5-2016

Student Achievement in Response to Intervention Groups

Allison L. Gardenhour
East Tennessee State Universtiy

Student Achievement in Response to Intervention Groups

A dissertation

presented to

the faculty of the Department of Educational Leadership and Policy Analysis

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Doctor of Education in Educational Leadership

by

Allison L. Gardenhour

May 2016

Dr. Virginia Foley, Chair

Dr. Eric Glover

Dr. Don Good

Dr. Karin Keith

Keywords: RTI, Response to Intervention, Intervention Programs, Student Growth, Closing Achievement Gaps, Progress Monitoring

ABSTRACT

Student Achievement in Response to Intervention Groups

by

Allison L. Gardenhour

The purpose of this study was to identify components of Response to Intervention (RTI) groups associated with increased student growth on progress monitoring tests. The relationship between student growth scores and fidelity of implementation scores, types of groups, types of interventionists, group setting, group time, and various demographic groups were examined. Seven hundred fifteen students enrolled in reading and math groups in an RTI program at 8 schools in an Upper East Tennessee school system participated in this study. Ten research questions and null hypotheses were analyzed using Pearson correlations, independent t tests, and one-way Analyses of Variance. Results indicated significant gains for RTI students in every type of reading and math intervention group and every demographic population. These results contradicted current nationwide studies on RTI in which students made limited gains in intervention.

DEDICATION

This work is dedicated to my family and friends who continue to fight to improve education. Special thanks go out to our interventionists, our students, and all those who value education precisely because they had to struggle and sacrifice to succeed. For Cindy, Courtney, Corey, Dave, Dianna, Donna, Drew, Jami, JoDee, Naomi, Katherine, Kathleen, Shannon, and Tiffany, my brothers and sisters in the fight to help students grow, thank you for your continued moral support and friendship. For my cousin, Andrew, thanks for showing me how to fight the good fight with perseverance and love. You will forever live on in our hearts.

A special thank you goes out to both of my parents for believing in me and instilling a love of learning, education, and writing. Especially to my mother, Lynn, the first woman in the family to graduate college, who went on to earn multiple graduate degrees while working and raising me alone, you are a true inspiration. You lit a fire in me to speak for those whose voices weren't being heard. For my best friend and sister, Dianna. There just aren't words to express my gratitude for you. Thank you for supporting me in ways too numerous to count.

For my daughter, Isabel, you are an amazing young lady. Your loving support and kind example have inspired me to be a better person. I hope this process has helped you see that with passion, compassion, and effort, you can make positive changes in this world.

Last but never least, for my incredible husband, Chris, whose dedication to improving the lives of his students and teachers has inspired me on countless occasions. You are making such a difference in the lives of your students every day. Thank you for supporting me every step of the way. You are my rock and my love. I treasure your wisdom, intellect, insight, and caring. Without your sacrifice and support, this would not have been possible. Thank you.

ACKNOWLEDGEMENTS

There are so many people who will have my lifelong gratitude for their support on this journey. When people asked me who was on my committee, I often said that I was blessed to have the dissertation dream team. My committee was incredible and helped me every step of the way. Dr. Virginia Foley, Dr. Eric Glover, Dr. Don Good, and Dr. Karin Keith could not have been more supportive.

Dr. Foley, there just aren't words to adequately express how grateful I am to you and how much I respect and adore you. I knew from our first class together that I wanted you to be the one to stand beside me throughout this process. You are a strong and inspirational woman who leads with honesty, courage, and wisdom. You inspire us to dream of better schools and encourage us as we strive to create them. Dr. Glover, thank you for always reminding me to work toward a greater vision in life and education. You and Dr. Foley taught me that truly systemic change takes passion, caring, and consensus. Dr. Good, thank you for helping me every step of the way and for taking the extra time and effort to help me see that research is fun. Dr. Keith, you are strong, brilliant, kind, and know so much more about literacy than I ever will. I'm so grateful for you.

My heartfelt thanks goes to the leadership of Johnson City Schools for their incredible support my work and of Response to Intervention. What our principals, supervisors, and board do for our students and teachers is amazing. To be a part of a school system that supports struggling students in so many ways is such a blessing. There are too many people to thank by name. However, Dr. Roger Walk deserves special thanks. He showed me how to make the impossible possible through his caring, thoughtful leadership. Thank you for supporting me and changing the lives of countless students and teachers. You are truly a transformational leader.

TABLE OF CONTENTS

LIST OF FIGURES

CHAPTER 1
INTRODUCTION

Research about Response to Intervention (RTI) programs that are effective in closing achievement gaps and meeting federal requirements could help school systems nationwide find more effective ways to meet the needs of their struggling students. For this to happen it is important that school systems examine the success and implementation of existing intervention programs to ensure their effectiveness and alignment with the federal RTI model. The National Research Council defined Response to Intervention (RTI) as student-centered assessment models that use problem-solving and research-based strategies to identify and address learning problems (Berkeley, Bender, Gregg-Peaster, & Saunders, 2009; Johnson, Mellard, Fuchs, & McKnight, 2006). The primary goal of RTI is to provide needed, individualized interventions for students who struggle academically (Martinez & Young, 2011).

This study was used to examine the effectiveness and implementation of the Learning Enrichment and Development (LEAD) Program in several different structural and instructional areas. LEAD is an intensive literacy and math RTI program based on the strategies of many existing research-based programs, such as Lindamood-Bell's Seeing Stars, Beverly Tyner's Small Group Differentiated Instruction, Jan Richardson's Guided Reading Groups, Fountas and Pinnell's Comprehension Toolkit, and Lindamood Bell's Visualizing and Verbalizing. This study was an examination of which organizational components and instructional practices positively correlated with the most growth for students from varying demographic groups.

Response to Intervention: An Overview

Recently our nation mandated the implementation of a federal Response to Intervention (RTI) model to help struggling students succeed and determine eligibility for Specific Learning Disability (SLD). As of July 2014 every state was expected to be in compliance with the new RTI requirements even though only 13 of them had fully implemented using RTI for Specific Learning Disability diagnosis by 2011 (Zirkel, 2011). School systems all over the nation have scrambled to learn everything they could about RTI in order to build programs that would successfully fulfill the new requirements, align with the new standards, increase academic achievement, and close achievement gaps for struggling students.

Many different types of RTI programs existed prior to the federal RTI roll-out in 2014. Over time similarities in intervention programs have grown. Most RTI programs include a process by which a team defines a student's problem, plans and implements interventions to help the student grow, and provides ongoing assessments to determine the extent to which the interventions work (Bender & Shores, 2007; Fuchs, Mock, Morgan, & Young, 2003; Martinez & Young, 2011).

While there are a wide variety of goals for using an RTI framework several goals are prominent in the literature. The primary goal of most RTI programs is to provide students with the individualized and intensive help they need to succeed. Another common goal of RTI is to maintain an ongoing process that uses student performance to guide high-quality instruction to meet the student's needs whether in the classroom or in intervention groups (Abbott & Wills, 2012). A secondary goal of many RTI programs is either to cause so much growth that students no longer need special education services or to accrue so much data during the intervention that the eligibility process for Specific Learning Disability (SLD) is strengthened, streamlined, and accelerated. RTI interventions are designed to identify needs early and allow for flexibility in

type and amount of service received. This allows students to receive extra help as needed and frees them to return to the core curriculum without additional support as soon as they are ready.

During the 2004 reauthorization of the Individuals with Disabilities Education Act (IDEA) the Response to Intervention (RTI) model was proposed as an alternative to the IQ-discrepancy model formerly used to identify students with Specific Learning Disabilities (SLD). Several states that were using RTI programs in 2007 had already begun to use student performance in RTI to determine referral for special education testing (Berkeley et al., 2009). With the federal roll-out of RTI in 2014, schools in Tennessee began using information gathered from the RTI model as part of the criteria used to diagnose specific learning disabilities (Tennessee Department of Education, 2013). The use of federal and state RTI models became mandatory for the identification of students with specific learning disabilities in 2014. Many states, including Tennessee, developed RTI frameworks that proposed to close achievement gaps. A great deal of previous RTI research deals with teacher or administrator perceptions of RTI rather than determining which RTI practices align with student growth. While perceptual data are valuable, this study was designed to identify which interventions and other aspects of this Response to Intervention program positively correlated with student growth on progress monitoring tests. Response to Intervention programs are complex district wide initiatives that can be used to determine which practices accelerate student growth. As such, they can be used as a barometer of the effectiveness of instructional strategies and structural practices used within schools.

Purpose of the Study

The purpose of this nonexperimental quantitative study was to identify factors associated with increased student growth in RTI groups as measured by progress monitoring assessments on either AIMSweb or DIBELS tests. McMillan and Schumacher (2012) share that nonexperimental research design examines relationships between different phenomena without any direct manipulation of variables used in the study. This study was used to examine the relation between student growth on progress monitoring tests and specific research-based reading and math interventions, position of the interventionists, fidelity of implementation, group time, and setting. The study was used to explore growth comparisons of students from various demographic groups, including gender, language background, socioeconomic status, and special education status.

Research Questions

The nonexperimental quantitative design guided the following research questions:

Research Question 1: Is there a significant relationship between fidelity scores on RTI^2 Fidelity Reports and student growth on progress monitoring assessments?

Research Question 2: Is there a significant difference between student growth on progress monitoring assessments as compared by the type(s) of reading intervention (basic reading group, reading fluency group, or reading comprehension group)?

Research Question 3: Is there a significant difference in student growth on progress monitoring assessments as compared by the type(s) of math intervention (basic math, math computation group, or math reasoning group)?

Research Question 4: Is there a significant difference in student growth on progress monitoring assessments as compared by interventionist's position (RTI tutor, part time assistant, full time assistant, or classroom teacher)?

Research Question 5: Is there a significant difference in student growth measured by progress monitoring assessments as compared by the length of group time (30-44 minutes, 45-59 minutes, or 60 or more minutes).

Research Question 6: Is there a significant difference in student growth on progress monitoring assessments of pull-out groups and inclusion groups?

Research Question 7: Is there a significant difference between student growth on progress monitoring assessments between ESL and non-ESL students?

Research Question 8: Is there a significant difference in student growth on progress monitoring assessments between students in the low socioeconomic group and other socioeconomic groups?

Research Question 9: Is there a significant difference in student growth on progress monitoring assessments for special education students and regular education students?

Research Question 10: Is there a significant difference in student growth on progress monitoring assessments between males and females?

Significance of the Study

Previous studies of RTI have primarily focused on teacher or administrator perspectives rather than which aspects of RTI programs may be related to student growth. This type of study could be beneficial for school systems across the nation who are just starting or refining their RTI programs and seeking to find effective ways to close achievement gaps. Overall, the literature supported the use of RTI. However, the mixed results of a few studies demands further examination into the effectiveness of RTI implementation in school systems (Adams, 2013; Balu et al., 2015). Therefore, in order to create effective RTI programs, we must first learn which practices within our programs align with growth on progress monitoring assessments. The results of this study could be pivotal in refining the program's use to better meet student needs. It could also aid systems across the nation as they build their own effective RTI programs.

Further investigating RTI could provide a powerful tool for school improvement and systemic reform. Adelman and Taylor (2011) confirmed this:

> Addressing barriers to learning and teaching and reengaging disconnected students is a school improvement imperative. Developing and implementing a comprehensive, multifaceted, and cohesive system of learning supports is the next evolutionary stage in meeting this imperative. It is the missing component in efforts to close the achievement gap, enhance school safety, reduce dropout rates, shut down the pipeline from schools to prisons, and promote well-being and social justice. (p. 8)

Students, parents, educators, school reformers, politicians, and advocates for social change across the nation have long searched for the best way to meet the needs of students who struggle academically because low literacy rates and academic failure are predictors of increased rates of poverty and reliance on public assistance. The United States Department of Education study on adult literacy revealed that attaining higher levels of literacy led to lower poverty (Kutner et al., 2007). When adults progressed from Below Basic to Basic or Basic to Proficient on different literacy measures, their likelihood to be in lower socioeconomic groups diminished.

Among women who received Below Basic ratings on prose, 10% had received public assistance in the past and 4% were currently receiving assistance. Ikeda (2012) pointed out that while research on intervention programs is important, research that helps us solve important social problems, such as over-identification of minority students in special education programs, are the most important things we can examine. Research that helps us pair aspects of effective RTI programs with student growth can aid us in our quest to create more effective RTI programs that close academic gaps for students who have long struggled in our schools.

Definitions of Terms

For this research, the following operational definitions were used:

1. *AIMSweb* - a set of formative assessments created by Shinn and Germann that measure areas of basic literacy skills and basic math skills in grades K-8 using standardized methods (Kiser, 2011). Each test takes only a few minutes and is designed to be administered weekly, bi-weekly, or monthly. These are the tests given to all students in this study every 10 days for progress monitoring with the exception of the K-1 reading groups.
2. *Core Curriculum* - high-quality, rigorous, standards-based instruction for all students in the classroom that incorporates a gradual release of responsibility, examples of the thinking required to complete the work, and access to academic language, peer support, and needs-based guided instruction (Fisher & Frey, 2010; Tennessee Department of Education, 2013).
3. *Curriculum-Based Measurement (CBM)* - brief, national-normed, formative assessments that allow for student growth scores to be graphed on a weekly, bi-weekly, or monthly

basis because they integrate the reliability and validity features of traditional psychometrics with standardized measurement. CBMs are designed to allow teachers to systematically monitor and evaluate the effects of instruction on student performance (Ardoin & Christ, 2009). The AIMSweb, DIBELS, and EasyCBM tests used in this study are all Curriculum-Based Measurements.

4. *Differentiated Instruction* - A multidirectional process of creating and implementing educational experiences that are tailored to meet the individual needs of each child, including the supports needed to foster the highest achievement possible by that individual child (O' Meara, 2011).
5. *Dynamic Indicator of Basic Early Literacy Skills (DIBELS)* - a set of formative assessments created by Good and Kaminski that include measures for letter and sound recognition, phonemic awareness, and oral reading fluency (Abbott & Wills, 2012; Kiser, 2011). The DIBELS tests we used for this study were phoneme segmentation fluency (PSF), nonsense word fluency (NWF), and DIBELS oral reading fluency (DORF). DIBELS tests were given to all K-1 students as a universal screener three times a year and to kindergarten and first grade RTI students every 10 days for progress monitoring.
6. *EasyCBM* - a set of curriculum-based measurements that include measures for basic reading and math skills for grades K-8 very similar to the AIMSweb and DIBELS tests listed above (Brinker-McCammon, 2011). For this study EasyCBM tests were given as universal screeners three times a year in reading comprehension and vocabulary for second through eighth grades and for math in grades K-8. These assessments were part of the criteria used to decide who needed RTI.

7. *Eligibility* - the process by which a student becomes eligible to receive the resources and modifications provided by special education programs based on a diagnosis of specific learning disability (SLD) or another disability category. This process should include a categorical and explanatory diagnosis as well as treatment planning (Johnson, Humphrey, Mellard, Woods, & Swanson, 2010).
8. *Fidelity Check* - walkthrough-style observations designed to ascertain the extent to which the staff adheres to RTI procedures as they were designed, intended, and planned (Drury & Walter, 2014). See Appendix A for a detailed form used for fidelity checks.
9. *Fidelity of Implementation* - the delivery of instruction in the way it was intended to be delivered (Gresham, MacMillan, Boebe-Frankenburger, & Bocian, 2000). In the RTI program being studied this included not only program-specific and research-based teaching strategies but also higher-level questioning, stimuli-response feedback, and classroom management techniques.
10. *Fidelity Report* - a form used to monitor management and teaching strategies during a fidelity check (Tennessee Department of Education, 2013). The RTI^2 Fidelity Report used in this study is shown in Appendix A.
11. *Intervention* - explicit, small group or individual instruction in a student's area of weakness based on a systematic instructional approach that includes a set of delivery and design procedures focused on critical content and derived from effective school research (Tennessee Department of Education, 2014).
12. *Progress Monitoring Assessment* - a brief assessment in the student's area of weakness (i.e.- basic reading, reading fluency, reading comprehension, math calculation, math problem solving, or written expression) given every 5-10 days to determine growth and

the effectiveness of the intervention (Tennessee Department of Education, 2013). Academic deficits within the RTI framework can be monitored using CBMs or another instrument that is sensitive to change (Tennessee Department of Education, 2014). AIMSweb and DIBELS were the CBMs used to progress monitor students every 10 days in this study.

13. *Response to Intervention (RTI) or Response to Instruction and Intervention (RTI^2)* - a path to providing instructional opportunities for all students who fall at or below the 25th percentile, which includes a detailed, data-based decision making process in which appropriate data are collected to inform and drive instructional decisions, and small group interventions are implemented and monitored to help students grow academically (Tennessee Department of Education, 2013). The terms RTI and RTI^2 are used interchangeably in this study.
14. *Specific Learning Disability (SLD)* - a disability that adversely affects a child's educational performance and may manifest itself in the imperfect ability to listen, think, read, write, spell, or do mathematical calculations. Categories of SLD include basic reading, reading fluency, reading comprehension, math calculations, math problem solving, written expression, or another basic psychological process of understanding or using written or spoken language (Tennessee Department of Education, 2014).
15. *Student Growth*- for this study student growth was defined as a student's responsiveness to intervention as evidenced by higher post intervention scores than pre intervention scores. Post intervention scores were created by subtracting the average of the last three national percentile scores on progress monitoring tests minus the pre intervention scores (the average of the first three progress monitoring scores taken). As these national

percentiles were grade-normed, the growth of the natural slope of student learning throughout the year was already included in this equation. Average growth on a national percentile is zero and anything above a zero is a gain.

16. *Universal Screening* - a brief screening assessment of academic skills given to all students to determine whether or not they have the academic foundation necessary to achieve grade-level standards in basic reading, reading fluency, reading comprehension, math calculation, and math problem solving (Tennessee Department of Education, 2013, 2014). Easy CBM and DIBELS tests were used to screen the students in this study three times a year to determine eligibility in this RTI program.

Limitations and Delimitations

Correlational research always carries with it the limitation that we can only show an association between variables, not a causal relationship between the variables (Simon & Goes, 2013). The relationships found in this study were not widely generalizable because they are based on use in one school system.

The limitations of this study include the following:

1. The RTI^2 Fidelity Report, while based on state templates, state requirements, and modified and approved by a diverse array of knowledgeable educators across the school system, was not tested for reliability and validity.
2. Each interventionist and RTI coordinator in the school system was provided with ongoing professional development in the form of multiple instructional workshops, monthly collaborative meetings, frequent academic coaching, and modeling of instructional practices. Each interventionist was given lesson plan templates with specific research-

based instructional strategies designed to help students grow in reading or math. However, in order to differentiate instruction to students' individual needs, instructional practices vary slightly among the eight elementary schools in the study.

The delimitations of this study, potentially affecting the generalizability of the study to other school systems, include the following:

1. The population of this study was limited to kindergarten through fourth grade students because RTI was not mandated or implemented consistently in grades 5-12 during the year the study was conducted.
2. The participants of this study were restricted to a single school system in Upper East Tennessee to make it feasible to gather relatively large amounts of data for each student, as well as to keep the instructional strategies, structural procedures, and assessments used consistent throughout the study. While only one school system was used, it should be noted that the school system where this study took place included a diverse population of students.

Overview of the Study

This study is organized into five chapters. Chapter 1 includes an introduction to the study, the purpose and significance of the study, research questions, definitions of terms used in the study, and the study's limitations and delimitations. Chapter 2 provides a review of the literature that explored the national and historical context of Response to Intervention (RTI), the relationship between RTI and Special Education, the components of effective RTI programs, and ways RTI can increase student learning in special populations. Chapter 3 documents the methodology used to conduct the study. Chapter 4 discloses the findings of the statistical

analyses. Chapter 5 presents the summary of findings, conclusions, and recommendations for practice and further research that arose from this study.

CHAPTER 2
REVIEW OF LITERATURE

Finding the best strategies to close achievement gaps for all students is something educators have been striving for the past few decades with marginal success. This is difficult because improving education for students who struggle academically requires systemic change in schools and systems. RTI programs could help educators begin to close achievement gaps in significant ways because they include the type of dynamic, collaborative, reflective, and data-based decision making processes needed to incite systemic change. In 2004 RTI was proposed as a strategy for identifying students with learning disabilities and preventing the over-identification of students in special education programs as part of the Individuals with Disabilities Education Act (IDEA) (Murakami-Ramalho & Wilcox, 2011). Over a decade later many schools are just now beginning their RTI programs and are still working hard to close those gaps and to ensure that all students receive a fair and appropriate public education that respects and fulfills their individual needs. RTI programs could help ensure that students' individual needs are met prior to referral for SLD, which could reduce over-identification of our largest disability population and begin to improve the quality and quantity of learning for most students significantly.

Response to Intervention

Response to Intervention (RTI) is a multifaceted intervention and decision-making process designed to help students who struggle improve academically. There have been many intervention programs designed to help struggling students prior to RTI. Some of these programs were successful and some were not (Jimerson, Burns, & VanDerHeyden, 2007; O'Conner & Witter-Freeman, 2012).

There were some issues with prior intervention programs that helped to set some of the foundational pieces of RTI (Jimerson et al., 2007). Prior to RTI most intervention programs were populated based on teacher referral, rather than on a combination of evidentiary proof of need and teacher concern. As beliefs about the severity of student needs vary by teacher, some students had a greater or lesser chance of being given intervention based on those beliefs. This kept some students from getting the help they needed and kept other students in intervention programs long after their needs were met. Unfortunately, prior to RTI most programs did not contain the formative assessments needed to ensure that students were experiencing ongoing growth during the period of intervention. Without ongoing monitoring in place to ensure that students were continuing to grow, it became difficult to ensure that the strategies used to help students were working. Ongoing progress monitoring is an essential component of effective response to intervention programs because students have different learning styles and conceptual needs. Prior to RTI many intervention programs included a great deal of reteaching of misunderstood classroom content. For students who did not learn material in class when it was taught the first time, merely reteaching those concepts in the same way rarely helped a struggling student master the content (Kimmel, 2008).

RTI programs include several key components to deal with these challenges and ensure students continue to grow throughout their time in intervention. First, all students are given universal screening tests to determine who needs intervention and which specific skills they need to master. Screening all students keeps some from being overlooked who may have needs that had traditionally gone unnoticed. It also prevents intervention students who have closed their achievement gaps from having to stay in intervention programs long after they need them and enables them to return to classroom instruction as soon as they are able to work independently.

Those who enter RTI programs are assessed every 5 to 10 days with progress monitoring tests to ascertain the specific skill gaps they possess and whether or not they are beginning to master those concepts (Tennessee Department of Education, 2013). This information is critical to help the interventionists and RTI team plan and refine interventions that are tailored to better meet the students' specific needs. The methods one student needs to learn may vary from the methods another needs, even within small group intervention. Thus, within RTI, each student has a team of educators reviewing his or her progress in all areas of schoolwork frequently and using that information to better adjust instruction to meet those individual needs. This combination of collaborative, ongoing data review and adjustment of instruction is the underlying process by which all RTI programs ensure that each student gets intervention tailored to his or her individual needs.

Historical Context of RTI: Federal, State, and Local Implementation

The concept of determining students' need for special education based on how they respond to intervention is not new but is a widely debated topic. Research on RTI dates back to the 1960s. However, as it was only federally mandated in the past few years, the process is still new for many parents and teachers (Bender & Shores, 2007; Berkeley et al., 2009). As such, it is imperative that those implementing RTI ensure that educators and parents are informed and actively participate in the process.

Barnett, Daly, Jones, and Lentz (2004) disclosed that the earliest mention of using students' responsiveness to intervention to determine eligibility for special education began in the 1960s at the inception of full scale, nationwide special education services. The National Research Council (NRC) mentioned changing the discrepancy model to identify SLD in 1982

(Martinez & Young, 2011). In that study the NRC also mentioned taking a close look at the effectiveness of special education assessment procedures, core classroom instruction, and special education instruction. These ideas paved the way for the fidelity checks and the other processes we use to ensure that instruction, interventions, and assessments are rigorous and foster student growth. Marie Clay, the prominent founder of the highly successful Reading Recovery early intervention program, coined the term *intervention* in a 1987 article in which she argued that children should not even be considered for learning disability designation until rigorous, responsive instruction had been provided and failed to speed up the child's progress (Lipson & Wixson, 2012).

Early RTI models included the use of Curriculum Based Measurements (CBM) to screen students for skill deficits and determine whether they were making progress toward the goal of grade-level learning (Deno & Gross, 1973). Barnett et al. (2004) suggested determining the need for special education based on failure to demonstrate a trajectory toward meeting those goals.

The President's Commission and the Reauthorization of IDEA

To prepare for the reauthorization of the Individuals with Disabilities Act (IDEA) in 2004, the president created a Commission on Excellence in Special Education. In 2002, this group evaluated the state of special education at every level across the nation to come up with recommendations for improvement. Their findings formed the basis of the changes brought forth in the IDEA reauthorization in 2004 (Drame & Xu, 2008). The President's Commission made several recommendations that became foundational pieces of RTI. For example, the commission proposed the need for early intervention and identification systems to decrease the number of students in the largest disability category, students with specific learning disabilities. To address

the over-identification of students with SLD, the commission proposed three pivotal changes to the SLD identification process that paved the way for RTI. First, they recommended abandoning the former classification process to make way for a new decision-making process that was based on response to intervention for those students. Next, they recommended implementing interventions that included scientifically validated, ongoing progress monitoring to ensure that students were growing during their period of intervention prior to referral, thereby doing away with the old "wait to fail" model. Finally, the commission recommended using the same, dynamic progress monitoring methods to make reevaluation decisions for students already receiving special education services (Barnett et al., 2004). The recommendations of the President's Commission on Excellence in Special Education formed the foundation of the changes brought forth in the 2004 Reauthorization of IDEA.

The reauthorization of the Individuals with Disabilities Education Act (IDEA) in 2004 was a legislative event that spurred the creation of RTI programs across the nation. This was the first time in our nation's history that the use of RTI was made acceptable as an alternative way to identify students with specific learning disabilities (Berkeley et al., 2009; Ikeda, 2012; Keller-Margulis, 2012). Martinez and Young (2011) asserted that part of the reason Congress amended the IDEA was to address the over-identification of students with SLD using the discrepancy model. In addition to using RTI as an alternative means to identify students with SLD, the regulations set forth in IDEA 2004 also made a shift from expecting all students, including those in special education, to master grade-level standards.

This shift toward expecting all students to master grade-level standards undergirds the focus on rigorous instruction in the classroom and in intervention programs. Barnett et al. (2004) reflected that the changes in IDEA 2004 and the No Child Left Behind Act require that students

receive effective instruction, progress monitoring, and scientifically-based program components prior to entering special education as a means of making educators accountable for student growth. Drame and Xu (2008) confirmed this shift toward accountability for students to meet grade-level standards. They described how documentation of underachievement to determine eligibility for special education services for SLD was based on a child's age, ability level, or intelligence quotient prior to RTI. Underachievement is now based on a child's lack of achievement of state-approved, grade level standards (Tennessee Department of Education, 2014).

The current practice of expecting all children to attain rigorous grade-level standards using evidence-based strategies was a relatively new educational practice that began with the concurrent legislative initiatives of No Child Left Behind in 2002 and the Reauthorization of IDEA in 2004. Ikeda (2012) revealed that state policy makers and educators may have missed some of the underlying thought processes that fueled the reauthorization in 2004. Ikeda argued that the first act was about getting students with disabilities into school buildings; whereas, the IDEA regulations are about getting students with disabilities engaged with the core curriculum. The evolution of thought driving the reauthorization has moved away from merely granting children with disabilities access to schools and measuring progress against self. Now, students with disabilities, like all other students, are measuring their progress against state-approved grade-level standards and access to life outcomes. These concepts further underscore the need for research on rigorous, highly-intensive instruction that propels student growth at each tier of an RTI program.

States Using RTI Prior to Federal Mandate (2004-2014)

Systemic change takes time, effort, and resources. Some states began implementing RTI programs immediately following IDEA's proposal to use Response to Intervention programs in 2004. In the time between the reauthorization of IDEA and the federal roll-out of RTI in 2014, 37 states included a response to intervention process to their state regulations as a possible alternative to the discrepancy model to identify students with SLD (Berkeley et al., 2009).

Berkeley et al. (2009) reviewed the degree to which states implemented RTI programs across the nation in the years between the reauthorization of IDEA and federally mandated RTI. Three years after the Reauthorization of IDEA in 2004, there were only three states that had not addressed RTI in any way (Alaska, New Jersey, and South Carolina). At that time, 22 states had begun developing their RTI models and 10 of them were already providing guidance to districts about how to implement an RTI program. This guidance was found in many forms. Maryland and Virginia already had comprehensive state RTI manuals in place, while other states were providing professional development or merely answering questions about RTI. Berkeley also found, by 2007, 15 states had adopted state RTI models and nine of those states had achieved large scale implementation (Arizona, Delaware, Georgia, Iowa, Kansas, Ohio, Oregon, Utah, and Washington). During this time, Tennessee and Massachusetts suggested that districts use existing tiered programs through the Reading First Initiative to fulfill this goal.

Existing State RTI Models Prior to Federal RTI Policy

Prior to the inception of the formal RTI frameworks two popular models were used to design intervention programs, the problem solving model and the standard treatment protocol (STP) model. Drame and Xu (2008) discussed the STP designed by Fuchs and Fuchs. The STP

calls for the use of standard, empirically validated programs to be used with fidelity for students who have similar problems for a specific period of time. The problem solving model was derived from prereferral intervention models that use collaborative teams to decide the best way to treat each student's learning issues. A combination of these models was used to form our current state and national RTI frameworks that include collaborative teaming, research-based instruction, data-based decision making, and monitoring for fidelity of implementation.

Keller-Margulis (2012) reported that in the time before RTI models became widely-used, there were various problem solving models on the scene. One of these models, the Instructional Support Team process studied by Kovaleski, Gickling, Morrow, and Swank (1999), yielded better academic outcomes for struggling students in Pennsylvania when it was implemented with a high degree of integrity. These models were the stepping stones that paved the way for fidelity monitoring within intervention programs. Berkeley et al. (2009) reported that fidelity monitoring occurred as early as 2007 in Pennsylvania and Oregon. Perhaps this was due in part to the findings that the Instructional Support Team process in Pennsylvania was more effective when paired with fidelity monitoring. Berkeley et al. also found that by 2007 Oregon already had specific fidelity checklists in place to rate the level of fidelity of instructors who provided interventions. Our current state and federal RTI models use these types of fidelity checklists to monitor and improve instruction within intervention programs (Tennessee Department of Education, 2013).

During the 2014-15 school year the state of Tennessee and the federal government made using an RTI process mandatory for determining eligibility for special education services for students with specific learning disabilities (Tennessee Department of Education, 2013). At that time, most school systems across the state of Tennessee were beginning to implement RTI

programs. While Oregon and Pennsylvania had already started fidelity checking by 2007, Tennessee began implementing RTI in small pockets of the state. The schools that piloted RTI in Tennessee received guidance from state officials who were not yet in the process of developing a state RTI model (Berkeley et al., 2009). Thus, the RTI process was so new in Tennessee that no one used it to determine eligibility for services for students with SLD. That process did not come until 7 years later with the federally mandated use of RTI to determine eligibility for SLD services in 2014.

RTI and Special Education: A Complicated Relationship

Response to Intervention is a general education initiative not part of special education. This means RTI programs are not funded by special education and as such, they follow different guidelines. One of the most notable differences between special education and RTI guidelines includes the idea that parents cannot opt out of RTI because these interventions are considered a normal part of the general education curriculum. Although RTI is not a part of special education, data from RTI interventions must now be used to identify students with specific learning disabilities that make them eligible to receive special education. This creates an important and often complex relationship between RTI and special education (Adams, 2013).

In July 2014, the federal government mandated the use of RTI to identify SLD students. The federal government mandated that states replace the discrepancy model with uniform RTI processes to determine eligibility for students with SLD (Tennessee Department of Education, 2013). This federal policy created a sense of urgency for states and schools to adopt RTI as part of their state regulations (Keller-Margulis, 2012; Zirkel & Thomas, 2010). This resulted in some schools trying to implement RTI programs in a hurry. Because systemic change takes time

(Fullan, 2003), experts suggest that full implementation of RTI will take between 3 and 5 years (Shapiro, 2009). The RTI program examined for this study matched federal and state mandates for compliance including progress monitoring and fidelity monitoring procedures.

Drame and Xu (2008) noted that one difference between RTI and the discrepancy model was that RTI ensured that students received services right away without having to wait months to become eligible for special education services. Swanson, Solis, Ciullo, and McKenna (2012) confirmed this when they noted the biggest advantage of RTI was getting to intervene with students at the first sign of trouble instead of having to wait to help them until they showed a discrepancy between their IQ and their performance. Several researchers have asserted that using one-point-in-time assessments to determine eligibility for special education services has been a long standing source of controversy (Barnett et al., 2004; Reschly & Ysseldyke, 2002).

Hughes and Dexter (2011) found that only a few studies showed slight decreases in special education numbers while most special education rolls remained fairly constant. Denton, Fletcher, Anthony, and Francis (2006) found that as many as 40% of the students in their intervention programs were able to leave special education and return to the general education population. Stuart, Rinaldi, and Higgins-Averill (2011) shared that after implementing their RTI program, special education referrals were down by 50% the first year and another 50% the following year. Their initial referral rates for special education have dropped from 10% to 3% of the student population. One of the study participants in Stuart et al. articulated, "I think that the fact that we haven't had referrals yet speaks for it right there (mid school year- year 2 of RTI implementation). Last year we had 22 referrals; this year we've had only three. That's huge. There's two pieces: We aren't referring as much and students who might have been referred at an earlier point two years ago are getting the services they need" (p. 61).

Consistency and Fairness in Determining SLD Eligibility

RTI programs have been determining rates of improvement and the need for further special education testing for many years. However, prior to the federal policy in 2014, RTI progress has never been used as the sole criteria for determining SLD. Prior to the federal requirements RTI programs varied so widely that the discrepancy model was still used for identifying SLD. As of 2011 only 13 states used RTI instead of the discrepancy model to identify students with SLD (Zirkel, 2011). Vaughn and Fuchs (2006) shared that the use of the discrepancy model was arbitrary and not valid. Hauerwas, Brown, and Scott (2013) confirmed that even though many RTI resources are available, there did not seem to be a clear definition of which specific RTI data collection and analysis processes should be used by the RTI team to determine eligibility for SLD.

One challenge of using student responsiveness to intervention to determine eligibility for SLD services is ensuring that the path to determining eligibility is consistent for all students (Balu et al., 2015). Griffiths, Parsons, Burns, VanDerHeyden, and Tilly (2007) shared that a great deal of fidelity and uniformity is needed across RTI programs in both instruction and testing to ensure that eligibility for SLD services remains the same for students in different schools. Tackett (2009) purported that without using the same criteria to determine eligibility, students may qualify for services at one school and not another, which would make it difficult to ensure students receive interventions as they move from one school to another.

Special education eligibility determines the types of modifications given on standardized tests. Hauerwas et al. (2013) explained that RTI could replace or supplement standardized tests as a part of the eligibility determination process for students with Specific Learning Disabilities. Due to this fidelity of implementation is highly important. Hauerwas et al. also reasoned that

modifications to curriculum delivery, screeners, and decision rules within RTI can alter the reliability and validity of the intervention in the same way that modifications alter the results of standardized tests. Thus, it is imperative that we routinely assess the fidelity of implementation of RTI instruction and structural components to ensure that they are in alignment with state and federal requirements and standard enough to contribute to SLD eligibility determinations in a fair way across school systems and states.

VanDerHeyden (2011) outlined several specific steps systems can take to ensure the alignment and fidelity of testing to determine eligibility for SLD. These steps include considering the sensitivity and predictive power of the tests, measuring the cost to benefit ratio for various assessments, relying on cut scores rather than more subjective measures, and logging the predictions of clinicians to find out the predictive validity of their hunches in relation to posttest scores.

Using the Discrepancy Model to Determine SLD Eligibility

There is much debate about the use of an RTI model to diagnose SLD instead of the previous discrepancy model between a student's IQ and performance (Kavale, Kauffman, Bachmeier, & LeFever, 2008; McKenzie, 2009; Reutenbach, 2008; VanDerHeyden, Witt, & Gilbertson, 2007). Kirk introduced the term "learning disability" in 1962 to describe children who were experiencing significant and unexplained underachievement in one or more academic areas despite normal intelligence measured by an IQ test (Drame & Xu, 2008). Specific Learning Disabilites (SLD) can be identified as a deficit in one of the following academic areas: oral expression, listening comprehension, basic reading, reading fluency, reading comprehension, math calculation, math problem solving, or written expression (Drame & Xu, 2008; Murakami-

Ramalho & Wilcox, 2011). In 1977 the U.S. Office of Education made the discrepancy between IQ and performance the primary criteria for diagnosing SLD. Since then the number of SLD students increased 200% (Berkeley et al., 2009; Vaughn, Linan-Thompson, & Hickman, 2003).

There have been some challenges with SLD identification throughout the years. Barnett et al. (2009) asserted that special education decision-making processes have been plagued with problems including the lack of validity and reliability of decisions that led to disability categories. Drame and Xu (2008) confirmed this explaining that one problem with using the discrepancy model to identify SLD was the need to wait until a there was a large enough gap between IQ and achievement before receiving help. This process can take years. Berkeley et al. (2009) reiterated this problem and proposed that the discrepancy model has created a "wait to fail" attitude in which students are left to struggle until the upper grades when their achievement gap has grown large enough to warrant eligibility for special education services. Another argument against the discrepancy model is that it contributes to over-identification or under-identification of minority groups in special education due to biased referral and assessment (Drame & Xu, 2008). Perhaps the most serious indictment against traditional special education classification procedures is that these procedures have failed to produce increased social and academic outcomes for at-risk children (Barnett et al., 2004). Therefore, research has shown that the discrepancy model has failed to adequately identify and intervene for students early enough to help them close their achievement gaps.

Using RTI to Determine SLD Eligibility

State and federal policy in 2014 required the use of RTI to identify students with Specific Learning Disabilities (Tennessee Department of Education, 2013). Work by Barnett et al. (2004)

supported this by suggesting that we identify students for special education based on structured, data-based problem solving and flexible service delivery models in which we progress monitor students in both intervention groups and their classrooms. Barnett et al. also found that the RTI process can help educators judge a child's least restrictive environment in a valid manner. However, Berkeley et al. (2009) criticized using the RTI process to identify SLD because, without the results of an IQ test, educators might label slow learners as SLD and they could not factor out other disability categories such as mental retardation, behavioral disorders, or ADHD. Drame and Xu (2008) were concerned that current RTI practices might be limited in their application to culturally and linguistically diverse students.

Using RTI to Reduce Numbers in Special Education

Ultimately the purpose of RTI is not to identify students with Specific Learning Disabilities for special education. Ikeda (2012) purported that sorting kids through tiers to identify SLD kids is not the purpose of RTI and neither is solving problems for all kids without consideration of their disability status. After all, there are many goals of RTI, and those vary by the needs of the schools and the students that are served (Monaghan, 2011).

One of the purposes of RTI is to help students grow so they do not need special education services. Hughes and Dexter (2011) found that only a few studies showed slight decreases in special education numbers while most special education rolls remained fairly constant. However, Denton et al. (2006) found that as many as 40% of the students in the RTI programs they studied were able to leave special education and return to the general education population. The programs studied by Denton et al. used Lindamood-Bell intervention strategies. This is especially pertinent to this research study, as many of the strategies used in the LEAD program

are based on Lindamood-Bell techniques. A preponderance of research shows that Response to Intervention programs are helping students catch up. The scientific literature shows that reading difficulties of a large majority of pupils can be prevented if students are given intensive interventions early (Gersten, & Dimino, 2006; Healy, Vanderwood, & Edelston, 2005; Justice, 2006; Vellutino, Scanlon, Sipay, Small, & Fanuele, 2006).

Closing Achievement Gaps in Special Populations

Drame and Xu (2008) expressed the ongoing difficulties many of our school systems have closing achievement gaps for economically disadvantaged students, minority groups, and English Language Learners. Abbott and Wills (2012) reported that within an RTI system, 80% of students are expected to meet academic expectations with 20% of the student body requiring intervention. However, the reality for urban schools or those in high-poverty areas is much different. Abbott and Wills reported that only 17% of fourth-grade students and 15% of eighth grade students who qualify for free and reduced lunch were proficient or better in reading on the 2009 National Assessment of Educational Progress. Prior to RTI implementation schools in the system being studied that had more than 90% free and reduced lunch rates and had RTI programs that served between 50%-75% of the school. This makes Tennessee's three tiered RTI triangle (see Appendix B) look more like a rectangle (Tennessee Department of Education, 2013). Abbott and Wills (2012) contended that when more than 20% of students are below academic expectations resources become strained. In this situation finding resources to provide the explicit, intensive, systematic, and persistent literacy intervention and monitoring for those who struggle can be challenging. Although RTI programs are one of the best ways to provide excellent educational opportunities for students living in poverty, the strain on resources at high poverty

schools is often more than schools alone can provide. Fortunately, after a few years of RTI intervention, many students in this program had their needs met and were able to return to the classroom, thereby reducing the numbers served to those that more closely matched state recommendations. In systems that have a high percentage of failing students systems may need to look at improving Tier 1 instruction, trying to find additional funding to implement larger RTI programs, or using temporarily using local norms to reduce numbers within their programs.

In the past there has been a great deal of controversy surrounding the seemingly disproportionate representation of African-American students in special education programs. Murakami-Ramalho and Wilcox (2011) documented:

> In an increasingly ethnically-diverse society, such as the USA, the over-identification of students due to biases related to racial, cultural, and language background has been reported (Linan-Thompson et al., 2007). The number of children identified for special education services decades later after the IDEA amendment, are high and may include biases, especially for those from linguistically diverse groups. After millions of dollars have been spent to alleviate educational inequalities, blacks and minorities are still overrepresented in the referral and special education process. (p. 485)

This over-representation has been documented throughout the years. Proctor, Graves, and Esch (2012) reasoned that this controversy stems from perceptions that standardized measures of intelligence, which are often used to help determine students' eligibility for special education services, are biased toward African-Americans, and the use of these measures contributes to the disproportionate representation of African Americans in special education. SLD diagnoses are the most common in special education. Murukami-Ramalho and Wilcox (2012) proposed that bypassing intelligence tests that are potentially biased could reduce over-representation of African-American students in special education programs. As an additional safeguard to reduce minority over-representation in special education, Drame and Xu (2008) proposed that schools first evaluate patterns of special education prevalence by specific demographic characteristics,

such as socioeconomic status, cultural and linguistic diversity, and staffing and administrative qualifications and characteristics to reduce the over and under-representation of linguistically diverse students in RTI programs and special education programs.

Ensuring mastery of the English language for all students, including our English Language Learners (ELL), is a top priority in our schools. Research suggests that RTI programs can help ELL reach this goal. In a study of first grade ELL at a school who scored low on DIBELS tests, Healy (2007) found that after tiered intervention all of the students attained mastery of reading concepts; some met their reading goals after 12 weeks and others needed 25 weeks, but all met their goal after tiered intervention. The students in the Healy study were not only English Language Learners but also attended a school with 100% poverty rate, thereby including them in multiple at-risk categories. Vaughn et al. (2006) found that ELLs who received small group instruction for 50 minutes a day in groups of three to five students in the areas of phonemic awareness, letter knowledge, decoding, and comprehension made statistically significant gains compared to their ELL peers in the control group.

Components of Effective RTI Frameworks

To determine the effectiveness of an RTI program we must first look to effective intervention programs of the past and determine which components made those programs successful. Swanson et al. (2012) explained that RTI frameworks must include high-quality classroom instruction paired with universal screening procedures to identify students with academic difficulties; secondary intervention that includes a standard, research-based treatment paired with progress monitoring; and tertiary intervention that is highly intensive and tailored to individual student needs. RTI researchers explained that the essential requirements of the federal

RTI model are (1) to put into place Tiers I, II, and III that provide high quality instruction that increases in intensity and decreases in numbers throughout the tiers; (2) to use universal screeners and frequent progress monitoring to determine the extent of student growth; (3) to have procedures in place to determine the extent to which these interventions are being implemented with fidelity; and (4) to have teams of knowledgeable educators meet frequently to make decisions about placement and instruction within these tiers based on the data collected (Denton et al., 2006; Gettinger & Stoiber, 2008; Jenkins, Schiller, Blackorby, Thayer, & Tilly, 2013; Powers & Mandal, 2011; Sanger, Freidli, Brunken, Snow, & Ritzman, 2012).

This basic framework was in place in each effective RTI program throughout the literature. The studies show that effective RTI programs include high quality, research-based, core instruction in Tier I and intensive small group programs for at-risk students in Tier II. Tier III programs are highly intensive, explicit, and systematic interventions for a few students who have severe academic deficits. Students at each of the tiers should receive high-quality instruction that is differentiated to meet their individual needs and monitored for fidelity (Bender & Shores, 2007; Cusumano & Mueller, 2007; Daly, Martens, Barnett, Witt, & Olson, 2007; McKenzie, 2009; Reutenbach, 2008). Differentiation for individual student need was a key component in successful RTI programs.

Adding to this framework, researchers (e.g. Gettinger & Stoiber, 2008; Hughes & Dexter, 2011; Morris et al., 2000) have found several characteristics common to the best RTI programs. These characteristics include the federal RTI requirements but also add collaborative planning and problem solving, teacher commitment, administrative support, and ongoing professional development to the components needed to create a successful RTI program. Ongoing coaching and modeling by reading specialists, reading teachers, program consultants, or district leaders

were cited as an important part of improving learning throughout the tiers (Denton et al., 2006; Hughes & Dexter, 2011; Meltzer, 2002; Morris et al., 2000; Stuart & Rinaldi, 2009).

The Three Tiers

The Response to Intervention model requires that students receive a multi-tiered approach to instruction based upon individual need that is responsive to change as the students' needs shift. The instruction within all tiers should be research-based and rigorous. Strong instruction benefits students at all levels and makes schools more effective. The intensity and amount of time spent in instruction should rise among the tiers as the needs of the students grow. The number of students served in each tier should decline as the intensity of instruction rises (Tennessee Department of Education, 2013). Adelman and Taylor (2011) reiterated the need for the number of students in groups to decline as the interventions become increasingly intense. They also suggested that one way to understand the three tiers is to consider the purpose of each tier in an interrelated continuum of overlapping intervention subsystems that promote student growth and prevent problems, respond to academic problems as early as possible, and treat severe, chronic, academic issues. Perhaps the easiest way to conceptualize the relationships of the three tiers used in RTI is by looking at the Tennessee RTI triangle in which it becomes clear that Tier 1, or core instruction given to all students in the classroom, is designed to meet the needs of 80% of students, Tier 2, or secondary intervention, is an intensive 30-45 minute group designed to meet the need of 5%-10% of students, and Tier 3, or tertiary intervention, is a highly intensive 45-60 minute group designed to meet the needs of 3%-5% of students (Tennessee Department of Education, 2013). This is the model used to design the program studied for this research. (See Appendix B for RTI triangle).

Tier 1. Many schools that are dealing with large numbers in RTI have a Tier 1 problem. According to the National Assessment of Educational Progress, 34% of fourth-grade students have below basic levels of achievement in reading (Ritchey, Silverman, Montanaro, Speece, & Schatschneider, 2012). Jenkins et al. (2013) suggested schools build a strong, high-quality, research-based core curriculum in Tier 1 prior to creating an RTI program to reduce the need for tiered instruction.

Several authors (e.g. Berkeley et al., 2009; Jenkins et al., 2013; Justice, 2006; Sanger et al., 2012) remarked that the push to increase the quality of core curricular instruction in Tier I will benefit our schools and that classrooms that differentiate instruction within Tier I get better results. They also suggested that all students should partake in high quality, core instruction that is of sufficient quality and rigor that most students will have their needs met in the classroom.

According to RTI requirements all students should engage in high quality Tier 1 instruction and be assessed with universal screeners that are nationally norm referenced, give percentile scores, and are sensitive to a rate of improvement in each domain of Reading and Math (Tennessee Department of Education, 2013). Powers and Mandal (2011) explained that most students make adequate progress when provided with a rigorous core curriculum and that those who do not should receive increasingly targeted and intensive interventions provided by professionals with greater expertise working with students who struggle. Berkeley et al. (2009) explained that RTI programs that include a strong core curriculum can be used to predict at-risk students and intervene with them earlier than RTI programs with weak classroom instruction. Hill, King, Lemons, and Partanen (2012) explained that schools that have poor Tier I instruction have higher numbers of students in Tier II. Research indicates that Tier 1, often referred to as the

preventive tier, includes both whole-group instruction and universal screening that takes place in the general education classroom and typically meets the needs of 80% of students (Berkeley et al., 2009; Fuchs & Fuchs, 2007; Tennessee Department of Education, 2013).

Tier 2. Students who score between the 11th through the 25th percentile on the universal screeners receive additional instruction in Tier 2. The RTI framework in Tennessee suggests that 80%-85% of students should succeed in Tier I, while only 10%-15% should fall into the Tier II category (Tennessee Department of Education, 2013). The National Center on Response to Intervention (2010) refers to Tier II as the secondary level of prevention used to address the challenges of most at-risk students. Berkeley et al. (2009) explained that Tier 2 serves around 15% of students in intensive research-based interventions with progress monitoring. Tier 2 is referred to as the *secondary intervention tier* and is given in addition to the primary instruction received by all students in Tier 1.

Tier 3. According to the Tennessee Department of Education (2013), the third tier, sometimes called *tertiary intervention,* should be the most intensive intervention within RTI. These small groups provide approximately 5% of students with highly intensive instruction targeted to their individual areas of need (Berkeley et al., 2009). Fewer students are served in Tier III, but they are given interventions that are highly individualized and intense, often by interventionists who are highly trained in how to meet the needs of the most severely struggling students. The Tennessee Department of Education (2013) recommends that Tier III groups are comprised of three to five students who have either fallen below the 10th percentile on universal

screeners or are more than 1 ½-2 years behind grade level. They recommend that only 3%-5% of students are served in Tier III.

Movement within tiers and data points. RTI research calls for increasing intensity, increasing amount of time, and decreasing numbers of students as intervention students move from Tiers II to III (Daly et al., 2007; McKenzie, 2009; Reutenbach, 2008; Scholin & Burns, 2012; Tunmer, 2007). Ideally, students in Tier II will have their needs met and get to return to normal classroom instruction in Tier 1. However, if students do not grow in Tier II, they will move into Tier III. Kratochwill, Volpiansky, Clements, and Ball (2007) explained that the combination of systematic progress monitoring and the student's response to a given level of intervention determines movement across tiers. The decisions the team makes regarding whether students are ready to move to a more intense or less intense intervention are based on student data. The nature of this movement through the tiers is a flexible, dynamic process that changes based on the changing needs of the students, which is why frequent collaborative meetings are needed to determine whether the current forms of intervention are working or not.

In summation, student movement through the tiers is flexible, multidirectional, and based on individual student progress or lack thereof. The intensity of instruction increases as the level of tiers increase. Barnett et al. (2004) described intervention intensity as an increase of time, effort, resources, or use of strategies that are difficult to achieve in a typical classroom, which makes intervention necessary. Barnett et al. also proposed that due to the nature of the design of increasing or decreasing intensity in assessment and instruction based on student growth; RTI could be used not only to determine the least restrictive environment needed by a student to achieve success, but also which instructional strategies are the least intrusive and most efficient.

Data Based Decision Making

Another hallmark of effective RTI programs is the frequent review of data from progress monitoring assessments, universal screeners, and fidelity reports by a group of stakeholders interested in the success of each individual child (Daly et al., 2007; McKenzie, 2009; Nellis, 2012; Reutenbach, 2008; Scholin & Burns, 2012). Fidelity reports and progress monitoring assessments were analyzed to ascertain the relationship between student growth and fidelity of implementation. These items form a great deal of the data analyzed by RTI teams to make decisions about changes to instruction within intervention and ultimately movement throughout the tiers. School-based RTI teams form professional learning communities that make decisions about the nature and intensity of each student's services. Students who grow within Tiers II and III have the opportunity to return to a less-intense tier as they move closer to grade level. Students who do not grow within Tiers II and III may be referred to special education to be considered for a diagnosis of Specific Learning Disability (SLD). This relationship between the data and the collaborative teams was confirmed by Abbott and Wills (2012) when they argued that teams should:

> Own the data. The data are what drives an RTI system. The RTI reading team members need to embrace all aspects of data collection and use. Data collection procedures should fit well within the school's unique environment, and most important, the RTI reading team should embrace and use the data to guide practice and intervention. (p. 43)

Data based decision making that includes data analysis, collaborative teaming, and problem solving about how to provide the best intensive, differentiated instruction for each student is an essential component of RTI (Tennessee Department of Education, 2013).

Collaborative Problem Solving and Planning

Collaboration was a theme that emerged across the research of successful RTI programs. Stuart et al. (2011) found a multidimensional collaborative planning model embedded into the process of successful RTI programs. This included weekly planning time given to individuals, grade levels, and school level members to work together. Flexible scheduling also provided additional time for two teachers per grade level to participate on vertical teams where members of varying grade levels met to discuss how concepts taught flow throughout the grades. In addition to collaborative meetings, professional development opportunities were given by experts in the new instructional strategies. Stuart et al. also found that effective RTI models included frequent meetings of teachers from various disciplines in which they planned and refined interventions, reflected on instruction and progress monitoring, and solved problems for students who were not growing. This type of collaboration and on-going professional development is a hallmark of successful RTI programs. The RTI program in this study held collaborative meetings monthly, more often if needed.

In addition to cross curricular teaming and planning, open and frequent communication among administrators, RTI program leaders, and teachers can strengthen RTI programs. Open communication can form the foundation for the teacher commitment and administrative support needed to help programs excel. Frequent, open communication can also make problem-solving and planning easier. Abbott and Wills (2012) suggested we involve every possible staff member at the school to help students in intervention programs improve academic outcomes.

Stakeholder involvement and meetings. To be successful, RTI programs must have support at the school and district level in the form of teacher commitment, strong leadership,

instructional coaching, ongoing professional development, and effective management of physical, human, and fiscal resources (Kavale et al., 2008; Reutenbach, 2008; Shinn, 2007; Tunmer, 2007; VanDerHeyden et al., 2007). Administrators who support RTI carefully allocate time, money, space, and personnel to benefit the students in intervention programs.

Response to Intervention programs are district-wide initiatives aimed at helping students improve their academic outcomes. As such, they need support from teachers, parents, students, administrators, and other stakeholders at each school to be successful. System-wide educational initiatives are more successful when school systems create them with input and support from the teachers and administrators implementing the changes. Teacher and administrator commitment were listed as key components of effective RTI programs. Teacher commitment was evidenced in educators' willingness to participate in ongoing professional development activities and data teams (Cusumano & Mueller, 2007; Gilbertson, Witt, LaFleur, Singletary, & VanDerHeyden, 2007; Reutenbach, 2008). Schools in which teachers were supported with ongoing, job-embedded professional development by academic coaches, consultants, or specialists saw the greatest level of fidelity of implementation in their RTI programs (Cusumano & Mueller, 2007; Gilbertson et al., 2007; Reutenbach, 2008). For example, Cusumano and Mueller (2007) expressed that students showed exemplary growth at the schools in which their teachers participated in reflective coaching with specialists, district workshops were provided for each program, book studies were available to help teachers improve student learning, ongoing professional learning communities were embedded in school structures, and horizontal and vertical data teaming were expected parts of teaching responsibilities.

Monthly RTI meetings: people involved. Collaborative teaming is an important and required part of RTI programs. In Tennessee, an RTI team is required to meet every 4 ½ weeks to discuss the progress of each child in Tiers II or III (Tennessee Department of Education, 2013). There is some debate about who should engage in the monthly meetings to problem solve for the intervention students. Barnett et al. (2004) asserted that the people who are analyzing the amount of effort and intensity required to accelerate the student's progress should be knowledgeable about the child and the available resources in that school. Abbott and Wills (2012) indicated that the team should be made up of the teachers, administrators, and paraprofessional staff who are involved in the instruction and the intervention. Other researchers agreed that these decision-making teams should consist of teachers and administrators, but added school psychologists and parents into the process (Bender & Shores, 2007; Berkeley et al., 2009; Fuchs et al., 2003).

Monthly RTI meetings: activities and time involved. The RTI program studied held official meetings every month in compliance with the state RTI requirements (Tennessee Department of Education, 2013). Frequent changes need to be made to student instruction within intervention to ensure that students continue to progress at an accelerated rate to catch up with their typically developing peers. Monthly collaborative meetings are required in state and federal RTI policy (Tennessee Department of Education, 2013). However, in the RTI program studied, this type of data-based decision making and problem solving occurs at each school many times each day by the system RTI coach, the school RTI coordinators, and the interventionists working with the students.

The literature confirms the need for ongoing problem-solving and data-based decision making within RTI programs. Researchers suggested that monthly RTI team meetings follow a cyclical process in which the team defines problems, plans and implements interventions to solve those problems, and evaluates student progress to see if those interventions are working and to further refine them (Bender & Shores, 2007; Berkeley et al., 2009; Fuchs et al., 2003). The overall purpose of RTI meetings, whether they were held weekly, monthly, or on an as-needed basis, was to discuss individual progress within interventions and refine instructional practices to accelerate that progress (Abbott & Wills, 2012). According to Abbott and Wills (2012) as the meetings evolved, the collaborative teams began to take on new responsibilities outside the intervention process in the schools. Abbott and Wills also found that as the teams analyzed the data, they began to shoulder the responsibility for deciding which assessments, instructional practices, schedules, and staff would best be used to improve academic outcomes for not only students within RTI, but also to improve classroom instruction. Therefore, what started as frequent data analyses designed to help struggling students grow in intervention became a collaborative, problem-solving model for overall school improvement. Barnett et al. (2004) added that according to the IDEA mandates, team judgements about service needs are the final arbiters for making special education decisions that could address the failure of traditional decision-making models for special education decisions brought forth by the President's Commission on Excellence in Special Education. These data teams, whether used to improve instruction within special education programs, the growth of individual students in intervention programs, or to promote widespread changes within Tier 1 instruction, are powerful tools for positive change in our schools.

Data Collection in RTI

One of the hallmarks of an RTI program is that the interventions and decisions are guided by a great deal of student data. Martinez and Young (2011) suggested we identify students early and assess them frequently. In Tennessee, it is required that RTI students be assessed every 5 to 10 days with progress monitoring assessments (Tennessee Department of Education, 2013). Balancing the need for progress monitoring data and the need for instructional time is a school team decision in Tennessee as long as testing occurs within a 10-day period. (Tennessee Department of Education, 2013). During the year this study was conducted all schools gave progress monitoring tests on the 10th day of instruction and official team meetings were held monthly after the second set of progress monitoring had been recorded to determine student growth.

In addition to traditional, standardized, nationally-normed progress monitoring tests, it is important to keep anecdotal formative data to ensure that daily instruction is targeted to individual student need. The interventionists in this study kept daily notes of student progress and individual student errors so they could address individual student misconceptions in subsequent lessons. This instructional record provided interventionists and RTI teams with the information they needed to assist the students and modify instruction on a daily basis. Martinez and Young (2011) asked RTI instructors whether RTI takes up too much time. The majority of respondents disagreed that RTI takes up too much time. The respondents left many comments that the overall RTI process was worth the time, but the paperwork and progress monitoring components were exceedingly time consuming. One teacher in this study explained, "It's hard to get it all done in a school day. The paperwork, the (RTI) documentation… it's been very trying this year. It's hard to manage, but we get it done" (Martinez & Young, 2011). Swanson et al.

(2012) reiterated this point when they explained that RTI processes and paperwork strained the time and resources that could be used to address students' needs earlier and more effectively.

Using data to differentiate placement and procedures. One of the responsibilities of RTI teams is to analyze the data and determine the timing, placement, and content of instruction used to accelerate student growth in RTI. Abbott and Wills (2012) studied the progress of students as they participated in a set of research-based interventions and found that as second-grade students improved their decoding and vocabulary skills, their intervention focus moved away from basic decoding skills toward fluency instruction. As they progressed through the intervention this required a change in instructional programming from using Early Intervention in Reading to using Read Naturally. The move from one program to another required the intervention instructors to be skilled in both programs and to closely monitor student progress to ascertain when this switch was needed. However, Abbott and Wills found that the students grew more and the intervention teachers became skilled in both programs, which added to the flexibility of services available to students.

Research Based Interventions

In Tennessee RTI programs must use scientifically validated, evidence based instructional practices (Tennessee Department of Education, 2013). This is common across the nation now that federal RTI policy is in place. Berkeley et al. (2009) reported that 93.3% of states made specific reference to using research-based intervention programs. Some states determined their research-based interventions through problem solving teams, while other states predetermine a list of research-based interventions approved for use with students of similar

academic needs (Berkeley et al.). The Tennessee RTI Framework incorporates both strategies by providing a rubric to determine whether or not individual intervention programs meet state criteria for being scientifically research based, peer reviewed, systematic, and explicit (Tennessee Department of Education, 2013). Kratochwill et al. (2007) maintained that the limited number of evidence-based interventions available created a challenge for those trying to implement RTI programs.

Research-based literacy instruction. Providing excellent instruction in each of the five core components of reading was a hallmark of effective RTI literacy programs throughout the literature (Denton et al.., 2006; Gettinger & Stoiber, 2008; Hughes & Dexter, 2011; Justice, 2006). The five components of literacy instruction that spanned the research were phonics, phonemic awareness, fluency, vocabulary, and comprehension (Linan-Thompson, Cirino, & Vaughn, 2007; Morris, Tyner, & Perney, 2000; Swanson et al., 2012). Each component was addressed differently in each program, but all were present. Swanson et al. (2012) explained each of the five components of reading in detail. They shared that phonemic awareness strategies that involve manipulating phonemes within spoken words are highly effective. They also stated that systematic phonics instruction improves decoding and that fluency instruction needs to include guided, repeated reading with feedback. Word recognition activities were mentioned. They suggested that vocabulary needs to be taught both directly and indirectly with repetition and multiple exposures and that comprehension instruction needs to include seven components. The seven components of comprehension instruction mentioned are comprehension monitoring, cooperative learning, graphic organizers, question answering, question generation, focus on story structure, and summarization (Swanson, 2012). Metzler (2002) also mentioned the importance of

using questioning to teach thinking strategies to improve cognition while improving reading skills.

When Abbott and Wills (2012) studied research-based interventions being implemented in kindergarten, they found that at the end of the first year of intervention, when teachers only wanted to focus on social-emotional growth, only 8% of the students met the benchmark. At the end of Year 2, when teachers allowed paraprofessionals to work with their students on the reading strategies listed above, 24% were at benchmark. As they continues to implement the reading strategies listed above, 38% of the students met benchmark by the end of Year 3, and by the end of the fourth school year, 55% met benchmark (Abbott & Willis). It was more difficult to find research about RTI implementation in secondary schools. Berkeley et al. (2009) asserted that most of the RTI research has targeted early childhood and that little empirical evidence suggests that RTI is appropriate for students in secondary schools. Abbott and Wills (2012) contended that implementing mastery learning, appropriate error correction, frequent opportunities for student response and feedback, and increased reading time were effective at all ages. Kimmel (2008) found that 80%-90% of students met growth criteria in reading and math after being provided with reading and math intervention that included modeling, guided practice, and independent practice. Results of a study by O'Conner, Fulmer, Harty, and Bell (2005) indicated that kindergarten and first grade students who participated in tiered intervention that included explicit instruction in blending phonemes progressed in their reading skills more significantly than those who did not receive tiered intervention. Each of these strategies is used in the RTI program being studied.

Testing in RTI: Universal Screening and Progress Monitoring

The effectiveness of instruction in RTI programs can be determined in many ways using many different assessments. The two major forms of assessments required by federal RTI policy are universal screening and progress monitoring (Tennessee Department of Education, 2013). Universal screening is the first step used to identify at-risk students. Hughes and Dexter (2011) described universal screening as an assessment in which all students are screened in one or more academic area. Those identified as at risk for learning difficulties are provided additional evidence-based intervention and progress monitoring in that area. Progress monitoring is an ongoing assessment given to students in Tiers II and III to determine whether they need to stay in their current intervention, return to the classroom, or be considered for special education. Progress monitoring assessments are given frequently and are used to assist with lesson planning as well as placement. The frequency of universal screening and progress monitoring is fairly uniform across the nation. Berkeley et al. (2009) reported that most states require universal screening three times per year and progress monitoring two to four times per month in Tiers II and III. In Tennessee universal screening takes place three times a year in elementary schools, and the results are used to determine placement in Tiers II and III as well as to guide instruction (Tennessee Department of Education, 2013).

Screening instruments. There are many different universal screeners available across the nation. The state and federal RTI models state that the best way to ensure that screeners are indeed universal is to require that the tests have been nationally norm referenced and use percentile rankings (Tennessee Department of Education, 2013). This can add a measure of uniformity to universal screening and progress monitoring procedures across the nation.

The literature emphasized both the DIBELS and AIMSweb tests are appropriate measures to determine student needs in intervention and future reading success (Abbott & Wills, 2012; Barnett et al., 2004). Barnett et al. highlighted work by Fuchs and Fuchs, (1986), Shinn and Bamonto, (1998), and Shapiro and Kratochwill, (2000) that reported curriculum-based measurements have been successfully used throughout the years as basic methods for examining readiness for general education and targeting interventions for students with academic problems. One of these tests, the DIBELS, includes a benchmark score that has a predictive value of future student success in reading and is used to delineate which students need intervention (Abbott & Wills, 2012).

Fidelity of Implementation

Another way to determine the effectiveness of RTI programs and appropriate placement within interventions is to conduct fidelity checks. Fidelity checks are walkthrough-style observations used to determine the degree to which interventionists are implementing the RTI program as designed (Drury & Walter, 2014). Ensuring fidelity of implementation across multiple schools and school systems is both essential and difficult for RTI practitioners. Keller-Margulis (2012) argued that fidelity of implementation often receives less attention than other elements of RTI, but it is more important because student growth on progress monitoring tests may be hard to interpret if the intervention was not evaluated for the recommended frequency, duration, and intensity of instruction. Bianco (2010) stated that assuring fidelity of implementation, or the delivery of instruction in the way it was intended to be delivered, is probably the most challenging goal of districts. Berkeley et al. (2009) concurred that while fidelity of implementation is critical to the integrity of the RTI process, it is difficult to address

and most state models do not have clear fidelity monitoring requirements. RTI programs in Tennessee are required to monitor fidelity frequently throughout each cycle of intervention to ensure the use of research-based instruction (Tennessee Department of Education, 2013). If interventionists modify instruction significantly, the activities used in RTI programs may no longer fall under the auspices of the original research that made that intervention research-based. This could result in programs becoming less effective and not complying with the research-based criteria needed for state approval (Tennessee Department of Education, 2013).

Several studies discussed which criteria should be considered during fidelity monitoring. Abbott and Wills (2012) argued that it is important to properly train those doing fidelity checks to ensure reliability; they also advised RTI teams to create a methodology for data collection within fidelity monitoring to ensure that the critical components of instruction were being implemented effectively in classrooms and intervention groups. Keller-Margulis (2012) asserted that fidelity checks should include both direct and indirect measures of implementation from multiple informants. They also proposed that monitoring needed to take place periodically in both expected and unexpected visits to get an accurate view of what is taking place in RTI groups and enable the team to collect data that reflected true implementation of the duration and intensity of the intervention provide; doing so would help the team determine the actual duration, frequency, and intensity of intervention the student needs to grow. While differentiating instruction to target student need and implementing intervention programs with fidelity may seem at odds, when the fidelity form used to monitor implementation includes several sections about differentiation, targeting individual needs through lesson planning, providing individualized feedback, and using appropriate questioning to correct student misconceptions, fidelity monitoring can be combined with differentiation to help students grow without limiting

their instruction to fidelity to a specific instructional program (See Fidelity Report in Appendix A).

Throughout the literature the importance of monitoring the fidelity of Tier I classroom instruction became apparent. Hill et al. (2012) suggested that it is hard to evaluate the effect of intervention programs without information about the quality of Tier I instruction because students who did not grow in a classroom that provided low-quality Tier I instruction would be inherently easier to "remediate" than students who were not responding to high-quality Tier I instruction. Drame and Xu (2008) added that the impact of community, school, classroom, and teacher factors at each tier of instruction should be taken into account when evaluating student achievement in instruction and intervention. Thus, fidelity monitoring should take place at all tiers of instruction and intervention to help determine the best ways to help struggling students grow. If Tier I instruction is lacking, it should be improved first to help students grow prior to needing intervention.

As instructional leaders at their schools, administrators and academic coaches are uniquely qualified to help teachers and interventionists refine instruction at each tier. As such, administrators and academic coaches are often used to provide fidelity monitoring. Several suggestions were made throughout the literature as to who should monitor fidelity. Abbott and Wills (2012) suggested that teams have administrators or academic coaches conduct fidelity checks because some teachers with excellent teacher effectiveness scores may have difficulty following intervention protocols that ensure fidelity and that findings of fidelity checks should be used to drive future professional development and implementation plans. Several programs studied suggested the use of academic coaches or consultants, tracking forms, frequent observations, and progress monitoring to ensure the fidelity of the programs (Abbott & Wills,

2012; Bianco, 2010). Fidelity monitoring is an important part of refining and improving RTI programs and classroom instruction.

Administrative Support

Administrators have the ability to support teachers and interventionists throughout the RTI process. Much of the research cited administrative support as an important factor in RTI success (Gilbertson et al., 2007; Kavale et al., 2008; O'Conner & Witter-Freeman, 2012; Reutenbach, 2008; VanDerHeyden, Witt, & Barnett, 2005; Wexler, Vaughn, Edmonds, & Reutenbach, 2008). One of the most important roles administrators have in RTI programs is to ensure the fidelity of the program by doing frequent fidelity checks and giving specific corrective feedback to the stakeholders involved. Gilbertson et al. (2007) noted that it is essential for those giving feedback after fidelity checks to be very specific and offer detailed corrective feedback. Teachers and interventionists are often more willing to receive this type of feedback from the instructional leaders of their schools than outside personnel. Gilbertson et al. found that only 40% of teachers increased their fidelity of RTI implementation after being asked how the interventions were going, but 60% improved their practice after receiving modeling and specific feedback about their performance. This type of feedback often means more coming from administrators, but it may also come from academic coaches, consultants, or reading specialists who are experts in the interventions being used (Cusumano & Mueller, 2007).

Providing funding. Fidelity monitoring is just one of the ways administrators can support the implementation of RTI programs. In addition to providing specific feedback to instructors, administrators can support RTI by helping schools access resources needed to make programs

run smoothly. For example, administrators allocate the funding needed to hire academic coaches, specialists, and high quality interventionists to run programs and provide interventions. VanDerHeyden et al. (2007) revealed that evidence-based interventions can markedly decrease the need for special education services when implemented with a high degree of fidelity by someone highly trained and paid to provide interventions. Finding the money to pay for highly trained specialists to work with students can be a challenge with our current budgets, especially because Tennessee RTI mandates come without any state funding to back them (Tennessee Department of Education, 2013). McKenzie (2009) raised questions about the supply and quality of interventionists providing RTI programs in our schools. It is challenging to find funding to procure high quality instructors for our students who need them the most. Thus, administrators are in a unique position to either procure funding to either hire specialists to provide the intervention or to provide professional development opportunities that improve interventionists' ability to help students grow. Both of these options can be a challenge.

Personnel decisions. Abbott and Wills (2012) stated that many schools across the nation find themselves in a situation where the personnel capacity is grossly outweighed by student need for intervention. For example, in schools where most of the students were not performing at benchmark levels, Abbott and Wills found that schools had classroom teachers assume intervention responsibilities in order to maximize the number of students receiving highly-structured small group interventions as quickly as possible. Ikeda (2012) argued that while schools want to implement practices that benefit students as quickly as possible using resources they already possess, classroom teachers may not have the skills they need to deliver instruction that is differentiated beyond accommodations in the school setting.

Balancing the need for a high-quality Tier I program with highly-intensive interventions can stress both fiscal and human resources in schools. To deal with this issue the skill and experience of interventionists across the nation vary widely based on the available resources. Berkeley et al. (2009) disclosed that in Utah and Virginia, Tier 2 instruction is provided by the classroom teacher, special education teacher, English-language-learning teacher, speech language pathologist, or another specialist; while in other states, like South Dakota, interventions can be provided by any trained staff member under the supervision of a specialist with expertise in the intervention. In elementary schools in Tennessee interventions can be provided by trained staff members under the supervision of a certified teacher and in middle and high schools, interventions must be provided by a certified teacher, though that person need not be certified at the specific grade level being taught (Tennessee Department of Education, 2013). Adelman and Taylor (2011) explained that in most schools today interventions are provided by a wide range of school employed personnel and sometimes community-based providers who work at the schools. Adelman and Taylor purport that this is due to the long-standing marginalization of student and learning supports needed to provide for students with academic issues. However, several researchers argued that schools want to implement practices that are good for struggling students, but that those students require more instruction than classrooms can provide. Therefore, every staff member becomes an essential part of the process to provide additional instruction for these students (Abbott & Wills, 2012; Ikeda, 2012).

Professional Development in RTI

Whether intervention programs use highly-qualified classroom teachers or interventionists under the supervision of an intervention expert or academic coach, professional

development opportunities are an important part of helping those who provide interventions gain the knowledge and skills needed to implement interventions effectively. Professional development was a key component of the effective RTI programs studied in the literature (Abbott & Wills, 2012; Berkeley et al., 2009; Brown-Chidsey & Steege, 2005; Ikeda, 2012; Kratochwill et al., 2007). Berkeley et al. (2009) confirmed that each state had adopted an RTI model that included a professional development component within it, although the delivery of that professional development varied widely. Kratochwill et al. (2007) pointed out that RTI was a systemic school improvement effort that required change on many levels, including improving the professional practice of educators; thus, professional development was a centerpiece of concern.

The need for professional development that improved teaching practices and student growth was evident throughout the literature. Berkeley et al. (2009) insisted that for an RTI program to succeed, classroom teachers must assume active responsibility for delivering high quality instruction of research based interventions while collaborating with special educators and related service personnel to provide supports for struggling students. However, Berkeley et al. were concerned that classroom teachers do not currently have the knowledge or skills needed to do that effectively. Kratochwill et al. (2007) asserted that effective professional development aimed at improving teacher knowledge must result in changes in student outcomes. Providing targeted professional development that help both students and teachers improve in their areas of weakness can be difficult because those weaknesses evolve over time. However, providing dynamic professional development that is targeted to individual needs is essential to the success of strong, effective RTI programs. Ikeda (2012) reasoned that schools spend an incredible amount of energy finding students who are disabled and incredibly little time supporting teachers

and teaching them how to intervene for these students once they are identified. RTI programs must support their interventionists with ongoing professional development to ensure intensive instruction and effective implementation.

Ongoing professional development activities. Much of the literature mentioned the need for ongoing professional development opportunities. Kratochwill et al. (2007) indicated that the lack of training of how to implement of evidence-based practices presented a significant challenge to RTI implementation. In fact, Kratochwill et al. found that in a sample of 104 school districts across 12 states many districts adopted research-based programs but only 19% of district coordinators indicated the schools actually implemented the research-based curriculum that was adopted. Among the reasons listed for this lack of implementation were the lack of teacher training materials and required lessons in teaching strategies needed to implement the curriculum.

To combat this problem Brown-Chidsey and Steege (2005) recommended that RTI trainings were held over several sessions and emphasize three essential elements: schedule, teacher learning outcomes, and indicators of mastery of RTI methods. In one system different teachers were sent to different RTI workshops and required to train the other teachers providing interventions. This "train the trainers" model reduced the amount of knowledge lost by interventionist turnover that plagues programs that work with at-risk students (Abbott & Wills, 2012). Ikeda (2012) suggested that strategies with known effect that teachers can implement tomorrow need to be made available and that the professionals who support the interventionists and special educators implementing these strategies need even more support.

Embedded instructional coaching and professional learning communities. Due to the demanding nature of using rigorous, intensive, research-based interventions and the dynamic nature of targeting evolving individual needs, those providing the interventions need ongoing professional development by someone with explicit knowledge of the interventions, the instructors, and the students. Kratochwill et al. (2007) asserted that research has shown that isolated training is insufficient and educators need ongoing support and training to maintain a high degree of implementation. There are many variables to consider when implementing professional development for RTI, including training on evidence-based practices that align with multi-tiered interventions. Kratochwill et al. also expressed that RTI training must include an understanding of the scheduling, collaboration, curriculum, and leadership needs that drive the programs. As RTI programs impact areas of student learning and instructional techniques used throughout the school, the professional development must be embedded with a systems-change perspective if they are to continually impact student learning.

When making widespread changes to a school system, as educators do when implementing RTI programs, understanding about the nature of creating lasting change needs to be taken into account. Fullan (2003) reported that systemic transformation of this kind takes at least 10 years to implement. Abbott and Willis (2012) confirmed that modifying complicated school environments to incorporate new research-based strategies and interventions often requires years rather than months of systematic change.

To implement systemic change that takes years, alters beliefs, and introduces new research-based practices, it is imperative that we have collaborative professional development systems in place to create the kind of community in which new strategies are welcomed, supported, and evolve over time. Wiggins and McTighe (2007) suggested that action research

and professional improvement must become an expected part of everyone's ongoing job responsibilities. Wiggins and McTighe also recommended that professional development for teachers take place at their schools as they engage in ongoing action research and study groups, which could create a source of significant long-term improvement in teaching. The data collected in RTI could be used to fuel such action research and further study into which instructional techniques and programs are working best for struggling students.

If interventionists are to engage in this type of long term, research-based, reflective, professional development, it is crucial that we provide support and guidance as to how to do that. Knight (2007) expressed that teachers need to continually try improving their teaching practices if they are to reach all students, and he found that instructional coaching was an efficient method to help teachers better instruct students with academic difficulties. Knight also affirmed that changing the way we teach requires changing habits of behavior, which is not easy. Engagement in professional learning communities in which interventionists can explore new teaching methods while surrounded by supportive, experienced colleagues and academic coaches who are experts in implementing these research-based interventions could provide the support needed to create ongoing change within RTI. Pairing the expertise of instructional coaching with the support, collaboration, reflection, and data-based decision making practices found in professional learning communities can make RTI teams stronger and RTI implementation more successful and more widespread over time.

RTI Scheduling, Frequency, and Group Size

Picking the best interventionists, supporting them with ongoing professional development, and providing the most effective research-based interventions are arguably the

most important ways administrators can help their RTI programs become effective. However, there are other administrative decisions that leaders must make to improve implementation of RTI. These include scheduling the interventions in such a way that the recommended frequency, duration, group size, and attendance in groups are maintained (Wanzek & Vaughn, 2008).

Throughout the literature the research discussed organizational details of effective RTI programs. One of these details dealt with how many students should be served in each intensive group. Several studies focused on the effectiveness and feasibility of one-on-one tutoring programs; in most cases the programs were effective but too costly for many schools to implement (Elbaum, Vaughn, Hughes, & Moody, 2000; Gettinger & Stoiber, 2008; Morris et al., 2000). Elbaum et al. (2000) studied different intervention programs to see which type of instruction was most effective, small group or one-on-one. They found that both made significant gains, providing a foundation for more students to be served at a lower cost. Most Tier II and Tier III groups consist of small groups of between 3-5 students (Elbaum et al., 2000; Jenkins et al., 2013). The Tennessee RTI Framework suggests that Tier II students in elementary schools be served in groups of fewer than six students and Tier III students be served in groups of one to four (Tennessee Department of Education, 2013).

Tennessee's RTI framework also provided recommended amounts of time for students to engage in each of the tiers. In reading classes at the elementary level students are required to receive a minimum of 90 minutes in Tier I, an additional 30 minutes in Tier II, and an additional 45-60 minutes in Tier III (Tennessee Department of Education, 2013). The time allotments for math instruction and intervention are similar. Combined, a student who needs Tier III intervention should receive around 2½ hours daily in each of these core subjects. This leaves little time for any other subject. For students who also receive ESL, Special Education, or Speech

services, scheduling can be a true challenge. Swanson et al. (2012) confirmed that scheduling was a commonly cited challenge. Some students with multiple needs are pulled out of the classroom to receive so many different services that it is difficult for teachers to schedule Tier I instruction for them. To alleviate this problem Abbott and Wills (2012) reported that one school's RTI team created an intervention block that included every available person in the school. In this study office personnel oversaw students at benchmark level as they did independent work in the library, classroom teachers remained in their room and provided interventions for struggling students, while paraprofessionals provided scripted interventions (Abbott & Wills). The intervention block format is used widely in Upper East Tennessee but not in the system being studied because it takes time and focus away from Tier I instruction. Regardless of whether interventions are provided by intervention blocks or pull-out groups, flexible scheduling of small groups and creative use of staff resources was critical to implementing effective reading interventions. Flexible, dynamic scheduling is key to creating a program that evolves with the changing needs of the students. Whether dealing with student movement through the tiers or interventionist absences, flexible schedule is imperative in RTI programs. Abbott and Wills disclosed that at one school dealing with frequent interventionist absences, the RTI team created a backup plan to ensure that small-group interventions happened daily. This meant that sometimes students were divided into larger temporary groupings or that small-group intervention time was shortened when there was an assembly or field trip.

The literature documented variation in frequency and group size within RTI interventions. Berkeley et al. (2009) found that in Delaware, Pennsylvania, Kansas, Arizona, and Nebraska, Tier 3 interventions were provided in small groups; whereas in Florida, Ohio, Oregon, and Washington, Tier 3 interventions are individualized. However, in Utah, West Virginia, and

Louisiana, systems are allowed to provide Tier 3 interventions in small groups or individually. Berkeley et al. also found that while state requirements for instructional group size varied, 80% of the states did have a specified group size per tier. As for frequency of intervention, 66.6% of states specify guidelines by tier for how frequently interventions needed to occur, which typically involved the requirement of additional supplementary instruction at Tiers 2 and 3 (Berkeley et al., 2009).

Chapter Summary

A preponderance of research supports the need for Response to Intervention. Justice (2006) shared that the need for early and intensive multi-tiered intervention programs is proven by the scientific literature, which shows that the academic difficulties of a large majority of students can be prevented if early and intensive interventions are provided. RTI teams are at the heart of a school's ability to problem-solve and provide a better education for students who struggle. As Abbott and Wills (2012) said, "When a school is able to clearly define school goals and the actions that can move the school toward goal attainment, major changes can happen" (p. 44). The literature shows that Response to Intervention can powerfully impact academic outcomes for students and improve instruction in schools. This could potentially spread positive systemic changes in our education system and our communities.

CHAPTER 3

METHODOLOGY

The purpose of this nonexperimental quantitative study was to identify components of RTI programs associated with increased student growth in RTI groups. McMillian and Schumacher (2010) maintained that nonexperimental research design examined relationships between different phenomena without any direct manipulation of the conditions experienced in the study. This study was used to examine the relationship between student growth and specific research-based reading and math interventions, position of interventionists, fidelity of implementation, group time, and setting. This nonexperimental quantitative study was also used to explore growth comparisons of students from various demographic groups including gender, language background, socioeconomic status, and special education status within this RTI program.

Research Questions and Null Hypotheses

The nonexperimental quantitative design guided the following research questions and null hypotheses:

Research Question 1: Is there a significant relationship between fidelity scores and student growth on progress monitoring assessments?

$H_0$1: There is no significant relationship between fidelity scores and student growth on progress monitoring assessments.

Research Question 2: Is there a significant difference between student growth on progress monitoring assessments as compared by the type(s) of reading intervention (basic reading group, reading fluency group, or reading comprehension group)?

$H_0$2: There is no significant difference in student growth on progress monitoring assessments as compared by the type(s) of reading intervention.

Research Question 3: Is there a significant difference in student growth on progress monitoring assessments as compared by the type(s) of math intervention (basic math, math computation group, or math problem solving group)?

$H_0$3: There is no significant difference in student growth on progress monitoring assessments as compared by the type(s) of math intervention.

Research Question 4: Is there a significant difference in student growth on progress monitoring assessments as compared by interventionist's position (RTI tutor, part time assistant, full time assistant, or classroom teacher)?

$H_0$4: There is no significant difference in student growth on progress monitoring assessments as compared by interventionist's position.

Research Question 5: Is there a significant difference in student growth measured by progress monitoring assessments as compared by the length of group time (20-29 minutes, 30-44 minutes, 45-59 minutes, or 60 or more minutes)?

$H_0$5: There is no significant difference in student growth measured by progress monitoring assessments as compared by the length of group time.

Research Question 6: Is there a significant difference in student growth on progress monitoring assessments of pull-out groups and inclusion groups?

$H_0$6: There is no significant difference in student growth on progress monitoring assessments of pull-out groups and inclusion groups.

Research Question 7: Is there a significant difference between student growth on progress monitoring assessments between ESL and non-ESL students?

$H_0$7: There is no significant difference between student growth on progress monitoring assessments between ESL and non-ESL students.

Research Question 8: Is there a significant difference in student growth on progress monitoring assessments between students in low socioeconomic groups and other socioeconomic groups?

$H_0$8: There is no significant difference in student growth on progress monitoring assessments between students in low socioeconomic groups and other socioeconomic groups.

Research Question 9: Is there a significant difference in student growth on progress monitoring assessments for special education students and non-special education students?

$H_0$9: There is no significant difference in student growth on progress monitoring assessments for special education students and non-special education students.

Research Question 10: Is there a significant difference in student growth on progress monitoring assessments between males and females?

$H_0$10: There is no significant difference in student growth on progress monitoring assessments between males and females.

Population

The population of this study was 715 kindergarten through fourth grade students participating in Response to Intervention groups at eight elementary schools in an Upper East

Tennessee school system. The students involved in this study participated in Tier II or Tier III response to intervention groups during 2014-2015. The population met all the state criteria for participation in RTI groups including scores on approved universal screening and initial progress monitoring tests at or below the 25th percentile on national norms.

The population for this study included all students enrolled in reading and math Tier II and Tier III RTI groups at each of the eight elementary schools in this system during 2014-15, a total of 715 students. The only students excluded from the study were those who had incomplete data because they moved into or out of the school system prior to exiting RTI or finishing the school year. The number of RTI students studied at each school were: School 1 (N= 92), School 2 (N= 45), School 3 (N= 87), School 4 (N= 166), School 5 (N= 53), School 6 (N= 100), School 7 (N= 44), and School 8 (N= 100).

Instrumentation

AIMSweb and DIBELS tests were used to show student growth based on existing research that these measures have been proven to be both valid and reliable over time. The OR (Oral Reading Fluency) test in AIMSweb and the DORF (DIBELS Oral Reading Fluency) tests were both previously called the CBM-R, or Curriculum-Based Measurement for Reading. Previous studies identified the CBM-R as a sensitive measure that can adequately assess reading skill level and growth over time, both of which are important pieces of information needed to make sound decisions within an RTI framework (Burns & Senesac, 2005; Fuchs, 2003; Gresham, 2002; Scholin & Burns, 2012). AIMSweb and DIBELS assessments have been tested for validity and reliability: both tests have a high degree of content, construct, and predictive validity. While AIMSweb and DIBELS tests have a high concurrent validity with each other,

they do not have a high degree of concurrent validity with the EasyCBM tests given as universal screeners in this program. Therefore, we did not use the EasyCBM test scores in this study.

AIMSweb, DIBELS, and EasyCBM tests were all on the state approved list of RTI assessments and were rigorously studied by assessment experts at the state level before being placed on that list. Each of these types of assessments have proven reliable in accurately assessing the level of response to intervention in this RTI program and in other intervention programs across the country. To measure the validity of growth scores within each type of intervention group, the assessments were paired with the students' corresponding skills deficit. The AIMSweb tests used for second through fourth grade reading students were the OR (Oral Reading) for Reading Fluency groups and the MAZE for Reading Comprehension groups. The OR test is a 1-minute running record in which students read a passage aloud and the teacher notes how many words are read and marks any missed words on the page. The MAZE test is a 3-minute reading passage with cloze sentences spaced throughout the passage. Students must pick one of three vocabulary words in each cloze sentence to make the passage make sense. The AIMSweb tests used for students in second through fourth grade math groups were the MCOMP (Math Computation) for math calculations and the MCAP (Math Concepts and Problem Solving) for math reasoning. The MCOMP is an 8-minute test of basic math fluency problems including addition, subtraction, multiplication, and division. The MCAP test is an 8-minute test of all other math concepts including fractions, time, money, word problems, etc.

For kindergarten and first grade math intervention students we used the TEN (Tests of Early Numeracy) that assess oral counting skills, number identification skills, quantity discrimination skills, and the ability to fill in a missing number in a series. Each of these 1-minute tests is a quick check of number sense for students in Basic Math groups. On the Oral

Counting test, students count orally to 100, or as high as they can within a minute. The Number Identification test is a 1-minute test in which students demonstrate their recognition of numerals to 20. On the Quantity Discrimination test, students are given sets of two numbers and asked to find the one that the teacher names. For the Missing Number test, students are given sets of three chronological numbers in which one is missing. They must name the missing number for several of these sets within the minute allotted.

The DIBELS tests we used for kindergarten through first grade basic reading groups were the NWF (Nonsense Word Fluency) test that assessed correct letter sound relationships and whole words read, the PSF (Phoneme Segmentation Fluency) test that assessed the ability to segment phonemes, and the DORF (DIBELS Oral Reading Fluency) test that assesses oral reading fluency and is very similar to AIMSweb's OR test of oral reading fluency. Students in Basic Reading groups take the NWF or PSF tests. On the NWF test students must read as many nonsense words and their corresponding letter sound relationships as they can in 1 minute. For the PSF students need to segment the sounds in a series of two to three phoneme words within a minute.

Fidelity of implementation was determined using scores from the RTI^2 Fidelity Report (see Appendix A). This form was created to meet the requirements set forth by the Tennessee Department of Education in 2013. Several areas on the report were taken directly from sample fidelity check forms found in the RTI^2 Framework Implementation Guide (Tennessee Department of Education, 2013). The form was then created and refined with input from the school system's RTI Coordinator, RTI Coach, RTI Coordinators from each school included in the study and several interventionists. The form was reviewed, revised, and approved by several school system supervisors, several members of the special education team, the school

psychologist, the diagnostician, and principals from every school included in the study. This district team created the form to serve for both types of fidelity monitoring: documentation and implementation checks.

Documentation checks are periodic reviews of the paperwork that provide evidence that the students are receiving instruction as specified by their RTI team. Document checks include the first six items on the RTI^2 Fidelity Report. These items chronicle the interventionist's efforts to use research-based activities aligned with the students' skill deficits while maintaining records of attendance, progress monitoring scores, anecdotal records of student growth on daily informal notes, and lesson plans that are current, rigorous, research-based, and aligned with the students' individual needs.

Implementation checks are also measured using the RTI^2 Fidelity Report. Implementation checks are full, direct observations that include a quick check of the items included on the document check but also measure whether or not the interactions between students and interventionists are positive, engaging, well-paced, occur for the full group time, and use appropriate stimuli-feedback response and questioning techniques. To align with state fidelity standards, scores of 80% or higher on the Fidelity Report are considered proficient (Tennessee Department of Education, 2013).

Data Collection

Permission to conduct research was obtained from the director of the school system and principals of all the schools studied as well as the Institutional Review Board (IRB) of East Tennessee State University. The Power School database was used to access demographic data regarding socioeconomic status, ELL status, socioeconomic status, and gender. General

demographic data were transferred onto Excel and SPSS with no identifiable information included.

While participating in the RTI program in 2014-15, students were given assessments to monitor their progress every 10 days using AIMSweb and DIBELS tests. Student growth was measured using AIMSweb tests for kindergarten through fourth grade math intervention students and for second through fourth grade reading intervention students. Student growth scores came from the DIBELS database for students in kindergarten and first grade reading groups. Nationally normed percentile scores from these assessments were recorded onto Student Intervention Plans by school personnel at that time. The school system and the IRB granted permission for me to gather information from the Student Intervention Plans and transfer them into Excel and SPSS prior to data analysis with no identifying student, teacher, or school information included. Data that detailed type of intervention groups received, number of weeks in intervention, allotted time in group, interventionist position, and group setting were also collected from the Student Intervention Plans and transferred into Excel and SPSS without identifiable information included.

During the 2014-15 school year principals, RTI coordinators, and academic coaches conducted fidelity checks of the intervention groups and denoted their findings on RTI^2 Fidelity Reports. Fidelity percentages were written on the fidelity reports at that time. The school system and the IRB granted permission for me to gather information from the fidelity reports and transfer them into Excel and SPSS with no identifying information attached. Each school in the system kept copies of all Student Intervention Plans and Fidelity Checks from 2014-15 in a notebook. Due to the retrospective, archival nature of these documents, I was granted permission by the school system and the IRB to gather this information at the school site and enter the data

into Excel and SPSS without identifying information to reduce bias and maintain the confidentiality of students, interventionists, and schools.

Data Analysis

Prior to conducting the analyses to address the research questions, student growth scores were calculated. Student growth scores were computed by subtracting the median baseline scores from the median postintervention scores for each test given. Median baseline scores consisted of an average of the first three progress monitoring scores received and median postintervention scores were created using the last three progress monitoring scores given. The progress monitoring scores used were national percentiles, thus factoring in the normal student growth expected by typically-developing peers throughout that school year. As it takes a score of zero to maintain the same position in national percentiles, any student growth score above zero shows a gain. AIMSweb and DIBELS had already created statistically valid and reliable national percentiles for typically developing peers for all of their assessments, so this information could be used to accurately assess whether an intervention student is growing faster or slower than a typically-developing student.

Student growth was the dependent variable for all research questions and the fidelity of implementation, interventionist position, group focus, group setting, group time, or demographic groups were the independent variables. The dependent variable for all research questions was the mean student growth in RTI.

Research Question 1 was analyzed using a Pearson *r* correlation between student growth scores and the average fidelity score. Research Questions 2-5 were analyzed using a series of Analysis of Variance (ANOVA) tests to determine whether or not a significant difference existed

between student growth and the various grouping variables (types of reading intervention, types of math intervention, interventionist position, and length of group time the student received). Research Questions 6-10 were analyzed using a series of independent samples t-tests. These questions examined differences in student growth scores as compared by two groups (inclusion or pull-out groups, gender, and students who were identified or not identified as having ELL, special education, or low socioeconomic status). All data were analyzed at the .05 level of significance.

Chapter Summary

Chapter 3 describes the methodology used in this nonexperimental quantitative research study. After a brief introduction the research questions and null hypotheses were delineated and the population was documented. These sections were followed by an explanation of the instrumentation, data collection, and analysis procedures used to determine the relationships between student growth scores and the structural, instructional, and demographic variables being studied within this Response to Intervention program.

CHAPTER 4

FINDINGS

The purpose of this study was to identify factors associated with increased student growth in RTI groups. This study was an examination of the relationship between student growth on progress monitoring tests and types of reading and math groups, position of the interventionists, fidelity of implementation, group time, and setting. The study was an exploration of growth comparisons of students from various demographic groups including gender, language background, socioeconomic status, and special education status. In this chapter data were presented and analyzed to answer 10 research questions and 10 null hypotheses. Data were retrieved from eight schools and 715 students who participated in Response to Intervention groups during the 2014-15 school year.

Research Question 1

Research Question 1: Is there a significant relationship between fidelity scores and student growth on progress monitoring assessments?

$H_0$1: There is no significant relationship between fidelity scores and student growth on progress monitoring assessments.

A Pearson correlation coefficient was calculated to test the relationship between student growth scores and fidelity report scores of K- 4 intervention students across the school system. The results of the analysis revealed a strong positive relationship between the growth scores of students (M = 25.38, SD = 23.27) and fidelity of implementation (M = 97.36, SD = 3.72) and a

statistically significant correlation [$r(719) = .107$, $p = .004$]. The coefficient of determination for this would be 0.01, indicating that 1% of the variance of the two variables is explained by the relationship, leaving 99% unexplained. Thus the findings are statistically significant but lack importance. As a result of the analysis the null hypothesis was rejected. Overall, the results suggest that students with high growth scores tended to be served in groups in which the interventionist received high fidelity scores. Figure 1 shows the distribution of fidelity scores and growth scores.

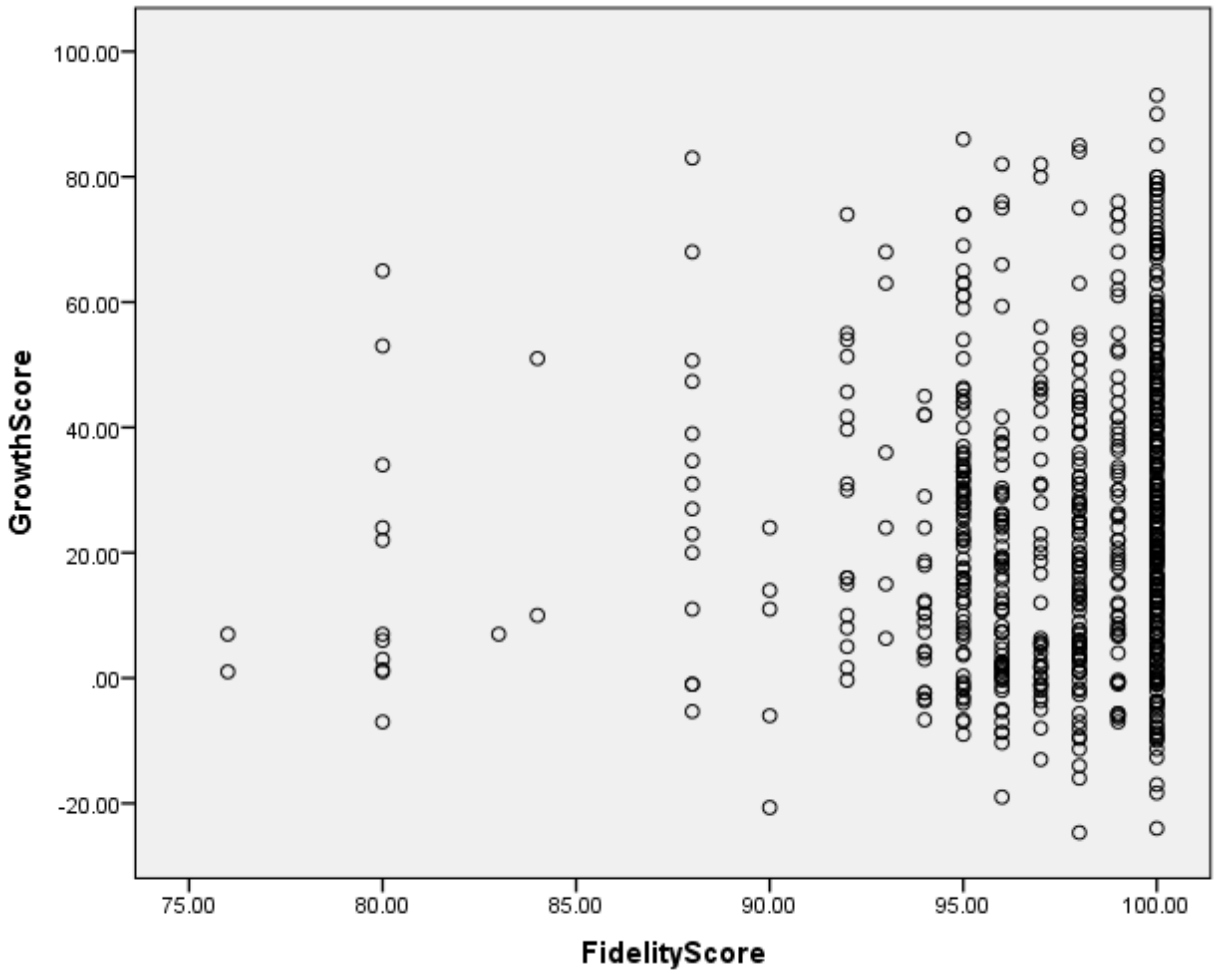


Figure 1. Distributions of Student Growth Scores and Fidelity of Implementation Scores

Research Question 2

Research Question 2: Is there a significant difference between student growth on progress monitoring assessments as compared by the type(s) of reading intervention (basic reading group, reading fluency group, or reading comprehension group)?

$H_0$2: There is no significant difference in student growth on progress monitoring assessments as compared by the type(s) of reading intervention.

A one-way analysis of variance was conducted to evaluate the relationship between the student growth scores and the type of reading intervention received during the first year of RTI implementation. The factor variable the type of reading intervention received included three categories: basic reading, reading fluency, and reading comprehension. The dependent variable was the amount of student growth as measured by percentile scores gained on progress monitoring tests throughout intervention. The ANOVA was significant, $F(2,554) = 69.047$, $p < .001$. Therefore, the null hypothesis was rejected. The strength of the relationship between the student growth score and the type of reading intervention received as assessed by η^2 was large (.20).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted to evaluate pairwise difference among the means of the three groups. A Tukey procedure was selected for the multiple comparisons because equal variances were assumed. There was a significant difference in the means between reading fluency and the other two groups (basic reading, $p < .001$; reading comprehension, $p < .001$). However, there was not a significant difference between the reading fluency and reading comprehension groups ($p = .964$). In general, students in the basic reading ($M = 29.75$) and reading comprehension ($M = 29.15$) groups grew

significantly more than the students in the reading fluency groups (M = 8.66). Figure 2 shows the distribution of growth scores by type of reading intervention received.

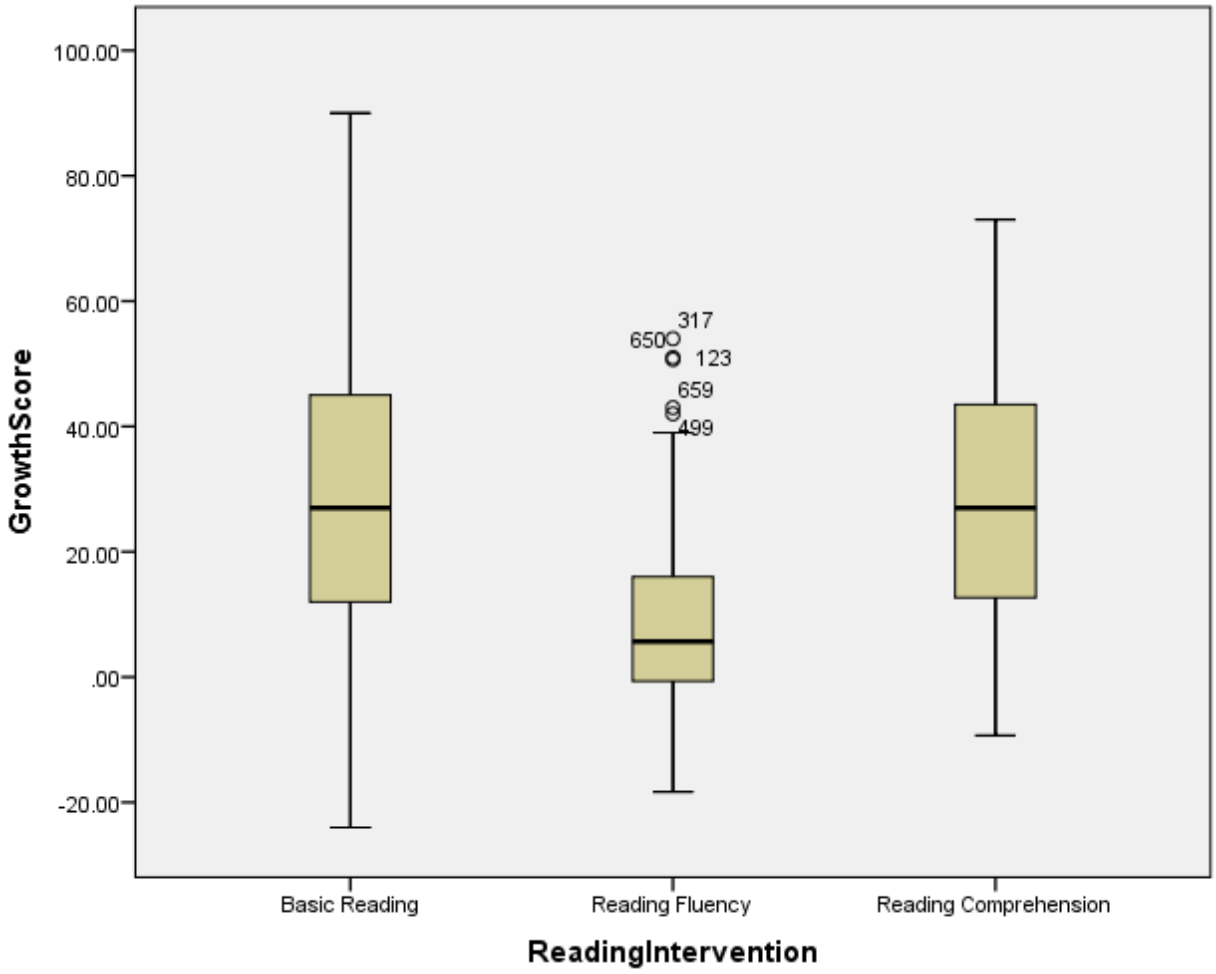


Figure 2. Distribution of Student Growth Scores for Basic Reading, Reading Fluency, and Reading Comprehension Groups

Research Question 3

Research Question 3: Is there a significant difference in student growth on progress monitoring assessments as compared by the type(s) of math intervention (basic math, math computation group, or math problem solving group)?

$H_0$3: There is no significant difference in student growth on progress monitoring assessments as compared by the type(s) of math intervention.

A one-way analysis of variance was conducted to evaluate the relationship between the student growth scores and the type of math intervention received during the first year of RTI implementation. The factor variable the type of math intervention received included three categories: basic math, math computation, and math problem solving. The dependent variable was the amount of student growth as measured by growth in percentile scores throughout intervention. The ANOVA was significant, $F(2,162) = 5.19$, $p = .007$. Therefore, the null hypothesis was rejected. The strength of the relationship between the student growth score and the type of math intervention received as assessed by η^2 was medium (.06).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted to evaluate pairwise difference among the means of the three groups. A Tukey procedure was selected for the multiple comparisons because equal variances were assumed. There was a significant difference in the means between basic math and math problem solving ($p = .005$). However, there was not a significant difference between the basic math and math computation groups ($p = .070$) or the math computation and math problem solving groups ($p = .506$).

In general, students in the basic math (M = 46.11) groups grew significantly more than the students in the math computation (M = 36.02) and the math problem solving groups (M = 31.71). Figure 3 shows the distribution of growth scores by type of math intervention received.

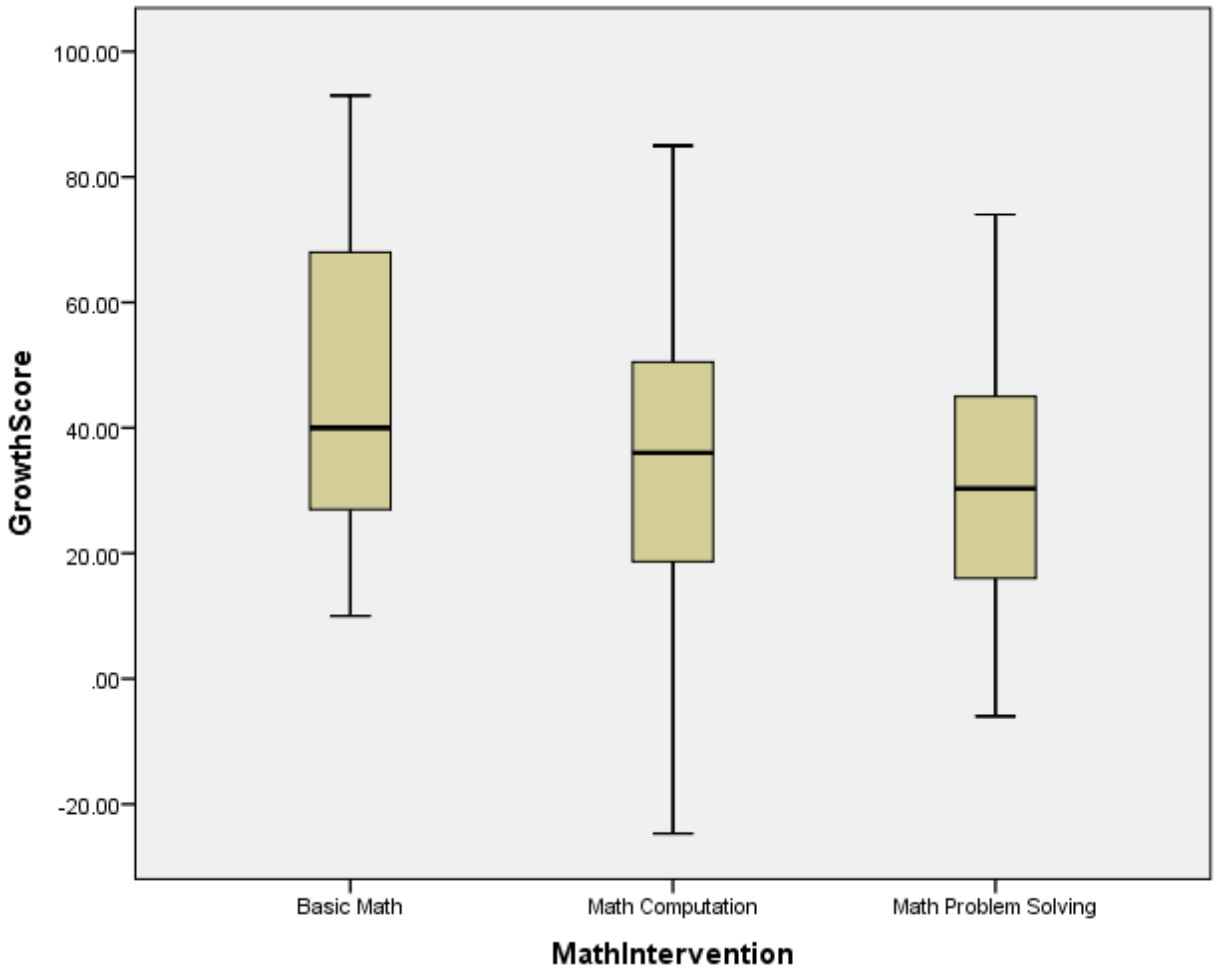


Figure 3. Distribution of Growth Scores for Basic Math, Math Computation, and Math Problem Solving Groups

Research Question 4

Research Question 4: Is there a significant difference in student growth on progress monitoring assessments as compared by interventionist's position (RTI tutor, part time assistant, full time assistant, and classroom teacher)?

$H_0$4: There is no significant difference in student growth on progress monitoring assessments as compared by interventionist's position.

A one-way analysis of variance was conducted to evaluate the relationship between the student growth scores and the position of the interventionists. The factor variable the interventionists' position included four categories: RTI tutor, part-time assistant, full-time assistant, and classroom teacher. The dependent variable was the amount of student growth as measured by percentile scores on progress monitoring tests throughout intervention. The ANOVA was significant, $F(3,719) = 7.102$, $p < .001$. Therefore, the null hypothesis was rejected. The strength of the relationship between the student growth score and the type of reading intervention received as assessed by η^2 was small to medium (.03).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted to evaluate pairwise difference among the means of the three groups. A Tukey procedure was selected for the multiple comparisons because equal variances were assumed. There was a significant difference in the means between the part-time assistants and the RTI tutors ($p = .002$) and part-time assistants and classroom teachers ($p < .001$). However, there was not a significant difference between the RTI tutors and full-time assistants ($p = .789$) or the RTI tutors and the classroom teachers ($p = .326$). There was also not a significant difference between the part-time and full-time assistants ($p = .322$) or full-time assistants and classroom teachers ($p = .230$).

Overall, students who had classroom teachers (*M* = 29.68), RTI tutors (*M* = 26.08), and full-time assistants (*M* = 23.12) as interventionists grew significantly more than the students with part-time assistants (*M* = 16.76). Figure 4 shows the distribution of growth scores by interventionist position.

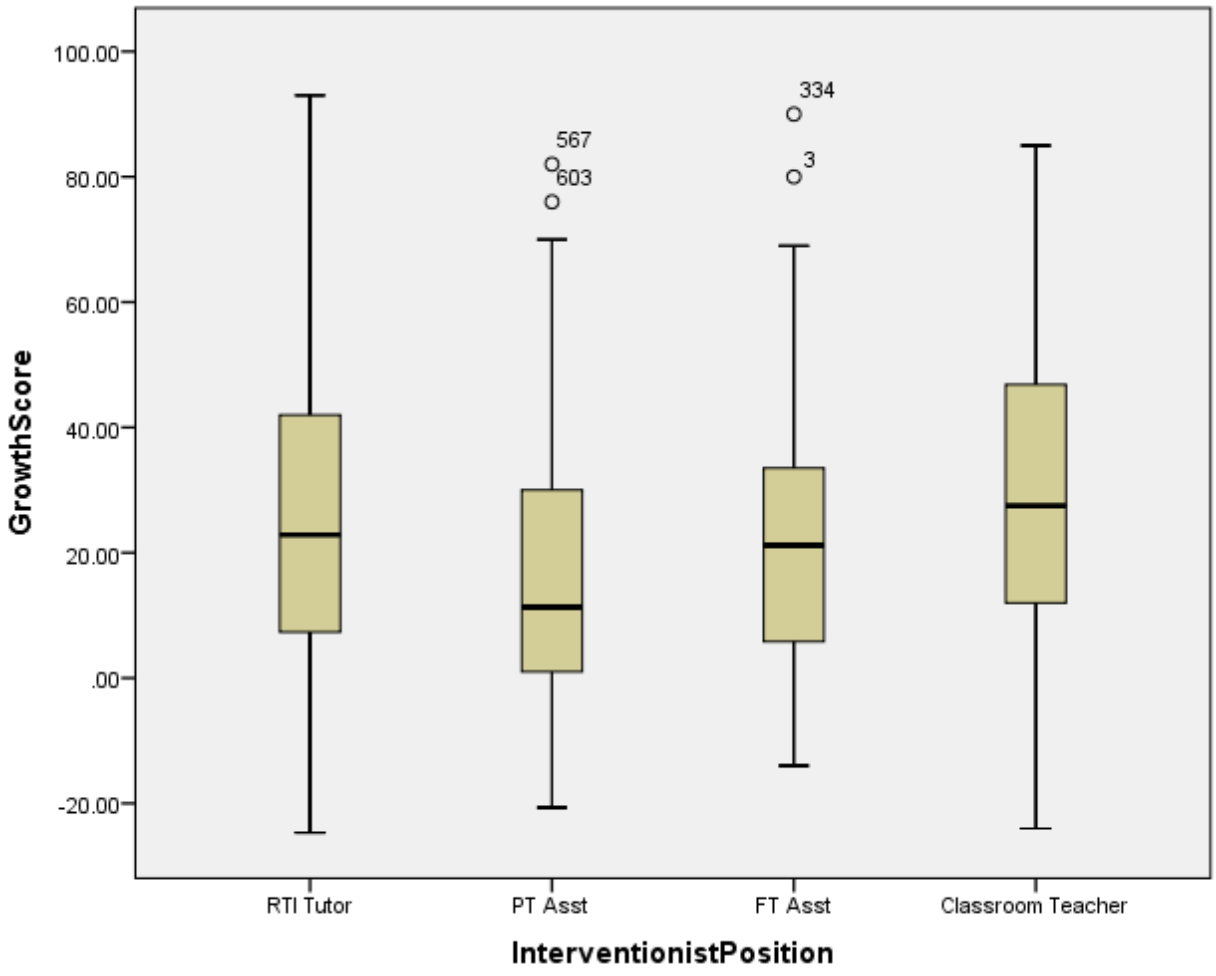


Figure 4. Distribution of Growth Scores for Students Served by RTI Tutors, Part-time Assistants, Full-time Assistants, and Classroom Teachers

Research Question 5

Research Question 5: Is there a significant difference in student growth measured by progress monitoring assessments as compared by the length of group time? The length of group time was broken down into 20-29 minutes, 30-44 minutes, 45-59 minutes, and 60 or more minutes.

$H_0$5: There is no significant difference in student growth measured by progress monitoring assessments as compared by the length of group time.

A one-way analysis of variance was conducted to evaluate the relationship between the student growth scores and the position of the interventionists. The factor variable the amount of time spent in daily intervention included four categories: 20-29 minutes, 30-44 minutes, 45-59 minutes, and 60 or more minutes. The dependent variable was the amount of student growth as measured by growth in percentile scores throughout intervention. The ANOVA was significant, $F(3,718) = 6.009$, $p < .001$. Therefore, the null hypothesis was rejected. The strength of the relationship between the student growth score and the type of reading intervention received as assessed by η^2 was small to medium (.02).

Because the overall *F* test was significant, post hoc multiple comparisons were conducted to evaluate pairwise difference among the means of the three groups. A Tukey procedure was selected for the multiple comparisons because equal variances were assumed. There was a significant difference in the means between students who received 30-44 minutes per day and those who received 60 or more minutes ($p = .002$). However, there was not a significant difference between any of the other groups: 20-29 minutes and 30-44 minutes ($p = .413$), 20-29 minutes and 40-59 minutes ($p = .555$), 20-29 minutes and 60 or more minutes ($p = .056$), 30-44

minutes and 45-59 minutes (p = .998) and 45-59 minutes and 60 or more minutes (p = .190). In general, students served for 20-29 minutes per day (M = 37.92) grew significantly more than the students served for longer periods of time: 30-44 minutes (M = 27.89), 45-59 minutes (M = 28.49), and 60 or more minutes (M = 21.42). Figure 5 shows the distribution of growth scores by the daily amount of time spent in group.

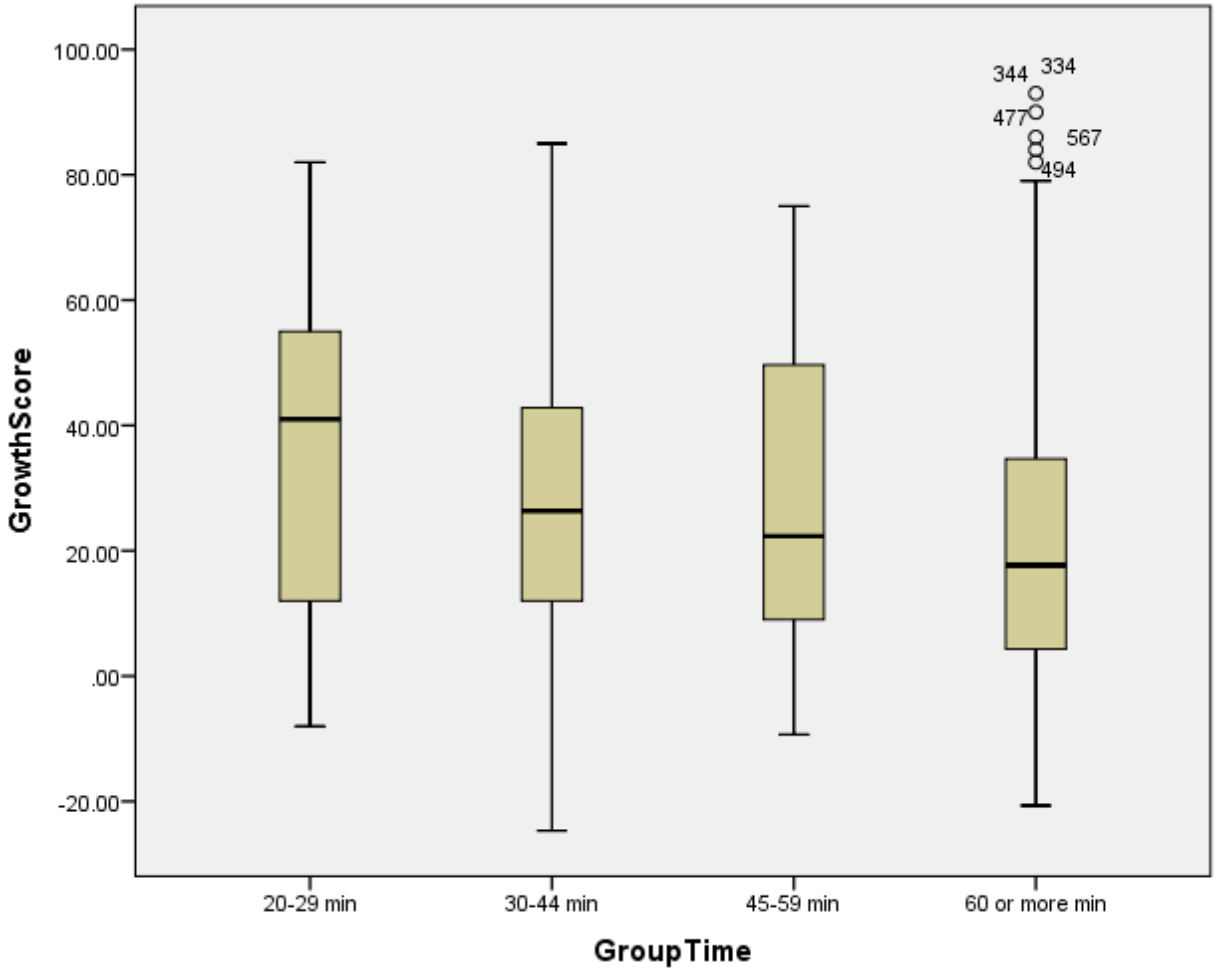


Figure 5. Distribution of Growth Scores for Students in Groups That Were 20-29 Minutes, 30-44 Minutes, 45-59 Minutes, or 60 or More Minutes Per Day

Research Question 6

Research Question 6: Is there a significant difference in student growth on progress monitoring assessments of pull-out groups and inclusion groups?

$H_0$6: There is no significant difference in student growth on progress monitoring assessments of pull-out groups and inclusion groups.

An independent-samples t test was conducted to evaluate whether the mean amount of student growth differs in pull-out groups (outside the classroom) or inclusion groups (inside the classroom). The student growth on progress monitoring assessments was the test variable, and the grouping variable was the group setting (pull-out or inclusion). The test was significant, $t(720) = 2.578$, $p = .010$. Therefore, the null hypothesis was rejected. Students in inclusion groups ($M = 29.42$, $SD = 25.41$) scored significantly higher than those in pull-out groups ($M = 24.15$, $SD = 22.46$). The 95% confidence interval for the difference in means was -9.27 to -1.26. The Cohen's d index was 0.23, which indicated a small effect size. Students in the inclusion groups tended to make significantly more growth on progress monitoring tests than those who received instruction outside the classroom. Figure 6 shows the distributions for the two groups.

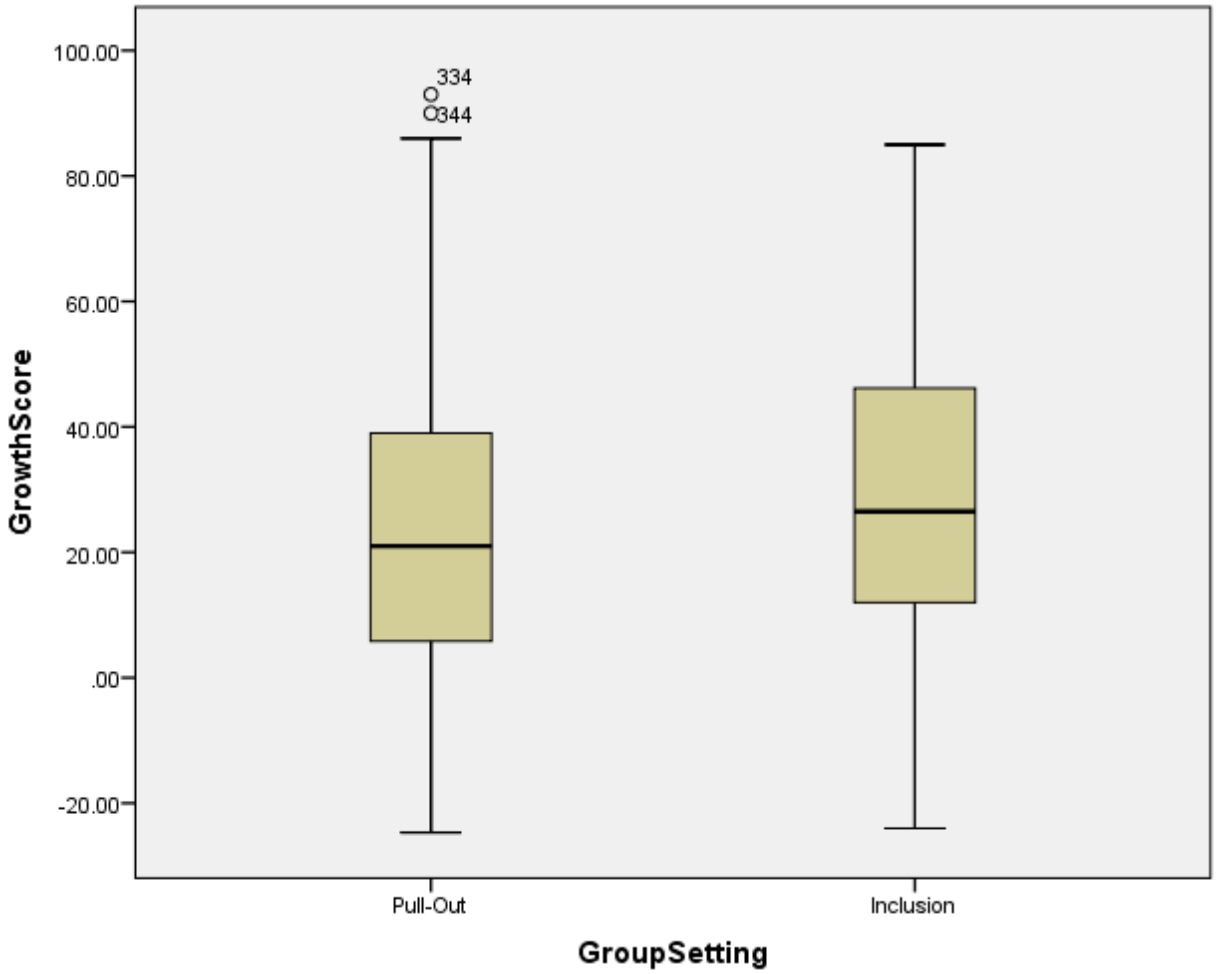


Figure 6. Distribution of Growth Scores for Students that Received Intervention in Pull-Out and Inclusion Groups

Research Question 7

Research Question 7: Is there a significant difference between student growth on progress monitoring assessments between ESL and non-ESL students?

$H_0$7: There is no significant difference between student growth on progress monitoring assessments between ESL and non-ESL students.

An independent-samples t test was conducted to evaluate whether the mean amount of student growth differs for English Language Learners (ELL) and Non-English Language Learners (Non-ELL). The student growth on progress monitoring assessments was the test variable, and the grouping variable was the language background of the students (ELL or Non-ELL). The test was not significant, $t(720) = 1.333$, $p = .183$. Therefore, the null hypothesis was retained. Students with an English language background ($M = 25.89$, $SD = 23.49$) and English Language Learners ($M = 22.76$, $SD = 21.96$) had similar growth scores in their RTI groups. The 95% confidence interval for the difference in means was -1.48 to 7.74. The Cohen's d index was 0.13, which indicated a small effect size. Figure 8 shows the distributions for the two groups.

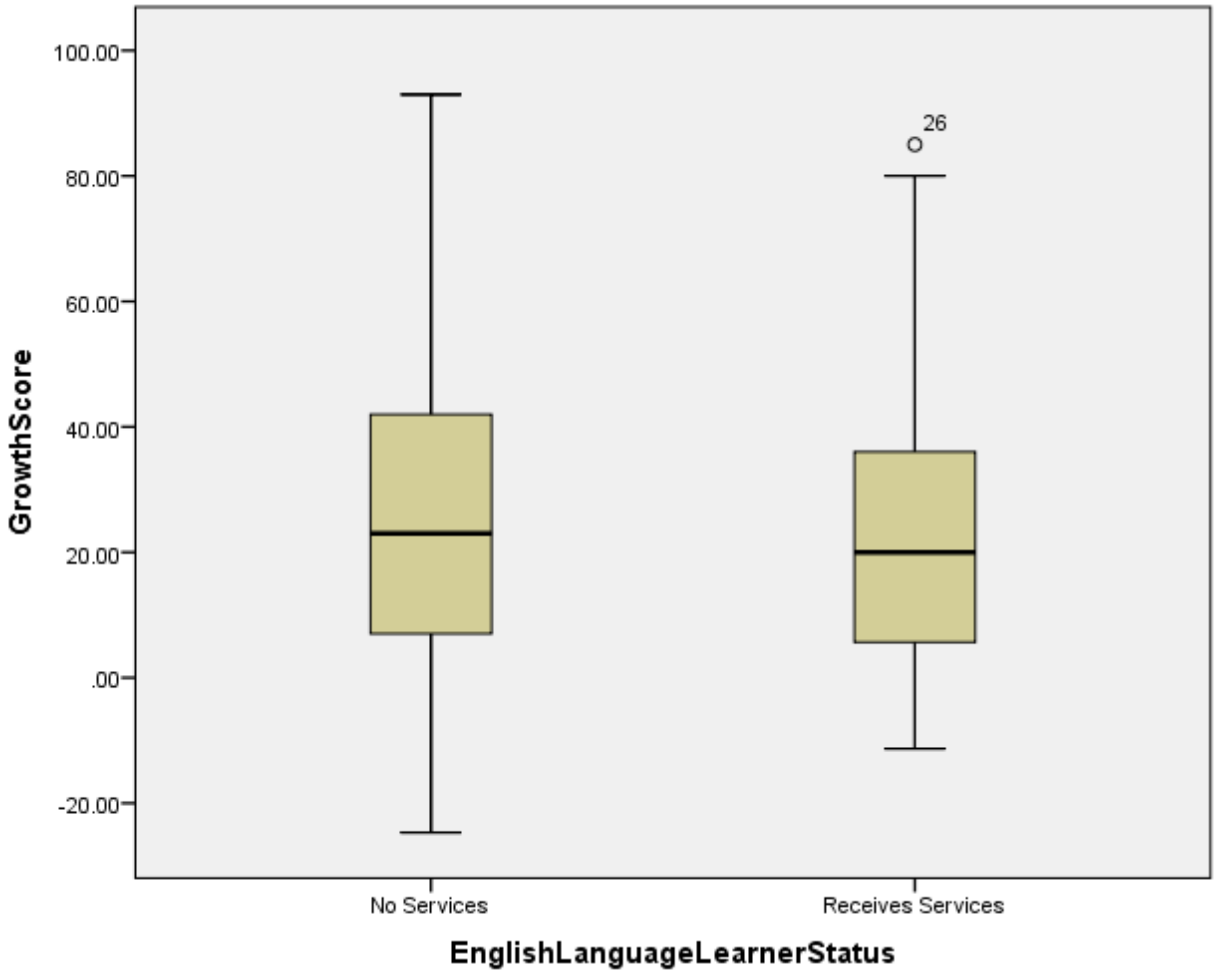


Figure 7. Distribution of Growth Scores for Students Receiving and Not Receiving English as a Second Language Services

Research Question 8

Research Question 8: Is there a significant difference in student growth on progress monitoring assessments between students in the low socioeconomic group and other socioeconomic groups?

$H_0$8: There is no significant difference in student growth on progress monitoring assessments between students in the low socioeconomic group and other socioeconomic groups.

An independent-samples t test was conducted to evaluate whether the mean amount of student growth differs for students with low socioeconomic status or other socioeconomic statuses as measured by fee-waiver eligibility. The student growth on progress monitoring assessments was the test variable, and the grouping variable was the socioeconomic status of the students. The test was significant, $t(720) = 4.149$, $p < .001$. Therefore, the null hypothesis was rejected. Students with low socioeconomic status ($M = 23.19$, $SD = 22.53$) scored significantly lower than those with other socioeconomic statuses ($M = 31.14$, $SD = 24.21$). The 95% confidence interval for the difference in means was 4.19 to 11.71. The Cohen's d index was 0.35, which indicated a small to medium effect size. Students in other socioeconomic groups tended to make significantly more growth on progress monitoring tests than those in the low socioeconomic group. Figure 8 shows the distributions for the two groups.

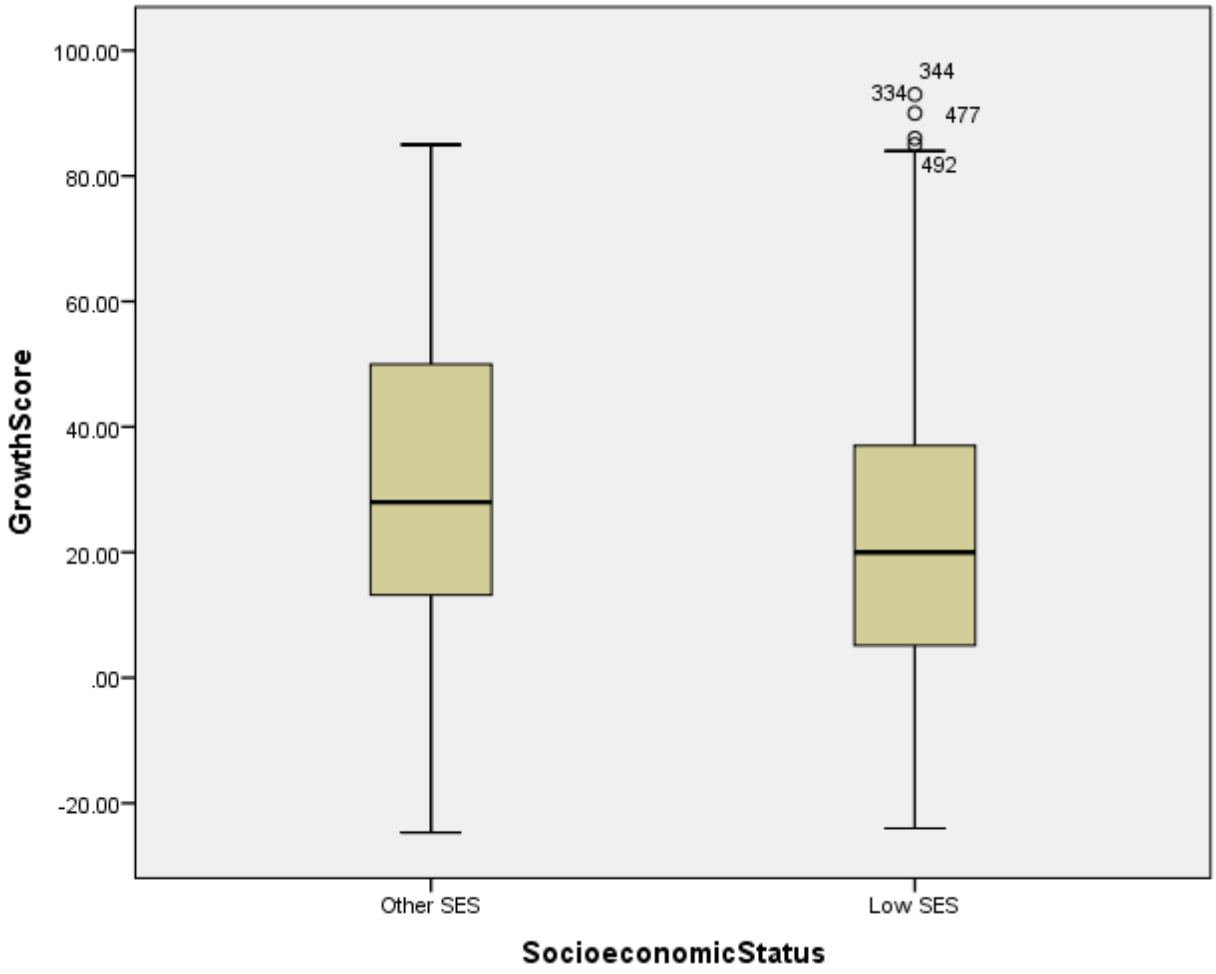


Figure 8. Distribution of Growth Scores for Students with Low Socioeconomic Status and Other Socioeconomic Statuses

Research Question 9

Research Question 9: Is there a significant difference in student growth on progress monitoring assessments for special education students and non-special education students?

$H_0$9: There is no significant difference in student growth on progress monitoring assessments for special education students and non-special education students.

An independent-samples t test was conducted to evaluate whether the mean amount of student growth differs for students receiving special education services and for those not receiving services. The student growth on progress monitoring assessments was the test variable, and the grouping variable was the special education status of the students. The test was significant, $t(720) = 4.475$, $p < .001$. Therefore, the null hypothesis was rejected. Students receiving special education services ($M = 16.16$, $SD = 19.28$) scored significantly lower than those not receiving services ($M = 26.97$, $SD = 23.54$). The 95% confidence interval for the difference in means was 6.07 to 15.55. The Cohen's d index was 0.47, which indicated a small to medium effect size. Students not receiving special education services tended to make significantly more growth on progress monitoring tests than those in special education. Figure 9 shows the distributions for the two groups.

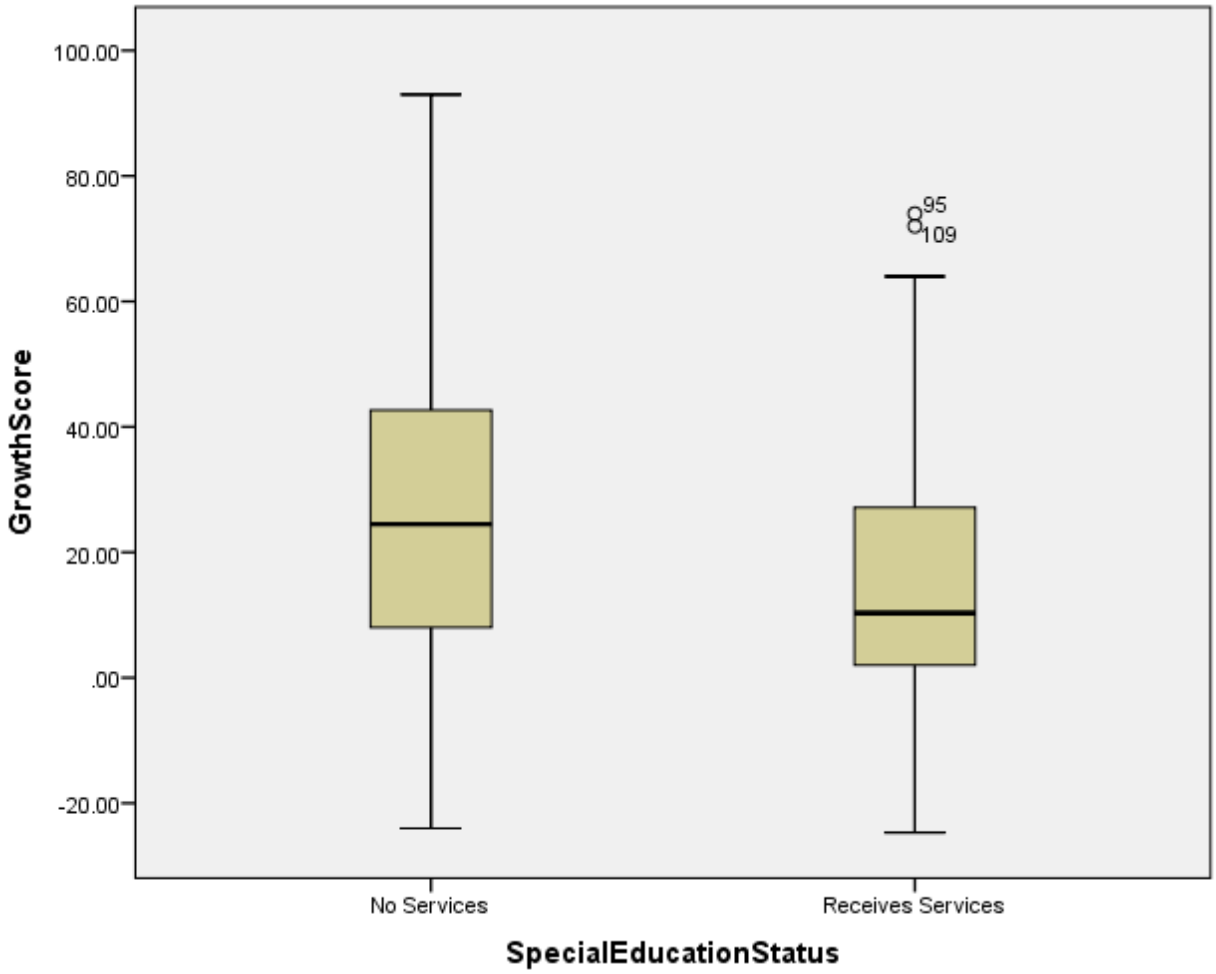


Figure 9. Distribution of Growth Scores for Students Receiving and Not Receiving Special Education Services

Research Question 10

Research Question 10: Is there a significant difference in student growth on progress monitoring assessments between males and females?

$H_0$10: There is no significant difference in student growth on progress monitoring assessments between males and females.

An independent-samples t test was conducted to evaluate whether the mean amount of student growth differs for males and females. The student growth on progress monitoring assessments was the test variable, and the grouping variable was gender. The test was not significant, $t(719) = .969$, $p = .333$. Therefore, the null hypothesis was retained. Males (M = 24.60, SD = 23.52) and Females (M = 26.28, SD = 23.00) had similar growth scores in their RTI groups. The 95% confidence interval for the difference in means was -5.08 to 1.72. The Cohen's d index was .07, which indicated a medium to large effect size. Figure 10 shows the distributions for the two groups.

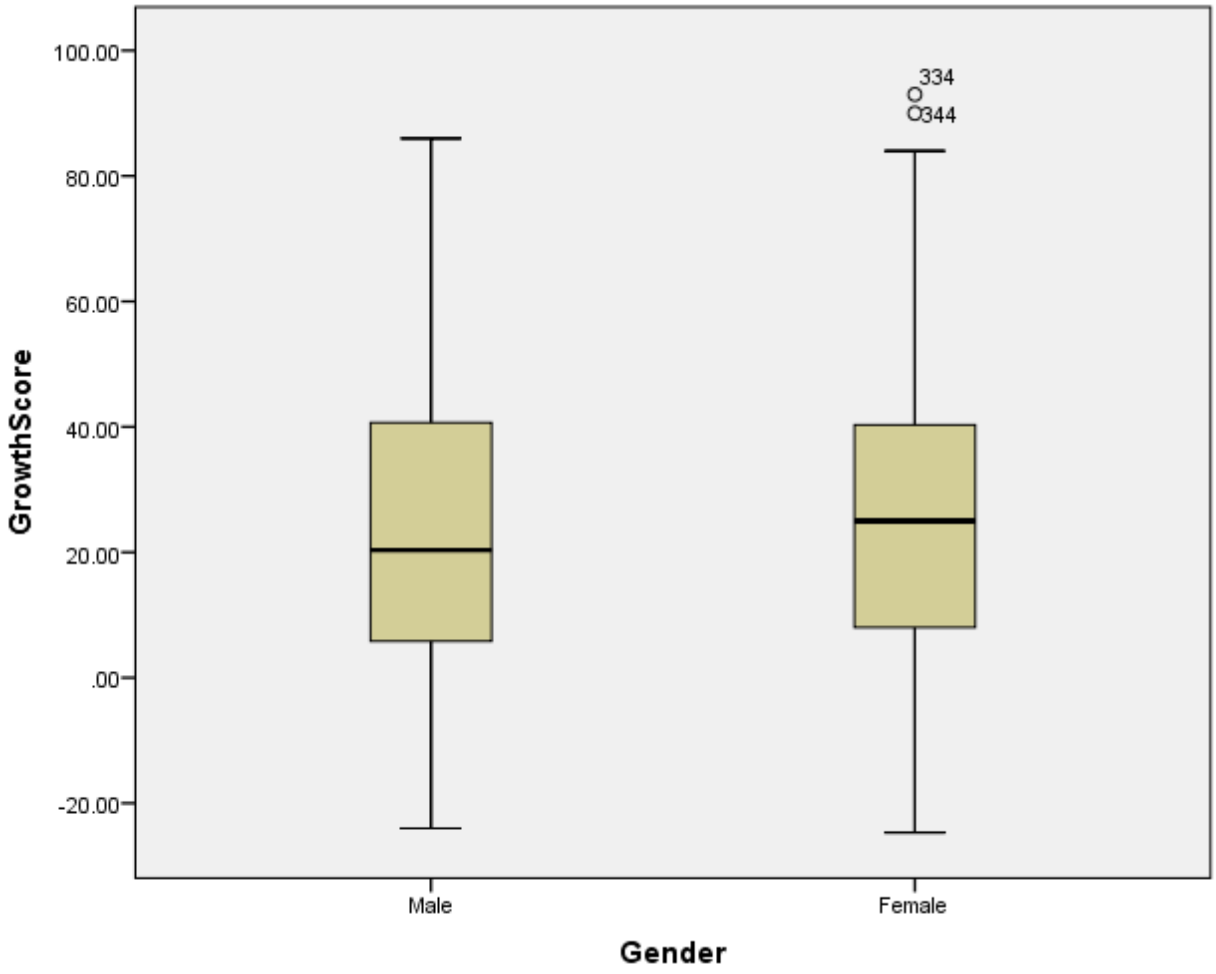


Figure 10. Distribution of Growth Scores for Males and Females

Chapter Summary

In this chapter data from intervention students in grades K through 4 at eight schools in one Upper East Tennessee school system were analyzed and presented. The data were collected for 715 students who participated in either reading or math intervention groups during the first year of implementation of the Response to Intervention program in 2014-15. Ten research questions and null hypotheses were addressed.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter contains a summary and conclusions of the findings as well as recommendations for readers who may use the results to inform future research and practice for Response to Intervention programs. The purpose of this study was to examine the relationship between student growth on progress monitoring tests and types of reading and math groups, position of the interventionists, fidelity of implementation, group time, and setting. The study was an exploration of growth comparisons of students from various demographic groups including gender, language background, socioeconomic status, and special education status. This study was conducted using data from students who participated in Response to Intervention groups at eight elementary schools in an Upper East Tennessee school system during the first year of RTI implementation in 2014-15.

Summary of the Study

The statistical analysis reported in the study was based on 10 research questions and null hypotheses presented in Chapters 1 and 3. Research Question 1 was analyzed using a Pearson r correlation. Research Questions 2 through 5 were analyzed using one-way analyses of variance. Research Questions 6 through 10 were analyzed using independent-samples t tests. Seven hundred fifteen intervention students participated in this study. The level of significance used in each test was .05. Findings indicated that intervention students in this study grew more in all types of intervention than their national peers (Balu et al., 2015). The results also indicated that students in all subgroups made significant gains. Those of lower socioeconomic status and those

receiving special education services grew at a significantly lower rate than their peers who did not receive free or reduced priced lunches or special education services. English Language Learners and both genders grew at the same pace as their peers.

Conclusions

This research study focused on 10 research questions. The questions and findings are discussed below.

Research Question 1:

Is there a significant relationship between fidelity scores and student growth on progress monitoring assessments?

The results of the correlational analysis revealed a strong positive relationship between an increase in student growth scores on progress monitoring tests and an increase in fidelity scores on the Fidelity Report. In general, the research found that students in groups with a higher level of fidelity of implementation had higher scores on progress monitoring assessments.

State fidelity requirements ask that those working in RTI programs to verify that research- based instruction takes place in groups 80% of the time (Tennessee Department of Education, 2013). However, fidelity monitoring requirements in this school system are more rigorous and holistic than the state fidelity forms. They are based on a variety of proven instructional practices, such as differentiation, motivation, and questioning techniques designed to build student engagement and understanding. To receive a high fidelity score for each lesson interventionists must use research-based reading or math strategies, align instruction with student

academic and emotional needs as identified by both quantitative and qualitative data, and differentiate instruction based on those needs. Interventionists with high fidelity scores must do this while maintaining appropriate pacing, positive interactions with students, and high levels of student engagement. To receive high fidelity scores interventionists must also use a variety of higher order, differentiated questioning aligned with the varying responses of students and designed to enhance thinking skills. Each of these areas measured on the Fidelity Report aligns seamlessly with the literature discussions about ensuring a high degree of fidelity of implementation in intervention groups. In fact, Abbott and Wills (2012) suggested:

> Fidelity of implementation checklists include... (a) use of procedures as outlined in the curriculum guide; (b) instructional features such as modeling, error correction, feedback, appropriate pacing; (c) instruction of key early literacy skills within lessons (e.g., oral reading with fluency practice, comprehension checks); and (d) management features such as the use of praise, transitions, and effective behavior management techniques with feedback provided to the teachers (pp. 38-39).

When interventionists' adherence to fidelity was rated using this format, students increased their reading ability and teachers improved their fidelity of implementation to more than 90% in the third year of implementation (Abbott & Wills, 2012). Fidelity of implementation in this study aligns with the Abbott and Wills study but is very different from fidelity of implementation in many other RTI programs studied. In the program being researched fidelity of implementation refers more to providing the dynamic, differentiated intervention the learner needs rather than fidelity to a scripted intervention program or model. For the purposes of this study fidelity means something vastly different from what it means in other programs. In many systems the term fidelity means close adherence to a scripted program without deviating from the script. Fidelity to this program is much more holistic and flexible than that, as shown on the fidelity form in Appendix A. To teach with fidelity in this program means masterfully using research-based

activities, aligning student need and instruction, differentiating instruction based on anecdotal notes, testing, and observation within the groups. To adhere to this program with fidelity instructors must build upon students' strengths and responses in a positive way that encourages active engagement and learning. Student responses are met with varied, appropriate feedback and specific stimuli-response questioning techniques that further build on students' strengths and differentiate learning to meet individual student needs. Appropriate pacing and documentation must also take place to receive a high score on a fidelity check. The findings of our study were vastly different from studies in which fidelity meant merely adherence to a program. This confirms that increased fidelity in the areas above aligns with increased student growth in intervention.

Research Question 2:

Is there a significant difference between student growth on progress monitoring assessments as compared by the type(s) of reading intervention?

A one-way analysis of variance (ANOVA) was conducted to evaluate the relationship between the student growth scores and the type of reading intervention received during the first year of RTI implementation. Post hoc multiple comparisons were conducted to evaluate pairwise differences among the means of the three groups, basic reading, reading fluency, and reading comprehension. Results indicated that students in all reading groups within the RTI program made gains and that those in the basic reading and comprehension groups made significant gains. The post hoc tests indicated that there was a significant difference between the mean student growth scores in reading fluency and the other two groups. Students in reading fluency groups

made fewer percentile gains on progress monitoring assessments than those in basic reading and reading comprehension groups.

It is positive that on average students in all reading groups made gains. It was not surprising that students in basic reading and reading comprehension groups made greater gains than those in fluency groups because this school system has been using reading programs that focused more on phonics and comprehension strategies prior to RTI implementation, while the strategies used in fluency groups have only been in place for a few years. Wanzek and Vaughn (2008) confirmed that in multiple reading intervention studies students consistently made fewer gains in reading fluency than other areas of reading. Reading fluency incorporates basic reading and comprehension skills. It is often one of the last components of reading to develop. When students learn new reading strategies, they sometimes slow their reading pace to attend to accuracy and comprehension, which results in a dip in reading fluency. Thus, lower fluency scores paired with high decoding and comprehension scores could indicate that students are slowing down to process the text. Additional inquiry into changes in self-correction rates could clarify whether the lag between fluency and comprehension growth is based on students slowing down to improve their reading or not.

Furthermore, most reading intervention students in this program who struggle to decode text begin in basic reading groups and move on to reading fluency or reading comprehension groups if they do not grow enough to exit the program. Many students graduate from basic reading groups and return to the classroom, making it more likely that the students left in fluency and comprehension groups are slower to make gains in reading. This helps to clarify the lower fluency gains and underscores the importance of the high comprehension scores. Flexible movement of students within and among groups is prevalent in this program as student needs

change. This type of fluid movement among groups was noted in Abbott and Wills (2012), in which students moved from one research-based program to the next as they gained knowledge in each area.

In general students in this program who have a deficit in basic reading skills begin receiving basic decoding, phonemic awareness, and phonics instruction using components of Beverly Tyner's Small Group Differentiated Instruction or Lindamood-Bell's Seeing Stars program including phonemic awareness, phonics, word recognition, and guided reading tasks. If their needs are not fully met after this instruction, students often progress to reading fluency groups using Jan Richardson or Fountas and Pinnell style guided reading strategies. Students who have severe reading comprehension deficits often move from using strategies from the Lindamood-Bell Visualizing and Verbalizing program into using those similar to the Fountas and Pinnell Comprehension Toolkit program. Thus, each student receives a variety of research-based instructional practices throughout their time in reading intervention groups.

Although research-based interventions used by this RTI program are listed, it should be noted that it is unlikely that any scripted intervention program will provide the significant gains experienced by this system. Rather than using the aforementioned programs in a formulaic way, this system used the research-based strategies from each of these programs that were most appropriate to meet the needs of each individual student to achieve these gains. While each individual activity used with students was research based and aligned with the core components of reading and math instruction proposed by the National Reading Panel and National Council of Teachers of Math, interventionists were given a great deal of flexibility to teach each student using the methods best suited for him or her.

The RTI program being studied currently uses the DIBELS and AIMSweb tests for universal screening and progress monitoring in math and reading. The literature emphasized both the DIBELS and AIMSweb tests as appropriate measures to determine student needs in intervention and future reading success (Abbott & Wills, 2012; Barnett et al., 2004). Barnett et al. highlighted work by Fuchs and Fuchs (1986), Shinn and Bamonto (1998), and Shapiro and Kratochwill (2000) that reported that curriculum-based measurements have been successfully used throughout the years as basic methods for examining readiness for general education and targeting interventions for students with academic problems. One of these testing batteries, the DIBELS, includes a benchmark score that has a predictive value of future student success in reading and is used to delineate which students need intervention (Abbott & Wills, 2012).

To maintain the same position in national percentiles, a typically developing student has a percentile gain of zero. Any score higher than that indicates a gain. Thus, it is notable that the basic reading and reading comprehension students have grown, on average, more than 25 percentile points. To qualify for RTI services, students must fall below the 25th percentile on nationally normed tests. Therefore, the average RTI student in this study, even one with a very low initial percentile, made enough gains to exit their basic reading or reading comprehension group.

At the national and state levels, students in reading groups did not grow as much as those in this study. Balu et al. undertook a massive nationwide study of RTI reading programs for the U.S. Department of Education in 2015. The Balu et al. study included around 24,000 students receiving intervention groups in first through third grades across the nation. First graders in the Balu et al. study made statistically significant, negative gains ($M = -0.13$, $p < .001$). In contrast, the first graders included in our study were provided basic reading groups that made statistically

significant, positive gains of nearly 30 points ($M = 29.75$, $p < .001$). Second and third grade reading intervention students in the Balu et al. (2015) study did not make statistically significant gains ($M = 0.04$, $p = 0.085$); ($M = -0.01$, $p = 0.82$). When using national percentiles, the cut scores are adjusted so that the gains of a typically developing student at the 50th percentile revert to zero. Therefore, it makes sense that in a nationwide study with a large population, like the Balu et al. study, student gains remained close to zero. However, in our smaller study, students in the same grades made significant gains in their reading fluency and reading comprehension groups ($M = 8.67$, $p < .001$); ($M = 29.15$, $p < .001$). Although both studies use national percentiles, the discrepancy in results between the two studies suggests that students in this RTI program are outpacing their national peers significantly in all types of reading intervention.

On the national and state levels universal screening and progress monitoring tests identify the specific skill deficits to be addressed in intervention groups (Balu et al., 2015; Tennessee Department of Education, 2013). Although this intervention program does use screening tests to identify specific skill deficits and address them, both perceptual data and quantifiable data are used to determine how to best meet student needs. Instruction is modified daily using anecdotal daily notes about student responses in intervention. Both questioning and instruction are designed to build from areas of strength into areas to refine. Using the strengths approach boosts student motivation, commitment, and willingness to attempt increasingly difficult tasks. This type of instruction and questioning is modeled by academic coaches on a regular basis in group and reinforced on fidelity checks. This combination of evidence-based, strengths building, and flexible, instructional design is notably different from the intervention programs with significantly fewer gains studied by Balu et al. (2015).

Research Question 3:

Is there a significant difference in student growth on progress monitoring assessments as compared by the type(s) of math intervention?

A one-way analysis of variance (ANOVA) was conducted to evaluate the relationship between the student growth scores and the type of math intervention received during the first year of RTI implementation. Post hoc multiple comparisons were conducted to evaluate pairwise differences among the means of the three groups (basic math, math computation, and math problem solving). Results indicated that students in all math groups within the RTI program made significant gains. The post hoc tests indicated that there was a significant difference between the mean student growth scores in the basic math and math problem solving groups, but not among the other group pairings. Students showed the most growth in the basic math groups, followed by math computation, and math problem solving, respectively. This aligns with the growing complexity of concepts taught in each type of math group. To maintain their same position in national percentiles a typically developing student has a percentile gain of zero. It is notable that the intervention students in this system have grown by more than 30 or 40 percentile points on average.

The students in the math groups in this program engage in instruction that is closely aligned to their specific skill need evidenced on progress monitoring assessments. Each lesson is designed for those students using an "I do, we do, you do" gradual release of responsibility lesson format. The gradual release model, initiated by Vygotsky, has become a research-based instructional format that emphasizes mentoring students to become capable thinkers and learners by engaging in, and discussing, progressively more difficult tasks with greater levels of independence (Kong, 2002). By using this model students in the math intervention groups have

been exposed to a wide variety of ways to solve each math task and are routinely asked to explain the reasoning behind their answers or thought processes. The statistically significant and highly positive growth scores in math intervention groups align with these practices.

Research Question 4:

Is there a significant difference in student growth on progress monitoring assessments as compared by interventionist's position (RTI tutor, part-time assistant, full-time assistant, and classroom teacher)?

A one-way analysis of variance (ANOVA) was conducted to evaluate the relationship between the student growth scores and the type of position of the person providing the intervention. Post hoc multiple comparisons were conducted to evaluate pairwise differences among the means of the four groups: RTI tutor, part-time assistant, full-time assistant, and classroom teacher. Results indicated that students who were served by classroom teachers made the most growth, followed by RTI tutors, full-time assistants, and part-time assistants, respectively. The post hoc tests indicated that there was a significant difference between the mean student growth scores for students who had part-time assistants as opposed to classroom teachers or RTI tutors.

In the RTI program being studied classroom teachers are only asked to teach Tier II students with less need in small groups within the classroom. Tier II and Tier III students with the lowest scores receive pull-out groups with interventionists who are RTI tutors or assistants. Classroom teachers are highly trained in their areas and already have relationships with the students. They also serve the students with lesser need than the students being served by

assistants and tutors in Tier III. Fives and Buehl (2010) found that classroom teachers differentiate instruction more often and more effectively than preservice teachers. Many of the RTI tutors in this program are preservice teachers. Each of these things could factor in to the higher gains scores of students taught by classroom teachers.

It makes sense that classroom teachers made higher gains than the other groups, but we should inquire as to why the gains of the RTI tutors were close behind the teachers, despite being paid the least and having the highest amount of turnover of all the interventionists. The amount of job-embedded professional development received by RTI tutors and classroom teachers may play a role in the significant gains made by their students. RTI tutors are trained in strategies to differentiate instruction, questioning, and feedback to help students grow in their specific area of need. The comparable gains between RTI tutors and classroom teachers may be explained, in part, to the fact that the RTI tutors spend the vast majority of the day working with intervention groups, whereas many assistants are pulled to do other duties during their work day. While every type of interventionist in the school system is provided with frequent coaching and modeling of student specific, research-based instructional strategies; RTI tutors, who teach groups most often, end up with the most training by academic coaches in how to implement these strategies. The literature suggests that academic coaching can have a positive influence on student achievement (Abbott & Wills, 2012; Brown-Chidsey & Steege, 2005; Ikeda, 2012; Knight, 2007; Kratochwill, 2007). Although the scope of this study did not analyze this, perhaps the embedded instructional coaching the RTI tutors received and the amount of time spent in groups could be having an effect on the scores of their students. The fact that the student growth scores of those served by RTI tutors, who are paid significantly less than assistants, were almost as high as students taught by classroom teachers confirms that higher pay does not necessarily equate with higher gains.

Research Question 5:

Is there a significant difference in student growth measured by progress monitoring assessments as compared by the length of group time?

A one-way analysis of variance (ANOVA) was conducted to evaluate the relationship between the student growth scores and the amount of time students spent in group daily. Post hoc multiple comparisons were conducted to evaluate pairwise differences among the means of the four groups: 20-29 minutes, 30-44 minutes, 40-59 minutes, and 60 or more minutes. Results indicated that students in the 20-29 minute groups made the most growth and the students who received 60 or more minutes made the least growth. On the surface it may seem like the students who were in groups for more time should make the most growth. However, when placing student in RTI groups, those who score the lowest are placed in Tier III groups that last 45-60 minutes. Therefore, the lowest performing students are often placed in the 60 minute groups. This makes it highly likely that the students who have the lowest scores and have not made gains in the past would be in the groups receiving the most time. Future research could be conducted to ascertain whether student growth was affected more by group time or initial scores used to place students in tiers. Another possibility for further study is to see if students lose motivation in longer groups because they are exposed to their area of difficulty for additional amounts of time. An additional point to consider is that the only students in this study who received 20-29 minute groups were Tier II kindergarten students who are served in the classroom. These students are being taught by their own teachers, so they had higher scores than their Tier III peers at the beginning of intervention. These students are also being taught the basic reading skills that aligned with the highest gains scores of all the reading interventions in Research Question 2.

Research Question 6:

Is there a significant difference in student growth on progress monitoring assessments of pull-out groups and inclusion groups?

An independent-samples t test indicated that there was a significant difference in student growth scores between students in pull-out groups and inclusion groups. Students in inclusion groups scored significantly higher than those in pull-out groups. Within the RTI program studied, the only students taught in inclusion groups are the higher-scoring Tier II students in grades K-2. The Tier II students being served in the classroom are made up of students who scored higher on the initial testing or started in Tier III groups and grew so much they moved into Tier II groups. Additionally, most K-2 students being served in the classroom are served in basic reading groups, which aligned with the highest scores of the three types of reading intervention in Research Question 2. Thus, it would make sense that these students would make greater gains than those in the pull-out groups, which include greater numbers of Tier III students receiving all three types of reading and math intervention. Finally, students in inclusion groups are being taught by their classroom teacher with whom they already have a working relationship. Further inquiry into how relationships with interventionists affected student growth in classroom and pull-out groups could be examined in the future.

Research Question 7:

Is there a significant difference between student growth on progress monitoring assessments between ESL and non-ESL students?

An independent-samples t test indicated that there was no significant difference in student growth scores between students who are English Language Learners and those who grew up with English as a first language. The students from both groups had very similar gains scores and the null hypothesis was retained. This is a very significant finding because it means English Language Learners in this RTI program are having their needs met at basically the same level of students who are not receiving ESL services. Closing achievement gaps for special populations is something people working in RTI programs strive to do and the data indicate that this intervention is working for the ELL population in this school system as well as the non-ELL students. The coordinators of this RTI program work closely with ESL teachers to ensure appropriate placement and instruction for ELL students. Healy (2007) and Vaughn et al. (2006) both found that English Language Learners who were given basic reading and comprehension instruction for 50 minutes a day met their reading goals in 12 to 25 weeks. The comparable growth of English Language Learners and native English speakers underscores the fact that RTI programs can help English Language Learners, and other struggling students close achievement gaps in both reading and math.

Research Question 8:

Is there a significant difference between student growth on progress monitoring assessments between students in the low socioeconomic group and those in other socioeconomic groups?

An independent-samples t test indicated that there was a significant difference in student growth scores between students with low socioeconomic status and students from other

socioeconomic groups. Although students from the lower socioeconomic group did make significant gains in intervention, gaining more than 20 percentile points during their time in intervention, students from other socioeconomic groups outpaced them by 8 percentile points. Unfortunately, the gap between students of lower socioeconomic status and those of other socioeconomic statuses was corroborated by nationwide studies of RTI (Abbott & Wills, 2012; Balu et al., 2015: Drame & Xu, 2008). Conversely, it is uncommon to see the gains of 23 percentile points for Title I students in intervention that we did in our study (Balu et al., 2015).

Research Question 9:

Is there a significant difference in student growth on progress monitoring assessments for special education students and non-special education students?

An independent-samples t test indicated that there was a significant difference in student growth scores between students who received special education services and those who did not. Although students receiving both RTI and Special Education did make more than 16 point gains on progress monitoring tests during intervention, RTI students who did not receive special education services surpassed these gains by 10 points. Unfortunately, the gap between special education students and those not receiving special education has been noted repeatedly in literature (Drame & Xu, 2008; Hughes & Dexter, 2011). Balu et al. (2015) found that students receiving special education services in RTI programs had an overall negative pattern of gains that was worse than that of their typically developing peers. Although our results did show the special education students trailing behind their typically developing peers, they were still gaining

16 percentile points on average, well above those seen in the nationwide RTI study (Balu et al., 2015).

Research Question 10:

Is there a significant difference in student growth on progress monitoring assessments between males and females?

An independent-samples t test indicated that there was no significant difference in student growth scores between males and females. The students from both groups had very similar gains scores and the null hypothesis was retained. In fact, the two group averages only differed by two points, which mirrored the difference in sample size of each group. This indicates that intervention needs are being met equally for both male and female students.

Recommendations for Practice

The findings and conclusions of this study have identified the following conclusions for practice in Response to Intervention programs:

1. The significant positive correlation between the fidelity scores and the student growth scores indicates that the method used for checking fidelity of implementation does align with increased student growth. The fidelity report used in this program is included in Appendix A and could be used for future fidelity checks.
2. The significant positive growth experienced by students in all types of reading and math intervention provides evidence that teaching practices in these groups are aligned with

student growth on progress monitoring tests. District leaders should analyze the gains in all areas of math, reading comprehension, and basic reading to maintain and increase the effectiveness of these types of groups in the future. Although the students in reading fluency groups made gains, the significant discrepancy between growth experienced by reading fluency groups and all other types of intervention groups underscores the need to improve reading fluency instruction in this program.

3. The fact that English Language Learners did not have a statistical difference between their growth and that of their native English speaking peers shows that the ELL students are growing to the level of their peers and closing previous achievement gaps. District leaders should examine why this is happening with English Language Learners and not Special Education students or students from the low socioeconomic group. This will help those working in the intervention program to better understand how to support students from all populations to improve student learning.

4. District leaders should inquire as to why the RTI tutors and classroom teachers had comparable scores despite the fact that classroom teachers served the highest students in the program and the RTI tutors serve the lowest students. If this similarity is indeed due to the coaching component of this intervention program, it would indicate that the funding for instructional coaching in intervention programs is beneficial. Other systems may want to consider building instructional coaching or ongoing professional development into their RTI programs.

Recommendations for Future Research

As this study took place during the first year of implementation of this RTI program, this study should be replicated in subsequent years to see if the growth scores increase once the program has passed the implementation dip. Studying the same system in future years could also help determine whether or not the achievement gaps for students in special education or with low incomes close with added experience in RTI implementation. Most of the studies of RTI programs found in the literature were based on teacher perceptions of the effectiveness of RTI programs rather than student growth in RTI. A mixed methods study pairing student growth results with teacher perceptions of RTI could be useful to help others determine whether or not teacher perceptions of RTI students align with the students' actual growth in intervention. This school system was unique in having instructional coaches dedicated to the RTI program. Further research on the effectiveness of instructional coaching and interventionist training within RTI programs would be useful. A study using value added scores rather than percentiles may give more in-depth and comprehensive results.

Replicating this study in other school systems or at higher grade levels would be beneficial. Although this study was conducted during the first year of RTI implementation at the elementary schools, the school system studied, as well as most of the school systems in Tennessee will begin implementing RTI at the high school level during the 2016-17 school year. Many systems are searching for information on effective high school RTI programs at this time. Very little information on high school RTI programs could be found in the literature. Studies on the effectiveness of RTI programs in grades 6-12 would be a great help to those beginning RTI in high schools.

Additionally, relatively few studies in the literature focus on math intervention programs relative to the large number of studies done on reading intervention. Although the results of this study showed great gains in math groups, future studies that aligned specific instructional strategies in math to student achievement scores would be helpful.

REFERENCES

Abbott, M., & Wills, H. (2012). Improving the upside-down Response-to-Intervention triangle with a systematic, effective, elementary school reading team. *Preventing School Failure, 56*(1), 37-46. Retrieved November 3, 2015, from http://www.tandfonline.com/doi/abs/10.1080/1045988X.2011.555793

Adams, J. (2013). *Response to intervention framework and progress monitoring process: K-3 regular education teachers' perception* (Doctoral dissertation). Retrieved May 11, 2015, from http://dc.etsu.edu/etd/1125/

Adelman, H., & Taylor, L. (2011). Moving beyond the three tier intervention pyramid toward a comprehensive framework for student and learning supports. *Center for Mental Health in Schools at UCLA,* 1-11.

Ardoin, S., & Christ, T. (2009). Curriculum-based measurement of oral reading: Standard errors associated with progress monitoring outcomes from DIBELS, AIMSweb, and an experimental passage set. *School Psychology Review, 38*(2), p. 266-283. Retrieved October 12, 2015, from http://search.proquest.com.iris.etsu.edu:2048/docview/219656384/fulltextPDF?accountid=10771

Balu, R., Zhu, P., Doolittle, F., Shiller, E., Jenkins, J., & Gersten, R. (2015). *Evaluation of Response to Intervention Practices for Elementary School Reading* (NCEE 2016-4000). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Educational Sciences, U.S. Department of Education. Retrieved December 20, 2015, from http://ies.ed.gov/ncee

Barnett, D. W., Daly, E. J., Jones, K. M., & Lentz, F. E. (2004). Response to intervention: Empirically based special service decisions from single-case designs of increasing and decreasing intensity. *The Journal of Special Education, 38*, 66-79. Retrieved November 3, 2015, from http://sed.sagepub.com/content/38/2/66

Barnett, D., Hawkins, R., Prasse, D., Graden, J., Nantais, M., & Pan, W. (2009). Decision-making validity in response to intervention. In S. R. Jimerson, M. K. Burns, & A. M. VanDerHeyden (Eds.), *Handbook of response to intervention: The science and practice of assessment and intervention* (pp. 106-116). New York, NY: Springer.

Bender, W. N., & Shores, C. (2007). Implementation of a standard treatment protocol response to intervention. In Bender, W. N., & Shores, C. (Eds.), *Response to intervention: A practical guide for every teacher* (pp. 21-45). Thousand Oaks, CA: Corwin.

Berkeley, S., Bender, W., Gregg-Peaster, L., & Saunders, L. (2009). Implementation of response to intervention: A snapshot of progress. *Journal of Learning Disabilities, 42*(1), 85-95. Retrieved May 11, 2015, from http://ldx.sagepub.com

Bianco, S. (2009). Improving student outcomes: Data-driven instruction and fidelity of implementation in a response to intervention (RTI) model. *Teaching Exceptional Children Plus, 6*(5), 1-13.

Bradley, R., Danielson, L., & Doolittle, J. (2005). Response to intervention. *Journal of Learning Disabilities, 38*, 485-486.

Brinker-McCammon, J. (2011). *The effect of teacher collaboration and co-teaching on the response to reading intervention of elementary-aged students with learning disabilities.* University of Northern Colorado, ProQuest.

Brown-Chidsey, R., & Steege, M. W. (2005). *Response to intervention: Principles and strategies for effective practice*. New York, NY: Guilford.

Burns, M., & Senesac, B. (2005). Comparison of dual discrepancy criteria to assess response to intervention. *Journal of School Psychology, 43*, 393-406.

Cusumano, C., & Mueller, J. (2007). How differentiated instruction helps struggling students. *Leadership, 36*(4), 8-10.

Daly, E., Martens, B., Barnett, D., Witt, J., & Olson, S. (2007). Varying intervention delivery in response to intervention: Confronting and resolving challenges with measurement, instruction, and intensity. *School Psychology Review, 36*(4), 562-581.

Denton, C., Fletcher, J., Anthony, J., & Francis, D. (2006). An evaluation of intensive intervention for students with persistent reading difficulties. *Journal of Learning Disabilities, 39*(5), 447-466.

Deno, S., & Gross, J. (1973). The Seward-University project: A cooperative effort to improve school services and university training. In E.N. Deno (Ed.), *Instructional alternatives for exceptional children* (pp. 104-121). Arlington, VA: Council for Exceptional Children.

Drame, E., & Xu, Y. (2008). Examining sociocultural factors in response to intervention models. *Childhood Education, 85*(1), 26-32. Retrieved May 11, 2015, from http://go.galegroup.com.iris.etsu.edu:2048/ps/retrieve.do?sort=RELEVANCE&docType=Article&tabID=T002&prodId=AONE&searchId=R1&resultListType=RESULT_LIST&searchType=AdvancedSearchForm&contentSegment=&currentPosition=1&searchResultsType=SingleTab&inPS=true&userGroupName=tel_a_etsul&docId=GALE%7CA188352658&contentSet=GALE%7CA188352658

Drury, D., & Walter, J. (2014). *The fidelity of implementation of the Response to Intervention (RTI) process in Missouri Public Schools.* (Doctoral Dissertation, Saint Louis University). Retrieved October 12, 2015, from http://etsu-edu-primo.hosted.exlibrisgroup.com.iris.etsu.edu:2048/primo_library/libweb/action/display.do?tabs=detailsTab&ct=display&fn=search&doc=TN_proquest1553000623&indx=5&recI

ds=TN_proquest1553000623&recIdxs=4&elementId=4&renderMode=poppedOut&displayMode=full&frbrVersion=4&dscnt=0&frbg=&scp.scps=scope%3A%2801ETSU%29%2Cscope%3A%2801ETSU_BEPRESS+%29%2Cprimo_central_multiple_fe&tab=default_tab&dstmp=1444651106137&srt=rank&mode=Basic&&dum=true&tb=t&vl(freeText0)=fidelity%20checks%20in%20RTI&vid=01ETSU

Elbaum, B., Vaughn, S., Hughes, M.T., & Moody, S.W. (2000). How effective are one-to-one tutoring programs in reading for elementary students at risk for reading failure? A meta-analysis of the intervention research. *Journal of Educational Psychology, 92*(4), 605-619.

Fisher, D., & Frey, N. (2010). *Enhancing RTI: How to ensure success with effective classroom instruction & intervention.* Alexandria, VA: Association for Supervision and Curriculum Development.

Fives, H., & Buehl, M. (2010). Examining the factor structure of the Teachers' Sense of Efficacy Scale. *The Journal of Experimental Education, 78*, 118-134. Retrieved February 20, 2016, from http://search.proquest.com.iris.etsu.edu:2048/docview/744643474?accountid=10771

Fuchs, D., Mock, D., Morgan, P. L., & Young, C. L. (2003). Responsiveness-to-intervention: Definitions, evidence, and implications for the learning disabilities construct. *Learning Disabilities Research & Practice*, *18*(3), 157-171.

Fullan, M. (2003). *The moral imperative of school leadership.* Thousand Oaks, CA: Corwin.

Gersten, R., & Dimino, J. (2006). RTI (response to intervention): Rethinking special education for students with reading disabilities (yet again). *Reading Research Quarterly, 41*, 99-108. Retrieved October 12, 2015, from http://go.galegroup.com.iris.etsu.edu:2048/ps/retrieve.do?sort=RELEVANCE&docType=Article&tabID=T002&prodId=ITOF&searchId=R2&resultListType=RESULT_LIST&searchType=AdvancedSearchForm&contentSegment=&currentPosition=1&searchResultsType=SingleTab&inPS=true&userGroupName=tel_a_etsul&docId=GALE%7CA149881663&contentSet=GALE%7CA149881663

Gettinger, M., & Stoiber, K. (2008). Applying a response-to-intervention model for early literacy development in low-income children. *Topics in Early Childhood Special Education, 27*(4), 198-213.

Gilbertson, D., Witt, J., LaFleur Singletary, L., & VanDerHeyden, A. (2007). Supporting teacher use of interventions: Effects of response dependent performance feedback on teacher implementation of a math intervention. *Journal of Behavioral Education, 16*, 311-326.

Gresham, F. (2002). Responsiveness to intervention: An alternative approach to the identification of learning disabilities. In R. Bradley, L. Danielson, & D.P. Hallahan (Eds.), *Identification of learning disabilities: Research to practice,* (pp. 467-519). Mahwah, NJ: Lawrence Erlbaum Associates.

Gresham, F., MacMillan, D., Beebe-Frankenburger, M., & Bocian, K. (2000). Treatment integrity in learning disabilities intervention research: Do we really know how treatments are implemented? *Learning Disabilities: Research & Practice, 15*(4), 198-205.

Griffiths, A. J., Parsons, L. B., Burns, M. K., VanDerHeyden, A., & Tilly, W. D. (2007). *Response to intervention: Research for practice.* National Association of State Directors of Special Education, Inc. Alexandria, VA: Griffiths.

Hauerwas, L., Brown, R., & Scott, A. (2013). Specific Learning Disability and Response to Intervention: State-Level Guidance. *Council for Exceptional Children, 80*(1), 101-120.

Healy, K., Vanderwood, M., & Edelston, D. (2005). Early literacy interventions for English language learners: Support for an RTI model. *The California School Psychologist*, 10, 55-63.

Healy, K. (2007). *Word identification fluency and nonsense word fluency as predictors of reading fluency in first grade* (Doctoral Dissertation). Retrieved November 1, 2015, from http://search.proquest.com.iris.etsu.edu:2048/docview/304878344/

Hill, D., King, S., Lemons, C., & Partanen, J. (2012). Fidelity of implementation and instructional alignment in response to research. *Learning Disabilities Research & Practice*, 27(3), 116-124.

Hughes, C., & Dexter, D. (2011). Response to Intervention: A research-based summary. *Theory into Practice*, 50, 4-11.

Ikeda, M. (2012). Policy and practice considerations for Response to Intervention: Reflections and commentary. *Journal of Learning Disabilities*, 45(3), 274-277. Retrieved April 11, 2015, from http://ldx.sagepub.com.iris.etsu.edu:2048/content/45/3/274

Jenkins, J., Schiller, E., Blackorby, J., Thayer, S.K., & Tilly, W.D. (2013). Responsiveness to Intervention in reading: Architecture and practices. *Learning Disability Quarterly*, 36(1), 36-46.

Jimerson, S. R., Burns, M. K., & VanDerHeyden, A. M. (2007). Response to intervention at school: The science and practice of assessment and intervention. In S. R. Jimerson, M. K. Burns, & A. M. VanDerHeyden (Eds.), *Handbook of response to intervention: The science and practice of assessment and intervention* (pp. 3-9). New York, NY: Springer.

Johnson, E., Humphrey, M., Mellard, D., Woods, K., & Swanson, H. (2010). Cognitive processing deficits and students with specific learning disabilities: A selective meta-analysis of the literature. *Learning Disability Quarterly*, 33(1), 3-18.

Johnson, E., Mellard, D., Fuchs, D., & McKnight, M. (2006). *Responsiveness to intervention (RTI): How to do it.* Lawrence, KS: National Research Center on Learning Disabilities.

Justice, L. (2006). Evidence-based practice, Response to Intervention, and the prevention of reading difficulties. *Language, Speech, and Hearing Services in Schools*, 37, 284-297.

Kavale, K., Kauffman, J., Bachmeier, R., & LeFever, G. (2008). Response-to-Intervention: Separating the rhetoric of self-congratulation from the reality of specific learning disability identification. *Learning Disability Quarterly,* 31, 135-150.

Keller-Margulis, M. (2012). Fidelity of implementation framework: A critical need for response to intervention models. *Psychology in the Schools, 49*(4), 342-352.doi

Kimmel, M. K. (2008). *The successes and challenges of response to intervention: A case study of the impact of RTI implementation.* (Doctoral dissertation, University of Southern California, Los Angeles). Retrieved April 11, 2015, from http://digitallibrary.usc.edu/cdm/ref/collection/p15799coll127/id/46254

Kiser, S. (2011). *DIBELS and AIMSweb: A predictability study*. (Doctoral Dissertation, Union University). Retrieved October 12, 2015, from http://etsu-edu-primo.hosted.exlibrisgroup.com.iris.etsu.edu:2048/primo_library/libweb/action/dlSearch.do?vid=01ETSU&institution=01ETSU&indx=1&bulkSize=10&pcAvailabiltyMode=false&ct=facet&fn=search&srt=rank&search_scope=Everything&tab=default_tab&search_prefix=KW&query_text=aimsweb&query=any%2Ccontains%2Caimsweb

Knight, J. (2007). *Instructional coaching: A partnership approach to improving instruction.* Thousand Oaks, CA: Corwin.

Kratochwill, T., Volpiansky, P., Clements, M., & Ball, C. (2007). Professional development in implementing and sustaining multitier prevention models: Implications for Response to Intervention. *School Psychology Review,* 36(4), 618-631.

Kong, A. (2002). *Scaffolding in a learning community of practice: A case study of a gradual release of responsibility from the teacher to the students.* Paper presented at the Annual Meeting of the International Reading Association (47th), San Francisco, CA. Retrieved February 20, 2016, from http://files.eric.ed.gov/fulltext/ED465995.pdf

Kovaleski, J., Gickling, E., Morrow, H., & Swank, P. (1999). High versus low implementation of instructional support teams: A case for maintaining program fidelity. *Remedial and Special Education,* 20, 170-183.

Kutner, M., Greenberg, E., Jin, Y., Boyle, B., Hsu, Y., & Dunleavy, E. (2007). *Literacy in everyday life: Results from the 2003 National Assessment of Adult Literacy* (NCES 2007-480). U.S. Department of Education. Washington, DC: National Center for Education Statistics. Retrieved February 20, 2016, from http://files.eric.ed.gov/fulltext/ED495996.pdf

Linan-Thompson, S., Cirino, P., & Vaughn, S. (2007). Determining English Language Learners' Response to Intervention: Questions and some answers. *Learning Disability Quarterly,* 30, 185-195.

Lipson, M. & Wixson, K. (2012). To what interventions are students responding? *The Reading Teacher,* 66(2), 111-115.

Martinez, R. & Young, A. (2011). Response to Intervention: How is it practiced and perceived? *International Journal of Special Education*, 26(1), 44-52.

McKenzie, R. (2009). Obscuring vital distinctions: The oversimplification of learning disabilities within RTI. *Learning Disability Quarterly, 32*(3), 203-215.

McMillan, J., & Schumacher, S. (2010). *Research in education: Evidence-based inquiry (7th ed.).* Upper Saddle River, NJ: Pearson.

Metzler, J. (2000). *Adolescent literacy resources: Linking research and practice.* Providence, RI: Northeast and Islands Regional Educational Laboratory.

Monaghan, R. (2011). *Implementation of Response to Intervention: How teacher and administrator conceptions reframe district level policy implementation.* (Doctoral Dissertation). Retrieved November 3, 2015, from http://search.proquest.com.iris.etsu.edu:2048/docview/894254240/

Morris, D., Tyner, B., & Perney, J. (2000). Early steps: Replicating the effects of a first-grade reading intervention program. *Journal of Educational Psychology*, 92(4), 681-693.

Murakami-Ramalho, E. & Wilcox, K. (2011). Response to Intervention: A successful principal's approach. *Journal of Educational Administration*, 50(4), 483-500. Retrieved September 19, 2015, from http://dx.doi.org/10.1108/09578231211238602

National Center on Response to Intervention (2010). *Essential components of RTI- A closer look at Response to Intervention.* Retrieved December 2, 2013, from http://www.rti4success.org

Nellis, L. (2012). Maximizing the effectiveness of building teams in response to intervention implementation. *Psychology in the Schools*, *49*(3), 245-256.

O'Connor, R. E., Fulmer, D., Harty, K. R., & Bell, K. M. (2005). Layers of reading intervention in kindergarten through third grade: Changes in teaching and student outcomes. *Journal of Learning Disabilities, 38*(5), 440-455. Retrieved on November 1, 2015, from http://ldx.sagepub.com/content/38/5/440

O'Connor, E., & Witter-Freeman, E. (2012). District level considerations in supporting and sustaining RTI implementation. *Psychology in the Schools*, 49(3), 297-310.

Powers, K., & Mandal, A. (2011). Tier III assessments, Data-based decision making, and interventions. *Contemporary School Psychology*, 15, 21-33.

Proctor, S., Graves, S., & Esch, R. (2012). Assessing African American students for specific learning disabilities: The promises and perils of Response to Intervention. *The Journal of Negro Education*, 81(3), 268-282.

Reutenbach, C. (2008). Succeed with a response-to-intervention model. *Intervention in School and Clinic, 44*, 126-128.

Ritchey, K., Silverman, R., Montanaro, E., Speece, D., & Schatscheider, C. (2012). Effects of a Tier 2 supplemental reading intervention for at-risk fourth-grade students. *Exceptional Children*, 78(3), 318-334. Retrieved October 13, 2015, from http://search.proquest.com.iris.etsu.edu:2048/docview/926833552/fulltextPDF?accountid=10771

Sanger, D., Freidli, C., Brunken, C., Snow, P., & Ritzman, M. (2012). Educators' year long reactions to the implementations of a Response to Intervention (RTI) model. *Journal of Ethnographic & Qualitative Research,* 7, 98-107.

Scholin, S., & Burns, M. (2012). Relationship between pre-intervention data and post-intervention reading fluency and growth: A meta-analysis of assessment data for individual students. *Psychology in the Schools*, 49(4), 385-398.

Shapiro, E. (2009). *Tiered instruction and intervention in a response-to-intervention model.* Retrieved November 28, 2015, from http://www.rtinetwork.org/essential/tieredinstruction/tiered-instruction-and-intervention-rti-model

Shinn, M. (2007). Identifying students at risk, monitoring performance, and determining eligibility within response to intervention: Research on educational need and benefit from academic intervention. *School Psychology Review, 36*(4), 601-617.

Simon, M., & Goes, J. (2013). *Dissertation and scholarly research: Recipes for success.* Seattle, WA: Dissertation Success LLC.

Stuart, S. & Rinaldi, C. (2009). A collaborative planning framework for teachers implementing tiered instruction. *Teaching Exceptional Children*, 41(4), 52-57.

Stuart, S., Rinaldi, C., & Higgins-Averill, O. (2011). Agents of change: Voices of teachers on Response to Intervention. *International Journal of Whole Schooling,* 7(2). 53-73.

Swanson, E., Solis, M., Ciullo, S., & McKenna, J. (2012). Special education teachers' perceptions and instructional practices in Response to Intervention implementation. *Learning Disability Quarterly,* 35(2), 115-126.

Tackett, K. (2009). *More than the sum of its parts: A multiple case study on the implementation of RTI in five sites.* (Doctoral dissertation, The University of Texas at Austin). Retrieved October 12, 2015, from http://etsu-edu-primo.hosted.exlibrisgroup.com.iris.etsu.edu:2048/primo_library/libweb/action/search.do?fn=search&ct=search&initialSearch=true&mode=Basic&tab=default_tab&indx=1&dum=true&srt=rank&vid=01ETSU&frbg=&tb=t&vl%28freeText0%29=fidelity+checks+in+RTI&scp.scps=scope%3A%2801ETSU%29%2Cscope%3A%2801ETSU_BEPRESS+%29%2Cprimo_central_multiple_fe

Tennessee Department of Education (2014). *Special education framework 2014.* Nashville, TN: Education, Tennessee Department of. Retrieved October 13, 2015, from http://www.tn.gov/assets/entities/education/attachments/sped_framework_manual.pdf

Tennessee Department of Education (2013). *TNCore RTI^2 framework 2013: Implementation Guide.* Nashville, TN: Education, Tennessee Department of. Retrieved August 5, 2013, from http://www.tn.gov/education

Tunmer, W. (2007). Recent developments in reading intervention research: Introduction to the special issue. *Reading and Writing, 21*, 299-316.

U.S. Department of Education (2009). *Implementing RTI using Title I, Title III, and CEIS funds: Key issues for decision-makers.* Washington, DC: Author. Retrieved April 11, 2015, from http://www2.ed.gov/programs/titleiparta/rtifiles/rti.pdf

Vanderheyden, A. (2011). Technical adequacy of Response to Intervention decisions. *Council for Exceptional Children,* 77(3), 335-350.

VanDerHeyden, A., Witt, J., & Barnett, D. (2005). The emergence and possible futures of response to intervention. *Journal of Psychoeducational Assessment, 23*, 339-361.

VanDerHeyden, A., Witt, J., & Gilbertson, D. (2007). A multi-year evaluation of the effects of a response to intervention (RTI) model on identification of children for special education. *Journal of School Psychology, 45*, 225-256.

Vaughn, S., Cirino, P. T., Linan-Thompson, S., Mathes, P. G., Carlson, C. D., Cardenas-Hagan, E., Pollard-Durodola, S. D., Fletcher, J. M., & Francis, D. J. (2006). Effectiveness of a Spanish intervention and an English Intervention for English-language learners at risk for reading problems. *American Educational Research Journal, 43*(3), 449-487. Retrieved November 1, 2015, from http://aer.sagepub.com/content/43/3/449

Vaughn, S., Linan-Thompson, S., & Hickman, P. (2003). Response to instruction as a means of identifying students with reading/learning disabilities. *Exceptional Children, 69*(4), 391-409.

Vaughn, S., & Fuchs, L. S. (2006). Response to "Competing views: A dialogue on Response to Intervention." *Assessment for Effective Instruction, 32*(1), 58-61.

Vellutino, F., Scanlon, D., Sipay, E., Small, S., & Fanuele, D., (2006). Response to intervention as a vehicle for distinguishing between children with and without reading disabilities: Evidence for the role of kindergarten and first-grade interventions. *Journal of Learning Disabilities,* 39(2). 157-169.

Wanzek, J, & Vaughn, S. (2008). Response to varying amounts of time in reading intervention for students with low response to intervention. *Journal of Learning Disabilities, 41*(2), 126-142. doi: 10.1177/0022219407313426.

Wexler, J., Vaughn, S., Edmonds, M., & Reutenbach, C. (2008). A synthesis of fluency intervention for secondary struggling readers. *Reading and Writing, 21*, 317-347.

Wiggins, G., & McTighe, J. (2007). *Schooling by design: mission, action, and achievement.* Alexandria, VA: Association for Supervision and Curriculum Development.

Zirkel, P. (2011). RTI confusion in the case law and the legal commentary. *Learning Disability Quarterly, 34*(4), 242-247. doi: 10.1177/0731948711421760.

Zirkel, P., & Thomas, L. (2010). State laws and guidelines for implementing RTI. *Teaching Exceptional Children,* 43(1), 60-73.

APPENDICES

APPENDIX A

RTI^2 FIDELITY REPORT

Check #___

RTI² Fidelity Report Tiers 2-3

Implementation Ck. __ (T2-3, T3-3)

Document Ck. __ (T2-3, T3-3)

(Document Check only requires review of the first 6 areas below)

Non-checks needed prior to SPED referral: 6 implementation & 1

Interventionist: _____ Date/Time: _____ Tier: __ Observer: _____

Circle One: 2= High Level of Implementation 1= Some Level of Implementation 0= Limited Level of Implementation

Area	Level of Implementation	Comments
Student attendance records are maintained.	2 1 0	
Progress monitoring results are maintained.	2 1 0	
Documentation is complete and given to RTI Coordinator on time.	2 1 0	
Instructor uses research-based activities.	2 1 0	
Activities are aligned with students' skill deficits identified in testing.	2 1 0	
Ideas are noted on daily informal notes to guide instruction.	2 1 0	
Student responses guide teacher feedback.	2 1 0	
Interaction with students is upbeat and encouraging.	2 1 0	
Instructor and students are actively engaged in learning.	2 1 0	
All parts of lesson plan are implemented at the scheduled time daily.	2 1 0	
Pacing is appropriate to lesson plan and student need.	2 1 0	
Intensive instruction takes place the full length of intervention time.	2 1 0	
Appropriate questioning techniques are used to guide learning.	2 1 0	

Total: _____/26 for implementation check (Score of 21 needed for 80% fidelity)

Total: _____/12 for documentation check (Score of 10 needed for 80% fidelity)

(Optional)
Reinforcement: _____

(Optional)
Refinement: _____

(Optional) Teacher Comments:

Please sign and return this to your RTI Coordinator by the end of the week.

Instruction implemented with a fidelity score of 80% plus: Yes or No ____%

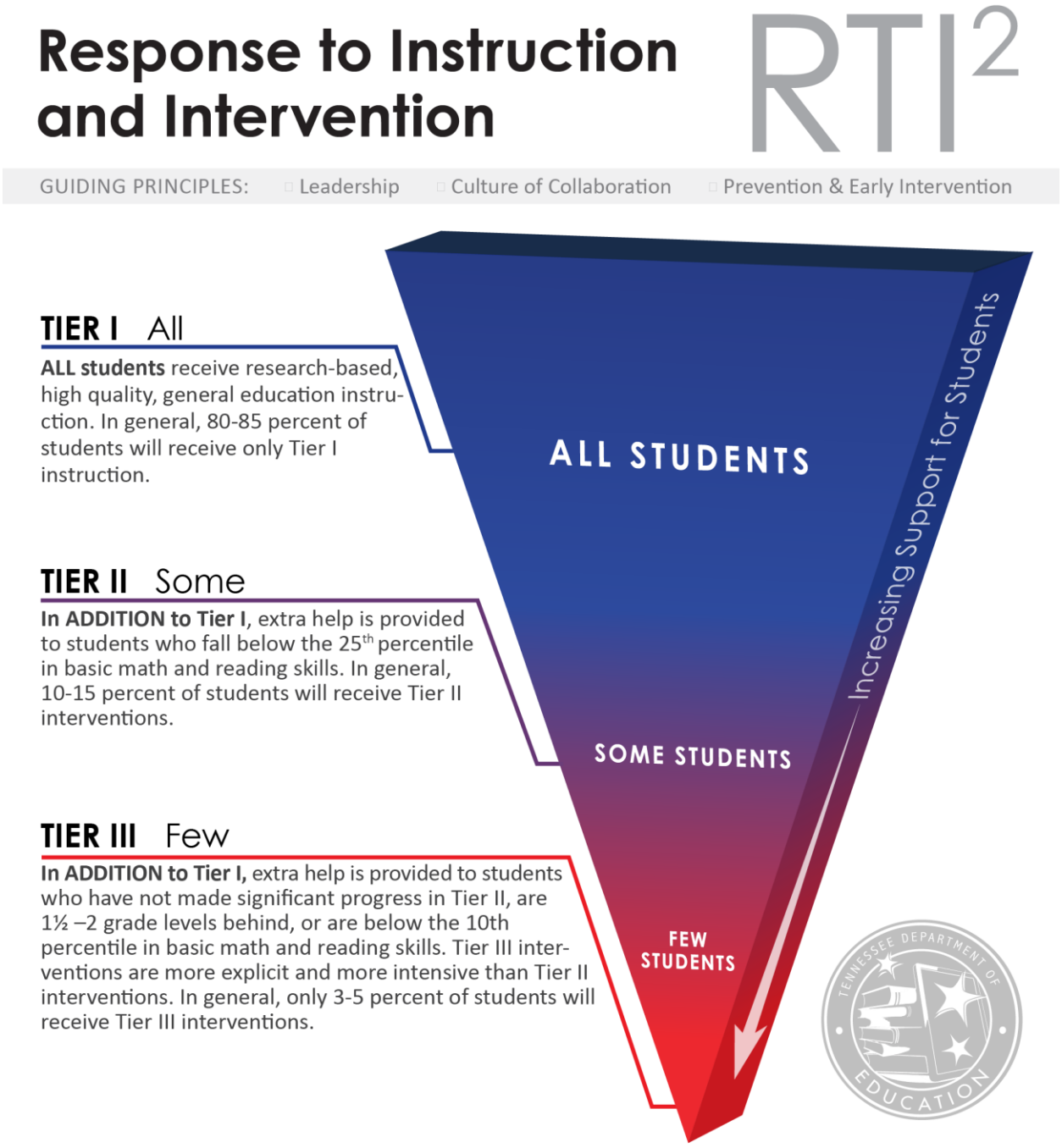
Students Present: _____

Instructor Signature: _____ Principal Signature: _____

Observer Signature(s), if different from principal: _____

APPENDIX B

RTI^2 TRIANGLE (Tennessee Department of Education, 2013)



VITA

ALLISON L. GARDENHOUR

Education:	Doctor of Education, Educational Leadership East Tennessee State University Johnson City, TN 2016
	Master of Education, Educational Leadership East Tennessee State University Johnson City, TN 2011
	Bachelor of Science, Elementary Education Indiana University School of Education, Indianapolis Indianapolis, Indiana 1998
Professional Experience:	Response to Intervention Coach, Grades K-12 Johnson City Schools, TN 2014- Present
	LEAD Literacy Program Coordinator, Grades K-6 Johnson City Schools, TN 2011-14
	Lindamood-Bell Coach, Title I Schools, Grades K-4 Johnson City Schools, TN 2009-11
	Lindamood-Bell Lead Teacher, Mountain View Elementary Johnson City Schools, TN 2007-2009
	Elementary Teacher, Mountain View Elementary Johnson City Schools, TN 1999-2007
	Elementary Teacher, Arlington Elementary Indianapolis, IN 1998-1999
Presentations:	TNDOE RTI^2 Regional Panel, 2016 Kingsport City Schools

UETCTM RTI^2 Math Workshop, 2015
Upper East TN Council of Mathematics
Johnson City Schools

RTI^2 Literacy and Math Workshops, 2014-Present
Johnson City Schools

RTI^2 Assessment and Paperwork Workshops, 2014-Present
Johnson City Schools

RTI^2 and Special Education Workshops, 2014-Present
Johnson City Schools

RTI^2 Coordinators' Workshops, 2014-Present
Johnson City Schools

RTI^2 Readiness for High School and RTI^2 Assessment, 2013-15
North Greene High School, Greene County Schools

RTI^2 Reading Comprehension Strategies, 2014-15
Ottway Elementary/Middle School, Greene County Schools

Lindamood-Bell/LEAD Program Literacy Workshops, 2007-2015
Johnson City Schools

Teaching Struggling Readers for America Reads Tutors, 2012
East Tennessee State University

Professional Memberships: Johnson City Education Association, President (JCEA/NEA)

Parent Teacher Association, Board Member (PTA)
South Side Elementary

International Reading Association (IRA/ILA)

Tennessee Reading Association (TRA)

Indiana Reading Association (IRA)

Tennessee Earth Science Teacher Association (TEST)

Tennessee Earth, Aquatic, and Marine Science Assn. (TEAMS)