise. RTI is a prevention system for long- term academic failure, not solely to prevent special education eligibility (Fuchs & Fuchs, 2007).

## Summary

A constructivist approach to education is one in which learners actively participate in the world around them in order to gain knowledge. Students learn better in an environment that is organized and familiar and one in which they can explore concepts through manipulation. The more teachers simulate learning conditions in the classroom, the more effective student learning becomes. Large numbers of children remain unable to read fluently. Researchers are recognizing that reading is more than just a subject to be mastered, and is a very important skill that will affect the lives of all people. There are many reading approaches that have been effective yet some students still cannot master the art of reading fluently. Teacher knowledge of literacy instruction is in direct correlation to student outcomes. If teachers are trained and given support, their skills improve and therefore have a more positive effect on student learning. Researchers have found that one on one tutorial creates a bond of trust and can have a positive effect on student's self-esteem and self-confidence. The objective to standards based reform is to develop a uniform curriculum that aligns with state standards which will lead to improvement in student outcomes. Accountability is very important to all stakeholders and school leaders must understand how to examine and interpret data in order to bring about positive change in the school setting. The discrepancy model of 1975 has been used for 40 years and has proved to be ineffective and is being replaced with the RTI model. RTI is a general education initiative and is not a "wait to fail" model, but provides instructional support through interventions that are designed to meet the needs of the student. It is multi-tiered and increases in intensity if the student fails to respond to

instruction. The sole purpose of RTI is to keep from putting an unnecessary label on a child.

# CHAPTER III

# METHODOLOGY

This chapter outlines the research questions that are addressed in the study. It also describes the participants and design and procedures of the study. This chapter also explains the data analysis, the instrument that was used, data collection process, and the statistical analyses that were undertaken to interpret the data.

## Research Questions

The purpose of this study was to conduct quantitative research on the relationship between RTI and student achievement in third, fourth and fifth grade students in Mississippi public schools. The study sought to determine whether there is a relationship between the implementation of RTI and student performance for each of grades three through five in reading as measured by the STAR Reading fall and winter diagnostic screeners. The study examined the following research questions:

1. After RTI implementation, is there a significant difference in Winter STAR Reading diagnostic screener scores compared to Fall STAR Reading diagnostic screener scores for each of grades three through five?
2. After RTI implementation, is there a significant difference in Fall STAR Reading diagnostic screener scores compared to Winter STAR Reading diagnostic scores by tier for each of grades three through five?

## Participants in the Study

Approximately 125 students from three elementary schools and one fifth grade school from a coastal school district were selected to participate in this study. The three elementary schools that were selected have a similar grade size of approximately 150

students per grade. The fifth grade school has an enrollment of approximately 430 students. They are similar in socioeconomic status and have approximately 40% free and reduced lunch. Minority groups from each school comprise 20% of their respective populations. All students selected had been identified below benchmark in reading and had been placed in the RTI process for remediation. Only students who attended third, fourth and fifth grades in the district during the 2010-2011 school year and were assessed in Fall and Winter using the STAR Reading diagnostic screener, were selected for the study.

## Research Design and Procedures

The study was non-experimental study. There was no random assignment of group members, and the members were not given special treatment. All third, fourth, and fifth grade students within the district that were selected to participate in this study were in the RTI process for reading intervention for the 2010-2011 school year. The selected students were assessed in reading comprehension. The researcher sought permission from the district superintendent to conduct the study using data from four schools in the selected district (Appendix A). Once permission was granted by the superintendent, a letter of permission to each building principal was sent in order to proceed with the study (Appendix B). The data includes reading scale scores from the fall diagnostic screener and reading scale scores from the winter diagnostic screener to determine academic achievement. The researcher completed an application for the Internal Review Board (IRB) which included the letter of permission from the district superintendent. Once approval was granted from the IRB committee (Appendix C), the researcher conducted

the study. The students were given the winter diagnostic screener the second week in February.

*Data Analysis*

The results from the STAR Reading diagnostic fall screener and winter screener were entered into SPSS and relevant statistical tests were conducted to determine if a significant relationship exists between student achievement and the RTI process. Each scale score was entered individually for each child.

*Instrumentation*

The purpose of this study was to collect, interpret, and analyze data with the intent to describe RTI as an effective agent of change. Upon completion of the fall and winter STAR Reading diagnostic screener, the scores were examined to determine the effectiveness of RTI implementation.

The STAR Reading diagnostic screener is designed for students who can read independently. It measures student's reading comprehension and compares their reading achievement to that of other students across the nation. The screener provides norm-referenced scores for students and is administered in the fall, winter and spring in order to get baseline data for each student and to measure growth over the school year. Students take the STAR Reading diagnostic screener at individual computers. The software delivers multiple-choice items one by one, and the student selects the answers. After the test is completed, the software calculates a score, and teachers and administrators view and analyze reports that show results for an individual, class, grade, or school. Students that score above the 25 th percentile are considered at benchmark level and there is no need for intervention. If a student falls below the 25th percentile, they are considered "at

risk" and are placed in Tier 2 remediation. Students that fall below the 10th percentile are considered to need urgent intervention- Tier 3. The STAR Reading diagnostic screener can provide accurate data in a short amount of time because it combines computer-adaptive technology with a specialized psychometric test design. It produces valid and reliable criterion referenced scores and is nationally normed. Cut scores are based on national data and can be used to determine skill deficiencies. A single assessment can serve multiple functions such as screening, progress monitoring, and diagnostic use to determine if there is a need for remediation.

Teachers are trained to relay the importance of the STAR Reading diagnostic screener to the students and allow the students to ask questions before beginning the test. All students in grades three through five are given the screener, which is used to analyze reading fluency and comprehension. The screener becomes part of the student's Teacher Support Team (TST) folder. Each student that is placed in the RTI process will have a TST folder made specifically for them. The folder is designed to keep track of screener results as well as documentation of grades and parent conference minutes. Parents are welcome to access the folder to view its contents and are given a copy of meeting minutes whether or not they attend the meeting. The folder remains part of the student's cumulative record as long as the students' are participating in the RTI process.

*Data Collection Process*

The researcher requested permission from all four school principals to collect data from the STAR Reading diagnostic screener (Appendix B). Data collected included scale score, grade equivalent, percentile rank, normal curve equivalent, instructional reading level and zone of proximal development. Additional data included TST folders of

students in the RTI process. The folders include minutes from TST meetings as well as progress monitoring results, frequency of intervention and Tier level of participant. The results sought to determine what effect, if any; RTI has on student achievement.

## Analysis of the Results

Primary data from the STAR Reading diagnostic screener were entered into SPSS and relevant statistical test were conducted. A paired samples t-test was used to determine if there is a significant difference in Winter STAR Reading diagnostic screener scores compared to Fall STAR Reading diagnostic screener scores after RTI implementation for students in grades three through five. A paired samples t- test was used to determine if there was a significant relationship between the frequency of RTI implementation and student achievement of students in Tier 2 and Tier 3 for reading, in grades three through five as measured by the Winter STAR Reading diagnostic screener. Results were calculated by the software and in addition to scale scores, students are grouped into five categories: Above Benchmark, At Benchmark, On Watch, Intervention Needed, and Urgent Intervention Needed. Student's status is recorded and students, who performed at the *Intervention* (Tier 2) and *Urgent Intervention* (Tier 3) level, are placed in the RTI process.

## Summary

This chapter served as a guide to the methods that were used in the study. It gave insight into the research questions, participants in the study, research design and procedures, instrumentation, data collection process, and analysis of the results. The goal of this research is to examine the effectiveness of the RTI process with regard to student achievement in reading. Chapter IV will present the findings of the study.

# CHAPTER IV

# RESULTS

## Introduction

Supplementing classroom teaching with individual tutoring can be a powerful intervention for underachieving students, even more effective than small group instruction (Wasik & Slavin, 1993). The individual attention within a tutoring relationship may lead to more engagement with the learning process, than small group instruction within the classroom setting (Juel, 1996). Pinnell, DeFord, Lyons, and Byrk (1994) state that another hypothesis for the stronger effects for tutoring versus small-group instruction could be that the one-on-one setting allows for opportunities for the student to respond and receive immediate feedback, both of which are critical in guiding the struggling reader in the development of effective reading strategies. This chapter includes characteristics of the sample in addition to the results of statistical testing. Analysis of data collected was used to attend to stated research questions. Data included was collected from the STAR reading diagnostic screeners administered in the Fall and Winter.

The STAR Reading diagnostic screener is designed for students who can read independently. It measures student's reading comprehension and compares their reading achievement to that of other students across the nation. The screener provides norm-referenced scores for students and is administered in the fall, winter and spring in order to get baseline data for each student and to measure growth over the school year. Students take the STAR Reading diagnostic screener at individual computers. The software delivers multiple-choice items one by one, and the student selects the answers. After the

test is completed, the software calculates a score, and teachers and administrators view and analyze reports that show results for an individual, class, grade, or school.

## Description of the Participants

The study sample represented in this investigation was 125 students who were given the STAR reading diagnostic screener in the fall and winter months during the 2010-2011 school year. The participants were chosen from three elementary schools and one fifth grade school from a coastal school district. The three elementary schools that were selected have a similar grade size of approximately 150 students per grade with an average class size of 26 students. The fifth grade school has an enrollment of approximately 430 students with an average class size of 26 students. They are similar in socioeconomic status and have approximately 40% free and reduced lunch participation. Minority groups from each school comprise 20% of their respective populations. All students selected had been identified below benchmark in reading and had been placed in the RTI process for remediation.

The procedure is termed *Response to Intervention* (RTI). RTI is a multilayered prevention system that identifies students' needs and puts them into tiers, based on their academic level. Fuchs and Fuchs (2006) noted, "RTI has been codified in federal law as an alternative to traditional methods of identification of learning disabilities, and practitioners are now struggling to build RTI models for their schools" (p. 623). The purpose of this study is to determine if RTI has an effect on student achievement in reading.

The Response to Intervention concept grew out of concerns expressed about the over-identification of Specific Learning Disabilities (SLD) (Kavale, Kauffman,

Bachmeier & Lefever, 2008). While potentially dovetailing nicely with the No Child Left Behind Act, the use of Responsiveness to Intervention means major changes in the district-wide configuration for instruction in reading, math and other basic skills of all students (Zirkel, 2007).

Only students who attended third, fourth and fifth grades in the district during the 2010-2011 school year and were assessed in Fall and Winter using the STAR Reading diagnostic screener, were selected for the study.

## Data Analysis

This was a non-experimental, quantitative study examining whether there was a relationship between RTI and student achievement in third, fourth and fifth grade students in four coastal schools. The study used primary data derived from the winter STAR reading diagnostic screener collected from third, fourth and fifth grade students in the RTI process. These scores were then compared to the archival data collected in the fall STAR reading diagnostic screener from the same students.

Paired t-tests were performed in order to determine if there is a relationship between RTI implementation and student achievement in reading. T-tests are used to test whether the means of two groups are statistically different from one another.

## Data Findings

All students benefit from a variety of instructional methods and support and an appropriate balance between the challenge of instruction and the opportunity for success (Lawrence-Brown, 2004). Research suggests that students should have an opportunity to participate regularly in peer-mediated instruction such as peer-assisted learning strategies (Dion, Morgan, Fuchs & Fuchs, 2004). Students learn in diverse ways and knowledge of

these different ways of learning can offer the opportunity for teachers to build instructional activities that involve a number of varied capabilities (Bender, 2007). In terms of planning an individual unit of instruction, teachers can take the multiple intelligence concepts and devise an interesting and diverse educational activity (2007). Bender (2007) suggests that giving students choices among assignments and having them base their choices on their learning strengths can result in students taking responsibility for their own work. When we teach students in a way that matches how they think, they perform better in school (Sternberg, 2006).

In order to determine if there is a relationship between RTI and student achievement the following research questions were asked:

Research Question 1: After RTI implementation, is there a significant difference in Winter STAR Reading diagnostic screener scores compared to Fall STAR Reading diagnostic screener scores for each of grades three through five?

Table 1

*Grade Comparisons*

| Variable | n | Mean | SD |
|---|---|---|---|
| Grade 3 | | | |
| Fall G.E. | 35 | 2.02 | .57 |
| Winter G.E. | 35 | 2.26 | .54 |
| Grade 4 | | | |
| Fall G.E. | 38 | 2.55 | .73 |
| Winter G.E. | 38 | 2.72 | .83 |
| Grade 5 | | | |
| Fall G.E. | 52 | 3.98 | 1.30 |
| Winter G.E. | 52 | 4.52 | 1.35 |

*Note:* G.E. denotes Grade Equivalent

The paired samples *t* statistic for the dependent variable, STAR Reading diagnostic scores indicated that RTI had a significant effect on student achievement in grade 3, $t(34)= 4.20$, $p<.001$. Grade equivalent mean was higher after RTI (Table 1). The paired samples *t* statistic for the dependent variable, STAR Reading diagnostic scores indicated that RTI did not have a significant effect on student achievement in grade 4, $t(37)= 1.61$, $p = .117$. The paired samples *t* statistic for the dependent variable, STAR Reading diagnostic scores indicated that RTI had a significant effect on student achievement in grade 5, $t(51)= 4.70$, $p<.001$ . Grade equivalent mean was higher after RTI (Table 1).

Research Question 2: After RTI implementation, is there a significant difference in Fall STAR Reading diagnostic screener scores compared to Winter STAR Reading diagnostic scores by tier for each of grades three through five?

Table 2

*Paired Samples – Tier 2*

| Variable | n | Mean | SD |
|---|---|---|---|
| *Grade 3* | | | |
| Fall | 21 | 2.42 | .30 |
| Winter | 21 | 2.58 | .39 |
| *Grade 4* | | | |
| Fall | 18 | 3.05 | .52 |
| Winter | 18 | 3.09 | .94 |
| *Grade 5* | | | |
| Fall | 36 | 4.11 | 1.22 |
| Winter | 36 | 4.74 | 1.33 |

Table 3

*Paired Samples – Tier 3*

| Variable | n | Mean | SD |
|---|---|---|---|
| *Grade 3* | | | |
| Fall | 14 | 1.42 | .27 |
| Winter | 14 | 1.79 | .35 |
| *Grade 4* | | | |
| Fall | 20 | 2.10 | .58 |
| Winter | 20 | 2.38 | .51 |
| *Grade 5* | | | |
| Fall | 16 | 3.68 | 1.44 |
| Winter | 16 | 4.00 | 1.27 |

For Tier 2, the paired samples *t* statistic for the dependent variable, indicated that frequency of RTI implementation had no significant effect on student achievement in grade 3, $t(20) = 1.934$, p=.067, nor on grade 4, $t(17) = .226$, p=. 824. The paired samples *t* statistic for the dependent variable, indicated that the frequency of RTI implementation had a significant effect on student achievement in grade 5, $t(35) = 5.213$, p =<.001 (Table 2). For tier 3, the paired samples *t* statistic for the dependent variable, indicated that frequency of RTI implementation had a significant effect on student achievement in grade 3, $t(13) = 5.667$, p= < .001 and grade 4, $t(19) = 3.313$, p= <.001. Grade 4 had the most significant gain. The paired samples t statistic for the dependent variable indicated

that the frequency of RTI implementation had no significant effect on student achievement in grade 5, t (15) =1.294, p =.215 (Table 3).

## Summary

This study investigated whether RTI implementation made a difference in winter STAR Reading diagnostic scores as compared to fall STAR Reading diagnostic scores in grades three through five in four coastal schools. It also investigated whether frequency of implementation made a difference in fall Reading diagnostic scores as compared to winter STAR Reading diagnostic scores by tiers for grades three through five. Paired Samples t-tests were conducted to identify statistically significant relationships.

This study revealed through the t-tests that RTI implementation had a significant impact on students in grades three and five. However, grade four did not show a significant improvement in their winter reading scores as compared to fall. The results also indicated that the frequency of RTI implementation (Tier 2) only showed to have a significant impact on students in grade five. When students were in Tier 3, grades three and four showed a significant difference in reading scores but in grade five, there was no significance noted.

# CHAPTER V

# SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

## Introduction

The primary purpose of this study was to determine if there was a statistically significant relationship between RTI implementation and student achievement in reading as measured by the STAR Reading diagnostic screener. This chapter includes a summary of the procedures, discussion of the findings, conclusions and future recommendations.

## Summary of Procedures

The study used primary data derived from the winter STAR reading diagnostic screener collected from third, fourth and fifth grade students in the RTI process. These scores were then compared to the archival data collected in the fall STAR reading diagnostic screener from the same students.

Independent t-tests were performed in order to determine if there is a relationship between RTI implementation and student achievement in reading. T-tests are used to test whether the means of two groups are statistically different from one another.

The study sample represented in this investigation was 125 students who were given the STAR reading diagnostic screener in the fall and winter months during the 2010-2011 school year. The participants were chosen from three elementary schools and one fifth grade school from a coastal school district. They are similar in socioeconomic status and have approximately 40% free and reduced lunch. Minority groups from each school are 20% of its population. The three elementary schools that were selected have a similar grade size of approximately 150 students per grade with an average class size of 26 students. The fifth grade school has an enrollment of approximately 430 students with

an average class size of 26 students. All four schools combined have a population of approximately 1,600 students. All students selected had been identified below benchmark in reading and had been placed in the RTI process for remediation. Only students who attended third, fourth and fifth grades in the district during the 2010-2011 school year and were assessed in Fall and Winter using the STAR Reading diagnostic screener, were selected for the study.

Before beginning the study, the researcher was granted permission from the superintendent of the district involved in the study and The University of Southern Mississippi's Institutional Review Board (IRB) (see Appendix C). During the month of August (fall) students were given the STAR Reading diagnostic screener. After examining the results, students who fell below benchmark were placed into the RTI process in either Tier 2 or Tier 3, depending on their screener score.

The STAR Reading diagnostic screener is designed for students who can read independently. It measures student's reading comprehension and compares their reading achievement to that of other students across the nation. The screener provides norm-referenced scores for students and is administered in the fall, winter and spring in order to get baseline data for each student and to measure growth over the school year. Students take the STAR Reading diagnostic screener at individual computers. The software delivers multiple-choice items one by one, and the student selects the answers. After the test is completed, the software calculates a score, and teachers and administrators view and analyze reports that show results for an individual, class, grade, or school. Students that score above the 25$^{th}$ percentile are considered at benchmark level and there is no need for intervention. If a student falls below the 25th percentile they are considered "at

risk" and are placed in Tier 2 remediation. Students that fall below the 10th percentile are considered to need urgent intervention - Tier 3.

In December (winter), the same students were given the screener again to determine whether there was a significant change in score after RTI implementation in Tiers 2 and 3. Data were compiled and analyzed by the researcher. To protect the anonymity of the students in this study, the STAR reading scores were only viewed by the researcher.

## Summary of Findings

The results from the STAR Reading diagnostic assessment were analyze using t – test statistical test using an alpha level of .05. A statistical analysis follows.

Research Question 1: After RTI implementation, is there a significant difference in Winter STAR Reading diagnostic screener scores compared to Fall STAR Reading diagnostic screener scores for each of grades three through five?

The study indicated that RTI had a significant effect on student reading achievement in grades three and five. The grade equivalent mean was higher after RTI for both grades. However, the study indicated that RTI did not have a significant effect on student reading achievement in grade 4. The grade equivalent mean was higher but not significantly.

Is RTI just another requirement that educators must fit into their crowded schedules, or is it really a change for the better? Response to Intervention is a promising educational development but must be understood and implemented correctly in order to work. RTI is not a quick fix or a simple add-on. It is a different approach to looking at students and serving students with appropriate resources. RTI is fundamentally practical.

It is not based on new theories or ideas, but is a way of putting into practice the things research has always taught educators to do (Fuchs & Fuchs, 2007).

Research Question 2: After RTI implementation, is there a significant difference in fall STAR Reading diagnostic screener scores compared to winter STAR Reading diagnostic scores by tier for each of grades three through five?

The study indicated for Tier 2, the paired samples *t* statistic for the dependent variable, indicated that frequency of RTI implementation had no significant effect on student achievement in grade 3, or grade 4. The paired samples *t* statistic for the dependent variable indicated that the frequency of RTI implementation had a significant effect on student achievement in grade 5. For Tier 3, the paired samples *t* statistic for the dependent variable, indicated that frequency of RTI implementation had a significant effect on student achievement in grade 3 and grade 4. Grade 4 had the most significant gain. The paired samples t statistic for the dependent variable indicated that the frequency of RTI implementation had no significant effect on student achievement in grade 5.

Layering instructional support based on the needs of students has been implemented for struggling readers by O'Connor (2000) and Dickson and Bursuck (1999). These researchers aimed to reduce reading failure in the early grades by providing instruction across levels that varied in length (number of minutes per session), intensity (number of times per week and group size) and duration (number of weeks). Both research studies demonstrated high effect sizes for students at risk for reading failure who were placed in small group, intensive interventions. A common finding from these two studies as well as work conducted by Torgesen (2001) and Vellutino, Scanlon,

Sipay, Small, Pratt, Chen, and Denckla, (1996), is that a small percentage of students (5-7%) fail to make adequate progress even when intensive and explicit supplemental instruction is provided. The student whose response to treatment is significantly lower than expected, could be identified as a student with reading or learning disability (Vaughn et al., 2003).

All students benefit from a variety of instructional methods and support as well as an appropriate balance between the challenge of instruction and the opportunity for success (Lawrence-Brown, 2004). Critical features of RTI are contained within the general education classroom and include the provision of high-quality, effective instruction in the general education curriculum and classroom, systematic instruction using differentiated instructional strategies for struggling students, and small group and individualized instruction (Drame & Xu, 2008). Intervention strategies are expected to be carried out by general educators in collaboration with a team of colleagues, including special educators (Coleman, Buysse, & Netizel, 2006). Students who struggle can only be successful if all stakeholders understand the implications of RTI and realized that the core component of RTI is evidence of high-quality instruction in the general education classroom (Drame & Xu, 2008).

## Discussion

High stakes testing is at the forefront of every educator's mind and school districts are faced with the responsibility of achieving and maintaining results in reading and other core subjects. Many variables exist that can effect small group instruction such as time spent on remediation, quality of curriculum, educational experience and staff certification. Research has consistently supported the effectiveness of adult-instructed,

one-to-one tutoring programs in reading if the interventions were well designed and provided immediate and substantial assistance to elementary students identified at risk of reading failure (Elbaum, Vaughm, Hughes, & Moody, 2000).

Class size can also have an effect on student achievement. Nye, Hedges, and Konstantopoulos (2001) conducted a study that explored the relationship between the number of years that students participated in small classes and their level of achievement. After one year, the students in smaller classes had significantly high achievement scores on the Stanford Achievement Test reading and mathematics subtests than students in larger classes. The gap in scores widened after two years, indication that the effects of small classes are cumulative.

Research has also shown evidence to support a direct relationship between teachers' knowledge and skill about essential components of effective literacy instruction and student literacy outcomes (Darling-Hammond, 2000; McCutcheon & Beerninger, 1999). When teachers are given targeted training and supports, their knowledge and skills improve in line with best practice, and these improvements have a positive impact upon student learning outcomes (McCutchen & Berninger, 1999). Gersten and Dimino (2006) pointed out the necessity of providing teachers the training they need in the use of RTI, especially when students are failing in reading. They said,

> Many teachers appear to grasp the logic underlying RTI. In other words, they see help is provided or students who falling behind without great discussion of whether the problem is perceptual, low IQ, motivational, or environmental. It merely calls for 20 minutes or so of small-group work to "catch students up" with their peers. Only when this type of catch up work procedure does not work are

students given extensive diagnostic testing and possible placement into a special education program. (p. 102)

It is imperative that school leaders understand both state and local assessments and interpret them accurately so school stakeholders have a clear understanding of what is needed in order to move forward. Fullan (2001) defines assessment literacy as the collective capacity of teachers and leaders in schools to examine data, make critical sense of it, develop action plans based on the data, take action and monitor progress along the way. According to Earl and Katz (2003) accountability does not produce productive schools if the purpose is to identify the culprits. The essence of accountability is looking forward, using data to inform judgments about current performance to formulate plans for reasonable actions.

With student achievement at the forefront of every educator's mind, RTI is a promising initiative for all school districts. The targeted school district has three K-4 schools, one fifth grade school, a 6-8 middle school, and a high school that consists of grades 9-12. Recently, the targeted school district began building a new high school which will afford them more room for growth. The superintendent, along with the school board members, and community member were not pleased with the way the schools were set up and have worked together tirelessly to make a positive change for the students in this district. Since many of the school board members have children in the district, they have not taken this task lightly. The superintendent, school board members and a committee of fifteen teachers have worked tirelessly in collaboration for over a year. Their goal was to find the best way to configure the schools in order to better serve the students both physically and academically. Throughout this process, their efforts have

yielded results that could possibly impact student achievement in a more positive way. The new configuration has recently been changed to three K-3 schools, an upper elementary of 4-6 grades, a middle school of grades 7-8 and high school grades of grades 9-12.

*Research Question 1*

In retrospect, the placement of grade levels could have made an impact on this study. While all mean scores showed improvement with RTI implementation, only grades three and five showed significant improvements. Grade five students were in isolation at one school with one remediation assistant; whereas grades three and four were spread out among three different schools, with three different remediation assistants. This could have positively affected student achievement in grade five.

Research has shown that early intervention can increase student achievement, and this could be attributed to the improvement in grade three. One explanation for the fourth grade students' lack of progress in RTI implementation could be due to being the older of the two groups within the same building. Another explanation for the lack of significant progress in fourth grade could be attributed to the more intense focus on content area at that level.

*Research Question 2*

As the tiers progress, the intervention becomes more intense. The students in grades three and four in Tier 2, showed no significant improvement in reading fluency. However, grade five students showed a significant gain in reading fluency. As stated earlier, it may be due to the fact that grade five students are in one school with one

remediation assistant teacher using the same curriculum for all fifth grade students in the second Tier.

In regard to Tier 3 remediation, the results indicated that third and fourth graders made a significant improvement in reading fluency. Grade five made a mean score improvement in reading fluency; however, they did not improve significantly. This could be an indication that early intervention is imperative if we want to impact student achievement and ensure student success. The new configuration could allow teachers in the three elementary schools to focus on early intervention in grades K-3 at an intense level. Ideally, as students move into the upper grades, most of their deficits in achievement have been remediated.

RTI is a general education process of instruction, assessment, and intervention that holds great promise for more efficiently addressing the needs of all learners in all schools. One advantage of RTI is the increased collaboration among school staff. All stakeholders such as school board members, superintendents, principals, general education teachers, school psychologists, and special education teachers, all share responsibility for students' overall success. In order for RTI to be implemented successfully, schools must have a commitment from the entire school district. A team of teachers and administrators must develop a school-based RTI model of student support. All teachers should implement RTI best practices. Children will succeed when families and schools work together and communicate regularly about student progress.

## Recommendations for Policy and Practice

At the present time, RTI remediation personnel are not required to have a degree in elementary education. Since the targeted school district is required to implement RTI,

school board members could use this information to allocate additional funding to provide certified staff members to remediate students in the RTI process. Since class size reduction has been linked to student achievement, the school board could take into account that the average class size in this study was approximately 25 students. This study may have turned out differently if class size had been reduced. The school board could implement reduced class sizes in grades K-5.

The district superintendent can use the information provided by this study to assess the skills and knowledge of staff and principals in order to facilitate effective change within the school district. The superintendent could also require building level principals to be knowledgeable of the RTI process in order to ensure validity in its implementation.

The building principals could require teachers to meet on a weekly basis in order to discuss the academic needs of the students and problem solve in the areas of concern. School administration could also place their strongest teachers in the areas where students need the most remediation.

Teachers could implement more frequent progress monitoring and pay close attention to individualized instruction for students in the RTI process. Classroom teachers could also examine their assessment procedures and ensure they are aligned with state frameworks and objectives.

## Limitations

The limitations associated with this study are as follows. The research was conducted within a single school district. The study was limited to this specific

population and therefore, generalizations were restricted to populations within similar demographics and teacher characteristics.

## Recommendations for Future Study

The purpose of this study was to determine whether RTI made a difference in student achievement in reading. Results indicated that RTI implementation did make an overall difference as indicated by the mean scores for all three grades. However, only grades three and five made a statistically significant improvement. The frequency of the intervention (Tier 2), made no significant impact on grades three and four. However, grade five made significant gains. Based on the results, it appears as the interventions became more intense (Tier 3); the results were not significant with grade five but significant with grades three and four. This could be an indication that younger students, who struggle with reading fluency, may need a more intense level of intervention as soon as they begin to show any sign of reading deficit.

A potential direction would be to further investigate whether the interventions were scientifically research based and time allowed for interventions for each grade level at each school. Based on this study, recommendations for future use are as follows:

1. This study could be replicated using certified staff members who have been trained to use the same curriculum district wide. This would provide more consistency within each grade level.
2. This study could be replicated using the same curriculum with only one grade level within various socioeconomic statuses in order to determine if curriculum makes a statistically significant difference in reading achievement.

3. A follow-up longitudinal study could be implemented on students in the RTI process in the early grades K-5. This would allow researchers to determine whether early intervention through RTI had an effect on reading achievement throughout their educational years.
4. Another researcher could examine the fourth grade curriculum to determine if more content area literacy strategies are needed at this level to increase reading levels for later grades.

## Summary

The purpose of this study was to determine whether RTI made a difference in student achievement in reading. A report entitled *Failing Our Children* prepared by the National Education Association (Neill, Guisbond, & Schaeffer, 2004) found that roughly 26% of all public schools did not make Adequate Yearly Progress (AYP) during the 2005-2006 school year. Thurlow, Moen, and Altman (2006), reported that in 2003-2004, only about 30% of students with Individualized Educational Plans (IEPs) performed at the proficient level on state-mandated reading and math assessments. Today more than 6 million school-aged students have IEPs, which means more than 4 million (or 70% of students lack proficiency in reading and math) (Rock, Gregg, Ellis, & Gable, 2008). According to the 26$^{th}$ Annual Report to Congress on IDEA (U.S. Department of Education, 2005) roughly 96% of general education teachers have students with learning disabilities in their classrooms. Of the teachers, nine of 10 have at least three students with IEPs. However, the challenges that confront present day teachers are not limited to students with disabilities (Rock et al., 2008). Students come from diverse backgrounds in

which parental expectations and community norms may be at odds with traditional schooling (Lapkoff & Li, 2007).

The study used primary data derived from the winter STAR Reading diagnostic screener collected from third, fourth and fifth grade students in the RTI process. These scores were then compared to the archival data collected in the fall STAR reading diagnostic screener from the same students.

Independent t-tests were performed in order to determine if there is a relationship between RTI implementation and student achievement in reading. T-tests are used to test whether the means of two groups are statistically different from one another.

The study sample represented in this investigation was 125 students who were given the STAR reading diagnostic screener in the fall and winter months during the 2010-2011 school year. The participants were chosen from three elementary schools and one fifth grade school from a coastal school district. They are similar in socioeconomic status and have approximately 40% free and reduced lunch participation. Minority groups from each school comprise 20% of their respective populations. The three elementary schools that were selected have a similar grade size of approximately 150 students per grade with an average class size of 26 students. The fifth grade school has an enrollment of approximately 430 students with an average class size of 26 students. All four schools combined have a population of approximately 1,600 students. All students selected had been identified below benchmark in reading and had been placed in the RTI process for remediation. Only students who attended third, fourth and fifth grades in the district during the 2010-2011 school year and were assessed in Fall and Winter using the STAR Reading diagnostic screener, were selected for the study.

Results indicated that RTI implementation did make an overall difference in the grade equivalent mean scores of grades three through five. However, it only made a significant difference in grades three and five.

The frequency of the intervention (Tier 2), made no significant impact on grades three and four. However, grade five made significant gains in Tier 2. This could be attributed to the three participating coastal schools being a K-4 school. All of the fifth grade students in this study were located in a fifth grade only, school. Based on the results, it appears as the interventions became more intense (Tier 3); the results were not significant with grade five but significant with grades three and four. This could validate the need for early intervention for students with reading difficulties.

In support of early intervention, Foorman (2007) reported that 82% of students identified as remedial and placed on an intervention before the third grade can recover, whereas only 46 % of students who receive intervention in the third through fifth grades recover. Only 10% to 15% of students recover as they move beyond the fifth grade.

Research has shown that through early intervention, RTI can increase student success and decrease the number students identified with specific learning disabilities in need of special education. Based on the results, it appears as the interventions became more intense (Tier 3); the results were not significant with grade five but significant with grades three and four. This could be an indication with reading fluency, may need a more intense level of intervention.

Although this study had some limitations, recommendations were made that could improve the quality of RTI implementation. Recommendations for future research include replicating this study using only certified staff members who have been trained to

use the same curriculum district wide. This would provide more intense remediation and better consistency within each grade level. Other recommendations included, replicating this study using the same curriculum with only one grade level within various socioeconomic statuses. This could help determine if curriculum makes a statistically significant difference in reading achievement. Other recommendations made were to follow up with a longitudinal study that could be implemented on students in the RTI process in the early grades K-5. This would allow researchers to determine whether early intervention through RTI had an effect on reading achievement throughout their educational years.

# APPENDIX A

## REQUEST TO SUPERINTENDENT FOR PERMISSION TO CONDUCT STUDY

October 28, 2010

Dear District Superintendent,

I am currently pursuing my doctorate degree in Educational Leadership from The University of Southern Mississippi. In order to meet this goal, I am required to plan and conduct a comprehensive research project that will enhance the field of education. I will be conducting the research project entitled: *The Relationship Between Response to Intervention Implementation and Student Achievement.* I would like to ask permission to conduct my study using data from the STAR Reading diagnostic screener for fall and winter benchmarks. Additionally, I will need to collect data from Teacher Support Team (TST) folders.

Only students who are in grades three through five will be selected to participate in the study. I will be available to answer any questions should they arise, and will collect the data once testing is completed.

If you have any questions at any time, you may contact me at 228-396-5137 or email me at carla.mccaleb@gmail.com.

Thank you in advance for this opportunity,

Carla McCaleb

# APPENDIX B

## REQUEST TO PRINCIPALS FOR PERMISSION TO CONDUCT STUDY

November 15, 2010

Dear Principal,

I am currently pursuing my doctorate degree in Educational Leadership from The University of Southern Mississippi. In order to meet this goal, I am required to plan and conduct a comprehensive research project that will enhance the field of education. I will be conducting the research project entitled: *The Relationship Between Response to Intervention Implementation and Student Achievement.* I would like to ask permission to collect data from students who are in the RTI process in grades three, four and five. I am requesting access to the fall benchmark scores from the STAR Reading diagnostic screener as well as winter benchmark scores. Additionally, I will need to collect data from Teacher Support Team (TST) folders.

I will be available to answer any questions should they arise, and will collect the data once testing is completed.

If you have any questions at any time, you may contact me at 228-396-5137 or email me at carla.mccaleb@gmail.com.

Thank you in advance for this opportunity,

Carla McCaleb

APPENDIX C

IRB APPROVAL FORM

THE UNIVERSITY OF SOUTHERN MISSISSIPPI

Institutional Review Board

118 College Drive #5147
Hattiesburg, MS 39406-0001
Tel: 601.266.6820
Fax: 601.266.5509
www.usm.edu/irb

**HUMAN SUBJECTS PROTECTION REVIEW COMMITTEE**
**NOTICE OF COMMITTEE ACTION**

The project has been reviewed by The University of Southern Mississippi Human Subjects Protection Review Committee in accordance with Federal Drug Administration regulations (21 CFR 26, 111), Department of Health and Human Services (45 CFR Part 46), and university guidelines to ensure adherence to the following criteria:

- The risks to subjects are minimized.
- The risks to subjects are reasonable in relation to the anticipated benefits.
- The selection of subjects is equitable.
- Informed consent is adequate and appropriately documented.
- Where appropriate, the research plan makes adequate provisions for monitoring the data collected to ensure the safety of the subjects.
- Where appropriate, there are adequate provisions to protect the privacy of subjects and to maintain the confidentiality of all data.
- Appropriate additional safeguards have been included to protect vulnerable subjects.
- Any unanticipated, serious, or continuing problems encountered regarding risks to subjects must be reported immediately, but not later than 10 days following the event. This should be reported to the IRB Office via the "Adverse Effect Report Form".
- If approved, the maximum period of approval is limited to twelve months. Projects that exceed this period must submit an application for renewal or continuation.

PROTOCOL NUMBER: **11012402**
PROJECT TITLE: **The Relationship Between Response to Invervention Implemenation and Student Achievement**
PROPOSED PROJECT DATES: **12/01/2010 to 04/01/2011**
PROJECT TYPE: **Dissertation**
PRINCIPAL INVESTIGATORS: **Carla McCaleb**
COLLEGE/DIVISION: **College of Education & Psychology**
DEPARTMENT: **Educational Leadership & School Counseling**
FUNDING AGENCY: **N/A**
HSPRC COMMITTEE ACTION: **Expedited Review Approval**
PERIOD OF APPROVAL: **02/07/2011 to 02/06/2012**

Lawrence A. Hosman
Lawrence A. Hosman, Ph.D.
HSPRC Chair

2-8-2011
Date

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