RESPONSE TO INTERVENTION: AN EXAMINATION OF STUDENT OUTCOMES BEFORE AND AFTER IMPLEMENTATION

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ABSTRACT

The current research study examined one district's journey through Response to Intervention (RtI) implementation. RtI is a program, now written into federal legislation (IDEIA, 2004; NCLB, 2002), that allows school districts to intervene with additional research-based education resources for struggling students. Districts are able to do this as a means of intervention prior to referral to special education in addition to identifying a student as eligible for special education services. The literature guiding districts through the RtI implementation process describes the components of RtI (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007) but lacks empirical research to establish the effectiveness of RtI in terms of student achievement. This dissertation seeks to add to the current literature by examining student outcomes before and after implementation of an RtI framework, analyzing the use of assessments to determine student placement into intervention services, and noting the perceptions of teachers during implementation. The results of this study will assist school districts by presenting student data trends that occurred before and after implementation, which may affect district practices and policy. In addition, implications for future research are discussed.

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RtI program in the district, you make words written in books come alive for children and that is a magnificent feat.

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

CHAPTER 1

INTRODUCTION TO THE STUDY

Today's educational climate is fraught with rhetoric that America's public schools are failing our struggling youth. No matter where an individual seeks information—be it a newspaper, online news media, a blog, or a magazine—there is bound to be an article or a story citing the troubles plaguing public education, particularly struggling students. This is not news for educators who have dedicated their lives to the service of children. Teachers, administrators, and other school personnel have become accustomed to the constant quest for school improvement. Regardless of who you are, there are two things that are certain about public education: everyone has an interest in it, and everyone seeks to improve it.

The pursuit for educational reform arguably began in the 1960s with Lyndon Johnson's "War on Poverty" and his commitment to giving equal educational access to all students, regardless of socioeconomic status. The reform began with legislation such as the Elementary and Secondary Education Act (ESEA), which called for "financial assistance to local educational agencies for the education of children of low income families" (ESEA, 1965, p. 27) and made the first federal commitment to school improvement. ESEA morphed over the following decades and eventually became known as a portion of the No Child Left Behind Act (NCLB, 2002), and the commitment to dedicating federal money and resources to assist in the education of low-achieving students continued. Simply put, there is a clear pledge of federal funds and policy that continue President Johnson's War on Poverty and his quest for educational equity—and yet, the achievement gap in the United States continues to widen. Students from diverse communities have remained relatively low achieving. In 2007, the National Assessment of Education Progress (NAEP) reported a 27-point literacy achievement gap between White and African-American students in Grade 4. In 2009, The NAEP (2007) also reported a 25-point literacy achievement gap between White and Hispanic students in Grade 4 (Hemphill & Vanneman, 2011; Vanneman, Hamilton, Baldwin Anderson, & Rahman, 2009).

Recent reports suggest that the achievement gap between these diverse groups of students still exists (NAEP, 2013a). Particularly, in the area of reading, 47% of students who are White are at or above the proficiency level, while 16% of students who are Black and 23% of Hispanic students are at or above the proficiency level (NAEP, 2013b). This is not to suggest that public education has only one battle—that of the achievement gap between various racial and socioeconomic groups. Public education must also be concerned with struggling students overall, who continue to lack the skills necessary for academic success and beyond.

In response to the growing concern regarding the achievement gap, the federal government has added specific language to policy that calls for more rigorous professional development for teachers, research-based instructional practice, and systematic evidence-based interventions for low-achieving students (IDEIA, 2004; NCLB, 2002). In addition, in New Jersey, administrative code requires that students receive interventions through a scientifically-based intervention program related to the area of weakness (N.J.A.C. 6A: 14). Policy and law is are slowly pushing education reform to address the needs of low-achieving students in ways that are new, innovative, and responsive. The response from educators has been mixed, with a myriad of reactions to federal and state regulation interference in the education of children (Aaron, Joshi, Gooden, & Bentum, 2008; Fuchs, Fuchs, & Bahr, 1990; Smith, Peters, Sanders, & Witz, 2010). Nonetheless the reality exists that, the education system must comply with these rules.

Across the country school districts are answering the challenge of federal and state mandates with new programming for students who lack the requisite skills to be successful in the academic arena. Some districts still use supplementary instructional programs or basic skills programs, but federal guidelines seek research-based best practices (IDEIA, 2004). The latest instructional framework that meets the federal requirement is called Response to Intervention (RtI), and it seeks to provide struggling students with targeted assistance in various service delivery intensities before falling behind academic peers, thus avoiding widening the achievement gap (Fisher & Frey, 2010; Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). The program is also intended to remedy academic difficulties prior to referral to special education services. While the model will be discussed in greater detail in Chapter 2, it is important to note that interventions in RtI come in the form of various Tiers. Tier 1 is considered all students in the school while Tier 2 and Tier

3 are intense smaller-group, generally pull-out instructional blocks (Fisher & Frey, 2010).

The dissertation used quantitative and limited descriptive methods by way of a survey to investigate and evaluate the RtI implementation process in a single school district in New Jersey, in which the researcher serves as an administrator. This paper seeks to add to the research regarding implementation of RtI in order to assist practitioners on their journey of making educational and instructional change.

Statement of the Problem

The district described in this dissertation has been moving toward the RtI model in order to assist students who are struggling in the specific area of reading. There are two primary areas of concern for the district. First, the struggling students continue to show lower than typical growth on the New Jersey Assessment of Skills and Knowledge (NJASK)—the state assessment instrument. Simply put, the struggling students in the district who are low performing receive significant interventions and supports, yet show less progress than those students who receive no extra supports (New Jersey State School Performance Report, 2013). Second, there are demographic concerns in the district that allow for some disparity in program implementation across the elementary schools, particularly in regard to what constitutes a struggling student in need of support. For example, one school in the district is 83% White while another is 64% White as well as a varied non-English speaking population (New Jersey State School Performance Report, 2013). These demographics have allowed the district administration to question what constitutes a struggling learner. According to the RtI research, the lowest 20% of a population could be considered in need of intervention (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). Would it be the lowest 20% of the district of the lowest 20% in a particular school? The district seeks to use data to remedy this situation by changing the manner in which intervention programming is delivered to low-achieving students who require intervention. In addition to the concerns regarding student reading achievement within the district, New Jersey Administrative Code (N.J.A.C. 16A: 14) does not specifically delineate the requirements for an RtI program, with the exception of stating that it must be established based on evidenced-based interventions over a given course of time. This becomes problematic as districts across the state (and even the country) begin to employ the principles of RtI, but without proper guidance from code, statute, or regulations. Specifically, the legislation does not provide cut off scores nor intervention strategies. It only discusses the necessity of research-based interventions (N.J.A.C. 16A: 14), leaving districts to choose the manner in which intervention is delivered. Thus, this dissertation focuses on implementation practices and a review of the implementation research as they relate to student achievement.

The RtI model in the district was designed to replace the current student support program that has been in use in the district up to September 2014. The student support program that existed prior to the 2014-2015 school year was a pull out program where students identified, based loosely on data, as in need of reading support received an additional 30 minutes per day of language arts instruction. The district had noticed that the support program was not servicing students in such a way that it would increase their reading abilities on universal screening tests or the New Jersey state assessment. In fact, the previous support program continued to perpetuate the two primary issues mentioned earlier: lack of growth in low achieving students and difficulty meeting the needs of students in schools with varying demographics. According to the New Jersey State School Performance Report (2013) in Language Arts only (not in math), students who performed on a partially proficient level on the New Jersey Assessment of Skills and Knowledge in 2012 continued to make low-growth on the same assessment a year later in 2013. According to this, the partially proficient students in Language Arts fall further behind their peers by making low growth, thus widening the achievement gap.

In order to move from a traditional basic skills student support program to a true RtI model, the district has used multiple assessment tools to investigate how to best identify students for the RtI interventions in Tier 2 and Tier 3, these being the most intensive interventions a child is able to receive. In addition, the district began to use this data in the 2013-2014 school year as it inched towards an RtI model of intervention. The data collected previously were primarily used to allocate resources and identify children who required intervention beyond Tier 1 (classroom instruction). In the 2014-2015 school year, the data will also inform the district on the effectiveness of a changed program. A true and fully implemented RtI model does not yet exist in the district, and the district is using data in the form of test scores to help sculpt the program.

In 2014-2015, the school district administered the Reading Curriculum Based Measure (CBM) in Grades K-4. More specifically, the district looked closely at the reading measure (R-CBM). The R-CBM can be used to identify students who are in need of reading interventions through our RtI program. The district was also seeking to predict success on the NJASK, which is the New Jersey high-stakes assessment. The proper use of the CBM assessment as well as its predictive nature was also investigated in this dissertation.

Lastly, it is clearly understood that teachers are valuable stakeholders when it comes to educational change. While teacher input has been gathered to make the various changes to the district's reading student support program, the district has not undertaken systematically gathering their perceptions of these changes.

Overall, the problem that exists is detailed and complex. The district is seeking opportunities to develop the reading skills of struggling students across four schools that have diverse student demographics. It has been common practice to allow individual elementary school buildings to autonomously look at the needs of their students and adjust their instructional support program accordingly, but this has led to mixed results when it comes to student success on the NJASK (Buffum, Mattos, & Weber, 2009). The current research study examined how implementing theoretical RtI framework, appropriate assessment information through AIMSweb, and targeted instructional practices in literacy have impacted student outcomes.

In summary, there are multiple problems regarding in the implementation of RtI in this district in New Jersey. First, Administrative Code does not state requirements for intervention programs, leaving districts to autonomously decide how to best implement and monitor intervention programs. Second, districts have struggled with underwhelming student gains in the area of reading despite interventions prior to the implementation of an RtI model, and there are related issues that need to be addressed regarding the disparate demographics in the district. Third, the district continues to struggle with varying teacher philosophies and ideologies related to RtI and its implementation such as how to structure the tiered service delivery model or how to best use assessment data to make decisions regarding the intensity of intervention. The full implementation of an RtI program differs significantly from how interventions have been approached in the district for many years. Specifically, the concept of targeted and tiered interventions is new to the district. Of course, this can yield different reactions, as change in programs can be a source of anxiety. It is important to look at teacher philosophies as the district seeks to implement the RtI process for students struggling in reading.

The Current Study

After the reauthorization of IDEIA (2004), which included provisions allowing school districts to look at interventions prior to classifying a student as a student with disabilities, education research has taken a keen interest in the implementation of programs such as RtI and its effect on student achievement. As stated previously, New Jersey has few guidelines in Code that discuss the details of RtI implementation and monitoring, but does require some degree of intervention to be conducted by the school district prior to referral to special education, and the amendments to IDEA in 2004, which in turn have guided N.J.A.C 6A: 14 require that school districts develop procedures for identifying children with disabilities:

> These procedures shall include utilizing strategies identified through the Intervention and Referral Services program according to N.J.A.C. 6A:16-8, as well as other general education strategies. Interventions in the general education setting shall be provided to students exhibiting academic difficulties and shall be utilized, as appropriate, prior to referring a student for an evaluation of eligibility for special education and related services. (N.J.A.C 6A: 14, p. 57)

Prior research on RtI has suggested there are required components of implementing a successful RtI model (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007), such as a tiered program with varying levels, and these tiers fluctuate instructional group size and intensity, among other things.

Literacy research has also taken a stand on what is considered evidence-based best practices in RtI as it relates to reading instruction. Prior descriptive, non-empirical, research tells us that RtI must consist of various tiers (Fisher & Frey, 2010; Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007) and targeted interventions that add to core instruction (Burns & Ysseldyke, 2005; Jenkins, Schiller, Blackorby, Thayer, & Tilly, 2013). There are also certain prescribed steps that should be taken from assessment to gather information to instructional intervention (Fuchs & Fuchs, 2005).

The purpose of this dissertation was to follow a district through the implementation of an RtI model that includes reliable assessment practices and tiered instruction. The current study utilized pre-existing data collected by the district that measured student outcomes resulting from the implementation of an intervention program in the area of reading.

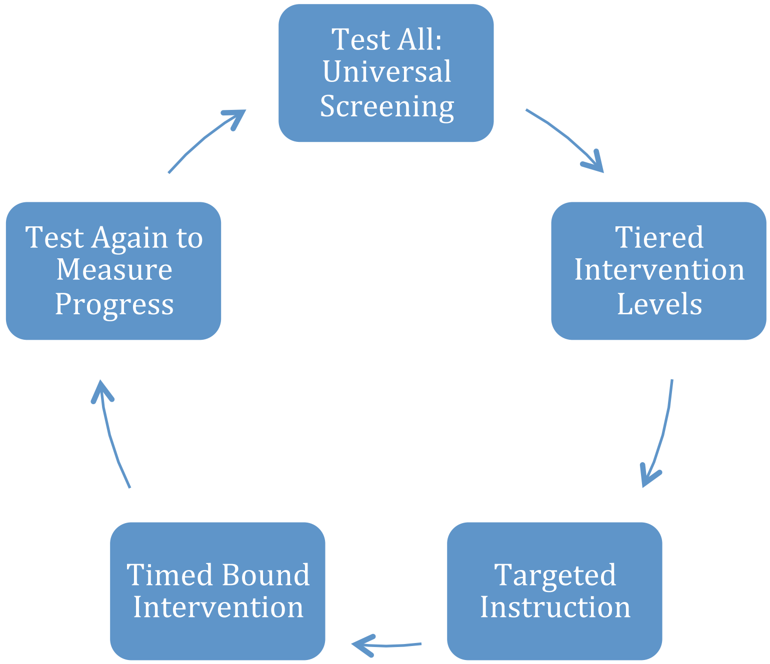

Figure 1.1. Model adopted by district

Figure 1.1 shows how the district has adopted what could be considered the 5 Ts model for RtI. First, students are *tested* using a universal screening. Second, the assessments are discussed at data meetings where educational professionals place the child into a *tiered* intervention based on need. Then, once in the intervention students receive *targeted instruction* based on reading deficit. This intervention is *time bound*, meaning students receive the intervention until data is collected that show the student needs a different service or none at all. Finally, students are *tested again* using the universal screening. This summary encompasses the primary change in Year 2 that is under investigation in this dissertation.

Prior to this, students were not tested using a universal screening tool. Students were placed in intervention programs based on teacher assessment. In addition, students who were identified for intervention all received the same level of intensity intervention (5 days per week in a group of approximately 6). Groups for intervention instruction were made based on scheduling convenience, not reading deficit. Lastly, there were no progress monitoring or follow-up assessments, including a universal screening, therefore students remained in intervention programs for at least an academic year or longer. A comparison chart of the primary differences between the 2013-2014 school year and 2014-2015 school year is found in Chapter 3.

As stated previously, much of the current research on RtI focuses on what makes certain RtI models successful (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007), using assessment in RtI (McAlenney & McCabe, 2012), examining case studies of schools that have implemented models of RtI (Robinson, Bursuck, & Sinclair, 2013; White, Polly, & Audette, 2012), and some empirical research looking at student achievement (Graves, Duesbery, Pyle, Brandon, & McIntosh, 2011; Wanzek, Roberts, Al Otaiba, & Kent, 2014). However, it is interesting that there is little research that examines RtI implementation retrospectively. Such an analysis would provide a comprehensive view of RtI implementation dovetailed with empirical data to show whether implementation affects student achievement. It would be worthwhile to describe the before-and-after landscape of what occurs both before RtI and after RtI, as well as all of the processes of implementation in between. No research has yet to examine RtI from this retrospective view using variables such as assessment data, correlation to statewide achievement test data, and teacher perception data. These variables can all give insight into the successes of RtI as the nation moves towards this as a method for intervening for struggling students.

The Purpose of the Research

First, this dissertation analyzed the differences in student achievement pre- and post-implementation of a full RtI program in the school district. As mentioned earlier, in the 2013-2014 (Year 1) school year the district did not apply the principles of a true RtI program for students in need of intervention, meaning a tiered and targeted instructional model was not used. In addition, there were no assessment practices that diagnosed reading struggles and no subsequent tiered intervention based on the data (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). Strides were made in data collection and analysis of student reading skills in order to make instructional decisions, but no tiered or targeted interventions occurred with fidelity to the components required by existing literature in RtI. In the 2014-2015 (Year 2) school year, the District has made significant strides in applying the principles of RtI—specifically, the targeted and tiered approach during an intervention period. In particular, students no longer receive a 30 minute period of pull out language arts instruction, but rather now receive a 30 minute period of instruction targeted to their reading deficit and skills needed. Due to the timing of this project, the focus of the dissertation was on data collected during the first half of Year 1 (2013-14) and the first half of Year 2 (2014-15).

Second, with such variable district demographics, this dissertation examined socioeconomic differences in the elementary school buildings and attempt to draw conclusions on the success of interventions based on these varying demographics.

Third, the district has adopted a CBM measure through Pearson's AIMSweb system. The predictive validity of this CBM was assessed in this dissertation. I performed an analysis to determine whether these assessment tools give the district the necessary information to accurately predict the likelihood of student success on more high-stakes testing, such as the NJASK.

Lastly, teacher perceptions were gathered in Year 2 of the implementation process. Data from this retrospective survey can allow the district to consider teacher perceptions and teacher implementation perspectives to see if there are discrepancies or agreements as to the effectiveness of the new RtI model. Essentially, a district-developed teacher survey can gather anecdotal evidence of how the implementation process has gone as well has how students perform in RtI interventions as perceived by the teachers.

Overall, the purpose of this research was to glean further knowledge in education research, policy, and practice when it comes to the implementation of programming, specifically RtI. The district is aiming to fully implement a true intervention program based on best practices in literacy in order to improve reading achievement in struggling students.

Research Questions

The goal of the current study was to discover whether implementation of an RtI program affects student achievement in reading, particularly when a program had not yet existed in prior years, as well as to uncover socioeconomic differences when comparing pre- and post- implementation data. This study also sought to understand teachers' perceptions of the implementation process of RtI as it relates to their teaching practice. There are several research questions that guide this dissertation:

1. Has the implementation of a targeted, tiered RtI program changed reading student achievement outcomes as measured by the AIMSweb probes? Are the same changes in reading performance after implementation measured as a function of socioeconomic status or ethnicity?
2. Is the AIMSweb assessment (used to identify children for RtI) accurate for identifying a student's likelihood to be successful on the NJASK state test?
3. What are teachers' perceptions of the effectiveness of an RtI program in the first year post-implementation?

The questions have been developed based on the experiences of district-level staff and administration as well as on the trends gleaned from a review of the existing research on RtI programs.

Significance of the Study

RtI has been discussed for decades, but has just recently become a widely accepted intervention model. The theory underlying RtI suggests that targeted, tiered, and time-bound interventions in the area of literacy are the most effective and produce the most gains in reading achievement (Fisher & Frey, 2010). Research suggests that struggling readers continue to struggle despite the best efforts of teachers and administrators (Allington, 2009; NAEP 2013a). Teachers also continue to have a vested interest in assisting struggling students through their teaching practice. It is important, however, to understand what the definition of evidence-based instruction has become and whether or not teachers' perceptions of successful implementation are on par with what the data tells us about student performance. The current research adds to the conversation regarding RtI theory's assertion that direct, targeted, and tiered instruction is the best method for enhancing student reading achievement for all students in diverse schools of varying demographics. It also determines whether the CBM assessments accurately identify struggling students, as well as gathers the perspectives of teachers. Lastly, this research is important to schools across the nation that continue to struggle with competing demands from local, state, and federal regulations while attempting to implement the most effective, beneficial educational programs for struggling students. This dissertation could act as a guide for districts that seek to move from an unfocused intervention period to a more targeted and tiered intervention program—a true RtI model.

CHAPTER 2

LITERATURE REVIEW

The reauthorization of IDEIA in 2004 began the field of education's journey into RtI. Though this reauthorization occurred ten years ago, it is important to understand that educational change occurs gradually and deliberately. Therefore, RtI and subsequent policies, procedures, and education practices are relatively new and innovative. In addition, research on RtI is also in its infancy stage. This important research has taken center stage in education (including special education) for the past decade, as it has begun to change the way we classify students as learning disabled. It has also changed the way in which educators view intervention practices in that teachers have had to move toward targeted and tiered instruction. There are still questions to be answered in regard to its implementation, effectiveness, and effect on long-term student achievement.

This literature review is organized into four primary areas. First, attention is given to the overall historical context of general and special education policy that led to IDEIA (2004) and its inclusion of RtI. The second section begins with a brief overview of RtI, particularly in terms of its tiers and conceptual framework, which is followed by considerable discussion of the use of assessment tools and their role in identifying students who require intervention. The section regarding the role of assessment in RtI also tackles the predictive nature of the assessments used to benchmark students for RtI programs. The final section focuses primarily on the research that relates to the current study's research questions. This section will review the literature pertaining to effective implementation of RtI, the effect RtI has on various diverse groups of students, and the perceptions of teachers as RtI begins to infiltrate public schools.

Historical Context of Intervention Programs

Interventions and special education were studied by psychologists and educators prior to Lyndon Johnson's "Great Society" and his first significant piece of legislation that provided equal access to educational opportunity, the Elementary and Secondary Education Act (1965). The psychologist Lightner Witmer founded the first psychology clinic at the University of Pennsylvania in the year 1896. His primary concern was providing assistance to children who were considered struggling learners or children who, today, would be considered learning disabled. His work used a team approach of various psychologists, social workers, and medical professionals, and he believed in a battery of assessments to assist in identification of the learning issues (Benjamin, 2007). The work of Witmer has an astounding resemblance to the current Child Study Team (CST), where a team of specialists approach problem solving students who present with a variety of learning needs. While this would not be considered the first RtI program, it looked remarkably similar to our current methodology of a problem-solving approach to students who struggle to learn. This similarity suggests that since the earliest investigations into the process of teaching and learning, professionals have been interested in models for effective intervention.

Years after Witmer's studies on children with disabilities, and approximately a decade after Johnson's Great Society promise, the mid-1970s brought new educational legislation that paved the way for equitable opportunity in education for children with disabilities (IDEA, 2004). This is consistent with the ESEA legislation of the 1960s. Essentially, the federal government made a significant financial and political commitment to improving America's public schools for all learners, including those with special educational needs. The publication of *A Nation at Risk* (1983) brought another challenge to the federal government—the government was now more concerned with research-based educational practices. Since then, federal and state policies have developed research-based regulations and procedures to safeguard the education of the nation's youth.

The IDEIA legislation also outlined procedures to be applied by school districts when determining eligibility for special education programs. At first, the procedures did not include provisions for school districts to attempt interventions prior to an evaluation for special education. Instead, it used a discrepancy model whereby students were found eligible for special education services, under the classification of SLD. This model stated that a child must have a significant discrepancy between his or her ability and achievement. The Child Find obligation of IDEIA requires school districts, parents, physicians, and other professionals to send a referral to the local school district's Child Study Team if a disability is even suspected. This resulted in substantial referrals to special education.

Most recently, the re-authorization of IDEIA in 2004 has now called for intervention programs to be attempted before a child is sent to the Child Study Team for screening. In light of this new legislation, many states have required districts to adopt research-based intervention protocols. Due to the newness of RtI programs, educational professionals and scholars continue to conduct research on programs and to review best practices in the area of intervention programming. The State of New Jersey does not currently have a mandatory RtI process; however, it uses a similar process called Intervention and Referral Services (I&RS) to assist with intervention for struggling students. The trouble is that this I&RS process does not require the use of the research-based practices set forth in the RtI framework. Interventions through I&RS can occur in any manner (in class or out of class, by the general education teacher, one day to five days per week, etc.), as there are no research-based guidelines that govern these practices. The RtI literature, however, has developed a framework within which interventions should occur. It is my goal, through this literature review, to analyze the current RtI literature so that it may be applied for implementation in not only districts, but also in the State of New Jersey as it moves toward more regulation with respect to RtI. While New Jersey does not yet require the use of RtI as an intervention program, the school district that is the subject of this research is beginning to use RtI as a means for intervention for struggling readers.

It will be important for states, like New Jersey, and districts, like the one that is the subject of this dissertation, to understand not only the theory behind RtI but also the practices associated with moving toward targeted and tiered interventions as discussed in the RtI literature. Like many educational reforms, RtI will have a lasting impact on policy and best practices in instruction as the scholarly community begins to look closely at implementation across the country.

Conceptual Framework of Response to Intervention

RtI is predicated on the assumption that general populations of students require varying levels of intensive instruction to make gains in particular behavioral or academic needs. Some students require much more intensive instruction on reading, for example, in order to achieve grade level standards and compete with academic peers, while others require only general education instruction to achieve the same grade level standards. IDEIA (2004) would suggest that RtI is something that should be tried prior to evaluation by the Child Study Team for eligibility of special education services. Regardless of how RtI is used in schools, it has been developed as a way to vary learning so as to meet the needs of diverse students (Fisher & Frey, 2010). In some schools, RtI is used to assure the use of best practices prior to determining special education eligibility (Aaron et al., 2008; Fuchs et al., 1990; Smith et al., 2010). In these cases, students at these schools receive more intensive interventions, moving from Tier 1 to Tier 2 and eventually Tier 3, as a means of intervening in an area of academic struggle. If these interventions are not successful, the child may then be considered for special education services. However, RtI can be used as a service delivery model for struggling students who may not qualify for special education but for whom learning is more difficult.. In those cases, the goal is not intervention prior to eligibility for special education services—but rather intervention to avoid special education services. In other words, RtI can act as a remedial, pre-referral program. In New Jersey, the administrative code (N.J.A.C. 6A:14) still uses the discrepancy model for the identification of children with specific learning disabilities and their eligibility for special education, thus leaving RtI to function more as a service delivery model.

As stated previously, RtI works under the assumption that varied intensive levels of instruction are needed for a student to be successful. The framework of RtI assumes that in any given population approximately 80% of the students will be able to adequately achieve with Tier 1 instruction. Tier 1 instruction comprises general education classroom, but all students in the general education classroom receive a universal screening test to determine if intervention is needed. Tier 1 instruction also provides all students with evidenced-based interventions (Fuchs & Fuchs, 2007).

Tier 1 instruction is considered a school district's standard curriculum, and these students only require general education instruction with some differentiated methods. Some researchers have begun to call this level of instruction "core instruction" (Fisher & Frey, 2010). If, when screened with the universal screening test, a student appears to have less-than-adequate skills in a given area (e.g., reading, math, or behavior), the student will then be considered for more specialized and intensive interventions. In Tier 2, students require some strategic interventions. Approximately 15% of the student population would typically require Tier 2. Strategic interventions for this tier include small group instruction or tutoring in the area of need (Fuchs & Fuchs, 2007), and. Tier 2 students are also monitored closely for growth in their area of need. Finally, a student who shows significantly low skills may receive a Tier 3 intervention. Tier 3 interventions are generally required for about 5% of a student population. These interventions are the most intensive, such as individualized programming or one-on-one instruction (Fisher & Frey, 2010; Fuchs & Fuchs, 2007). Children receiving Tier 3 interventions may or may not be made eligible for special education. Figure 2.1 provides a graphic of the RtI framework in a triangle form. It recommended that school districts have at least three levels of intervention (Fisher & Frey, 2010; Fuchs & Fuchs, 2007).

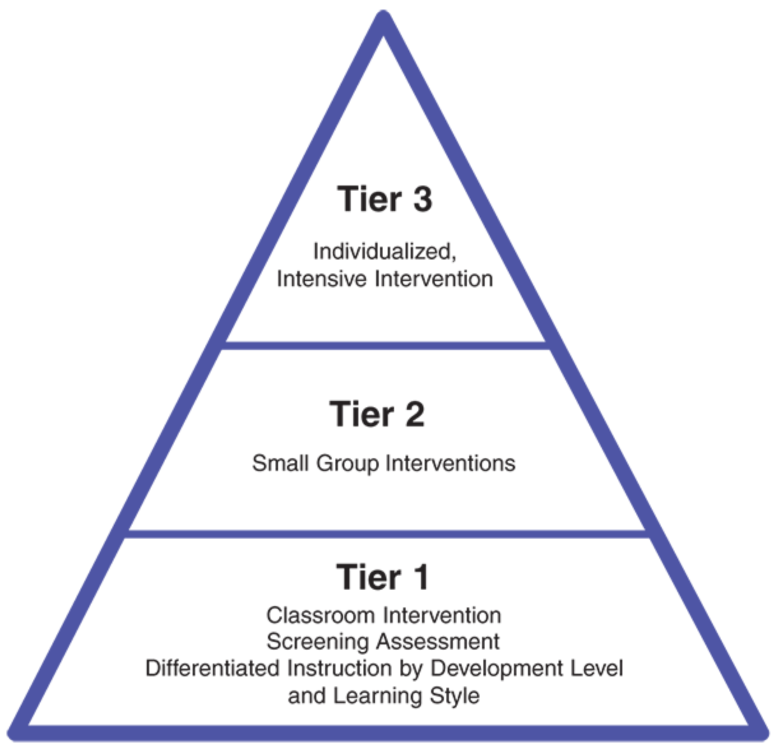

Figure 2.1. The Response to Intervention Triangle

Mellard, McKnight, and Jordan (2010) gathered descriptive data regarding RtI implementation across 41 elementary schools. The authors present the RtI triangle (see Figure 2.1) and its constructs—variables such as intensity, frequency, and group size—across the tiers. The authors also discuss the theoretical framework of the RtI model and how schools are taking this model and transforming it into practice. For example, RtI theory suggests that students in Tier 2 meet less often as an intervention group than those in Tier 3. This is the manipulation of the frequency variable in the RtI framework (Fuchs & Fuchs, 2007; Fisher & Frey, 2010), meaning that the theory calls for Tier 3 interventions to be more intensive than Tier 2 interventions. Mellard and colleagues (2010) found that of the 41 schools polled, 73% offered reading five days per week, suggesting no variation in the frequency of meeting time. However, when the authors looked at group size (another variable of the tiers), they found that Tier 3 instruction occurred more on a one-to-one basis. The article also discusses how students move within the tiers, indicating that schools primarily move students from one tier to another based on student performance.

The research synthesized by Mellard and colleagues (2010) describes the theoretical and conceptual approach to RtI, but it also takes the theory and discusses how schools have successfully used the tier structure to implement an intervention program that is responsive to student needs. The researchers relate the structure and function of the RtI model to the medical profession, suggesting that as a patient presents symptoms to a physician, the dosage and frequency of treatment changes (Mellard et al., 2010). The RtI tier model assumes necessary assessments were administered to a child and intervention instruction should be administered based on the assessments. It is important to remember that a variable similar to the “dose” of instruction is given through the tier model, much like a visit to a doctor. The focus of their article is the structural intensity of the tiers observed in over 40 elementary schools.

Mellard et al. (2010) also note a problem in the practical application of the RtI framework. Previous research suggests that in order for RtI to function as a medical health prevention model, it must be applied in a way that differentiates the treatment based on severity of symptoms (Caplan, 1964). As a parallel, physicians do not give all cancer patients chemotherapy five days a week. They differentiate the dosage of treatment based on the severity of the cancer. Schools have adequate assessments to measure the severity of reading challenges in students—thus, why give the same frequency of intervention to all struggling readers? Mellard and colleagues (2010) demonstrate that there are still some problematic trends in implementation of the RtI model in schools. Their study calls for a body of research where evidence is collected on schools that truly adhere to RtI models.

One goal of this dissertation is to show how application of a true RtI model can assist in raising student achievement in reading. In essence, educational research has found a theoretical model that has been proven to work, yet schools struggle with the implementation of this model. More research should be conducted to show the further advancements of RtI and how the RtI model is meeting the needs of students. This dissertation aims to show that elementary schools are able to implement the RtI model with fidelity, but most importantly that having varying levels of frequency, intensity, and group size can assist greatly in employing the theoretical model of RtI. In other words, school districts are able to implement despite the challenges posed by district policy, federal guidelines, and school scheduling and personnel issues.

A related issue presented by Mellard et al. (2010) is the concern regarding how students move within the tier system. While student performance is important, districts must use multiple means of assessment to gauge student progress. It is important to avoid having students incorrectly placed in an intervention program. It is also equally important that students do not get dismissed from intervention programming without proper assessments. Thus, the role of both benchmark probe assessments and continuous progress monitoring assessment are integral to the RtI process. The research presented by Mellard et al. (2010) and others suggest that RtI is still a new and burgeoning area of practice for school districts. The field of education has begun to see some consistency with the application of the RtI model, but lacks empirical evidence that the theory has been put into practice effectively when implemented.

Implementation of RtI: Guidance for Schools and Districts

School districts have sought guidance on how to best implement an RtI model over the past ten years (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). The related research is a mix of guidance, commentary, case studies, empirical research, and meta-analyses. The existing research all seeks to guide school districts regarding the best practices of RtI implementation.

Research that provides guidance and commentary on the structure and implementation of RtI often times present a model or framework for building RtI in schools to intervene for academically struggling students and avoid special education classification (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). Some research discusses pitfalls and possibilities in specific domains of learning, such as literacy

(Johnston, 2011). In a commentary article, Fuchs and Fuchs (2006) suggest schools use an RtI framework to build a capacity for RtI as an effective intervention system. The authors address questions of program efficacy, assessment integrity, and feasibility of the RtI model. While Fuchs and Fuchs (2006) synthesize previous research to develop thought-provoking questions that anticipate RtI issues, it hardly provides a framework for building and implementing an RtI program. The research in their article simply emphasizes questions to be considered when developing an RtI program, but does not give any type of suggested answers to the questions. This could leave school districts and program developers misguided in their quest to develop an effective RtI program. A year later, Fuchs and Fuchs (2007) provided a more comprehensive implementation model, asking districts to consider six components of RtI. Specifically, their research suggests that successful RtI programs must have six process components. First, districts must make decisions regarding the number of prevention tiers. Second, district must have specific identification criteria for students to enroll in the tiers. Third, specific targeted instructional strategies must be chosen. Fourth, decisions must be made as to what "response" looks like, or how much progress is enough progress to change the intervention. Fifth, districts must choose how to best use RtI as an evaluation tool for special education. Lastly, districts must make decisions regarding how the RtI triangle will incorporate special education instruction (Fuchs & Fuchs, 2007). In the conclusions of both of their articles, the authors point out that implementation practices are provisional in RtI and new innovations are developing often. This suggests that districts should look critically at various bodies of research when considering implementation of RtI programs.

Research conducted by Glover and DiPerna (2007) focused on a review of service delivery models for RtI. They provided commentary in regard to the effectiveness of each of the five core service delivery models for RtI. The five models outlined were 1) a multitier approach, 2) student assessment and decision-making, 3) evidence-based interventions, 4) maintenance of procedural integrity, and 5) development and sustainability of systems-level capacity. The authors discuss these five models in detail and propose that these five components are needed for successful implementation and sustainability of the RtI program. However, the research lacks substance as to what tangible action steps are needed for successful implementation.

Commentary and articles such as these, which build the foundation for practitioners and suggest models of RtI for implementation, certainly have their place in the academic literature of RtI. They are practitioner-friendly and give substantial guidance for implementation. However, there are some critical elements that are missing. First, though these articles discuss how to build a successful RtI program, they do not provide evidence as to how success is measured. Many articles boast successful implementation practices but lack the student achievement data to substantiate any such claim. Second, the articles fall short of giving tangible action steps schools and districts can take to develop effective programs. Again, the articles outline questions, frameworks, and models for RtI, but fail to give direct steps needed for effective implementation.

In order to better understand what makes RtI implementation effective for students, districts have examined various research that describes RtI implementation and subsequently discusses the results for augmented student achievement. The following subsections introduce the varied descriptive, case study and experimental research that have begun to highlight these areas in RtI implementation.

Descriptive Research

Jenkins et al. (2013) examined practices of implementation in RtI from various school and district-driven perspectives. The researchers sought to identify different school implementation guidelines, tier structures, implementation history, and special education identification. Surveys were given to 62 elementary schools across the nation and follow-up phone interviews were then conducted to gather more information from 45 schools. Results indicated that most schools were in year two of RtI implementation and were implementing RtI at grade levels K-3. Tier 1 survey results showed that 85% of schools reported using a published reading program (Harcourt) and 80% reported differentiation to provide core instruction. Tier 2 and Tier 3 survey results showed that 90% of schools used R-CBM as a universal screening assessment, 42% indicated that Tier 2 instruction occurs outside of the core program (pullout) with class sizes of 5-6 students. Tier 3 instruction also occurs outside of core program, and class sizes are 3-4 students. The time allocated for Tier 2 and Tier 3 interventions ranged from 3 days per week to 5 days per week, with 74% of districts offering Tier 3 interventions 5 days per week. Schools showed hugely varied results when it came to servicing special education students in reading using the RtI model. This research study gathered information regarding the implementation of RtI in various elementary schools across the U.S. to add some architecture to guide RtI practices—however, it does little more than describe what is currently occurring. It is also concerning that the results rely on self-report from districts that attended a conference. This specific conference is not representative of the vast number of educators who are struggling to implement RtI. This sample consisted primarily of educators who were teacher leaders and administrators who could afford to attend a conference, both financially and in release time from teaching duties.

Greenwood and Kim (2012) suggest that dependable implementation of RtI requires an "ecological footprint," and their research provides readers with the necessary ecobehavioral perspective and tools to implement RtI with fidelity. A fictitious case study was presented in which a child was having academic difficulty. Data were collected using an ecobehavioral taxonomy called the MainStream Code for Instructional Structure and Student Academic Response (MS-CISSAR). The results indicated that at Tier 1, behavior problems were reduced for the child, and at Tier 2, small group reading instruction improved the child's literacy skills. This study adds a unique element to the body of research on RtI, as it shows how to use a taxonomic data collection system to identify a few target areas in need of intervention. However, there was no true empirical evidence gathered to show that an ecobehavioral approach would work when implementing RtI. This could lead the reader to adopt a purely theoretical perspective with no practice use.

Burns and Ysseldyke (2005) present a comparison paper in which they analyze four different exemplary RtI models: Heartland Area Educational Agency in Iowa, Pennsylvania's Instructional Support Team, Ohio's Intervention Based Assessment, and the Minneapolis Public Schools. The authors investigate each model's effectiveness in various capacities, such as validity, personnel training, leadership needed, and special education eligibility. All four of the RtI models studied used effective CBM to inform instruction and monitor student progress, and each model also used similar training methods to train personnel. Leadership was managed in varying ways, and each RtI model had various timelines for how long the RtI process should last. While Burns and Ysseldyke (2005) present a helpful comparison of some highly-regarded RtI processes, it lacks specific details in regard to the methods the RtI models used, making it difficult to generalize these conclusions to other districts that wish to implement an RtI program. In addition, Burns and Ysseldyke (2005) conclude that there were positive outcomes for students with and without disabilities, but only go as far as to suggest that the RtI models resulted in fewer referrals and placements into special education. No discussion of student achievement outcomes occurred.

Case Study Research

White et al. (2012) sought to examine the features of one school's implementation process of an RtI model and the events that were crucial to fully implementing RtI. The primary purpose of this study was for the participants to describe the successes and pitfalls experienced along the way during implementation of RtI in one North Carolina elementary school. The results showed seven primary themes to be considered when implementing RtI: frustration with old pre-referral systems, implementation processes and procedures, classroom implementation, principal leadership, professional development, improved outcomes, and implementation obstacles. The authors concluded that their article has added to the body of research by providing an outline of the stages of effective implementation and show how teacher buy in can assist in garnering support for new initiatives. White et al. (2012) is an interesting retrospective view on RtI implementation, but does not offer suggestions for the pre-implementation phases of RtI.

Robinson et al., (2013) present a case study of exploratory research where they investigate the 5-year journey of RtI implementation in two rural public schools. Their research questions asked about the challenges in implementing RtI and the factors that have impeded or facilitated effective implementation in two elementary schools. Participants were first interviewed, field observations of classroom instruction were done, and observation of problem-solving meetings were also conducted. Similar to White et al. (2012), the authors found themes relating to the implementation of RtI. These themes include issues that related to evidence-based instruction, data-based decision making, collaboration, and support for implementation. Thus, these authors present yet another exploratory retrospective research paper that examined implementation issues. While Robinson et al. (2013) add another dimension to their study—classroom observation—they fail to discuss classroom practices in detail as the first implementation year progressed. This lack of findings or discussion based on classroom observations fails to show how implementation of RtI can enhance or change classroom practice.

Research by Shepherd and Salembier (2010) examined the practical application of RtI implementation at Riverside Elementary School. Results of this study found six common themes: changing classroom practices through student achievement data, redefining roles of teachers, refining school structures to make way for RtI, creating PD focused primarily on literacy, building a school-wide community of leaders and learners, and addressing issues of sustainability. Of the findings, most interesting was the concept that RtI should be changing the face of general education, not promoting a process to get into special education. This case study of Riverside Elementary was systematic in looking at implementation, but again gives a retrospective look at the implementation of RtI.

The descriptive and case study literature provides a road map for implementation. Descriptive research guides schools and districts as to what RtI looks like in practice (Burns & Ysseldyke, 2005; Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007; Jenkins et al., 2013), giving the reader insight as to what the final product of a fully-implemented RtI program will look like. Case study research allows a retrospective look at implementation through the lenses of specific schools and districts (Robinson et al., 2013; Shepherd & Salembier, 2010; White et al., 2012), but are limited as to how applicable those experiences are to other districts. Most importantly, the descriptive and case study literature have left room for further investigation of how RtI improves student academic outcomes. Empirical research is necessary to determine how RtI can improve academic achievement for struggling learners. In the data-driven educational society we function in, it is essential to understand how program changes empirically influence achievement.

Empirical Research

Graves et al. (2011) presented research discussing the effects of evidence-based Tier 1 and Tier 2 interventions in two urban middle schools. The primary purpose of their research was to pilot the use of Tier 1 and Tier 2 interventions with struggling students in Grade 6 across multiple years; however, the authors also sought to add to the body of research that discusses implementation practices in RtI in the middle school setting. The study consisted of treatment and control groups: students in the treatment group received tiered intervention English and LA instruction as part of a supplementary course, while students in the control group did not receive the supplementary instruction, but rather attended English classes as usual. Results indicated that the treatment group showed significant gains in oral reading fluency and on the Woodcock Johnson–III but in no other measures. This study certainly adds to the field, suggesting that Tier 2 interventions can be beneficial to students in urban areas. However, it was conducted in a middle school setting, and answers regarding RtI Implementation are also sought at the elementary level. The present study investigated the impact of RtI in elementary schools through a similar empirical lens with the focus on improving student achievement in literacy.

Wanzek et al. (2014) examined the relationship between print instruction in Tier 1 kindergarten classrooms and students at risk for reading difficulties. The purpose of their study was to look closely at the amount of time spent in Tier 1 reading print and how this related to end-of-year overall reading scores. Students were given a letter naming screening, as well as phonological awareness, alphabetic principle, and letter and word reading assessments at two points during the year (September and May). The findings determine a correlation indicating that the greater the amount of print reading per day, the greater the reading achievement on multiple measures. In addition, some positive correlations existed between print reading and pre-reading skills as well as some teacher-level variables, such as small group or 1:1 instruction. Wanzek et al.'s (2014) study is evidence that engagement in print reading will yield significantly higher reading achievement—however, this tells us little about the actual Tier 1 interventions employed during the study, and we continue to have questions regarding Tier 2 and Tier 3 implementation. The present study expanded on the research mentioned above by looking at not only Tier 1, but also Tier 2 and Tier 3 interventions. In addition, the present study examined interventions across multiple grade levels.

A conference abstract paper by Ransford-Kaldon, Flynt, and Ross (2011) presented a controlled experiment regarding the use of Leveled Literacy Intervention (LLI; Fountas & Pinnell, 2009) in the RtI framework. The results indicated that the use of LLI in combination with general education literacy instruction showed positive effects on student reading achievement. While this study used a controlled design, it only looked at one simple aspect of RtI, which was the specific program of LLI. The research does not answer questions regarding implementation of RtI without the specific use of a published program, but rather with the evidence-based instruction of RtI. Implementation without the support of a published program is important to investigate, as many districts do not have the ability to purchase expensive copyrighted programs. The current research intends to investigate the implementation of RtI using best practices, but not a specific program.

Review of the Implementation Research

Information regarding the implementation process of RtI programs is important for school districts that wish to begin the process, and many districts have undergone this process over the past ten years. The literature that discusses the implementation process is varied. Many important aspects have come to light with regard to implementation of RtI. First, there are common themes in how districts describe the RtI model (Burns & Ysseldyke, 2005; Jenkins et al., 2013). Second, schools and school districts are excellent at gathering data and articulating pitfalls and challenges after RtI has been implemented (Robinson et al., 2013; White et al., 2012). Also, themes that arise after implementation suggest districts that wish to implement RtI need guidance (Shepherd & Salembier, 2010). Lastly, there is some, but little empirical data. The limited existing research does show that RtI implementation benefits student achievement in literacy (Graves et al., 2011; Wanzek et al., 2014). Overall, the research on RtI tends to focus on common themes of RtI implementation, and limited research uses empirical data to show how RtI implementation has assisted struggling learners.

Case studies give those schools wishing to implement RtI a road map to follow for the process in their specific school or district (Shepherd & Salembier, 2010). Case studies are important to this body of research, but are only specific to the schools where the research was conducted. This is problematic because case studies can be a challenge to generalize to other contexts. States and districts have their own laws, policies, and procedures that govern how programs should be run, and this is an important factor to consider when looking to these case studies for guidance. Similarly, articles that provide commentary do build background and discuss the general theory if RtI implementation and practice (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). While this literature can be helpful for districts to learn about RtI programs, it falls short when it comes to discussing the particulars of developing RtI as a new, innovative program.

Other literature presents descriptive statistics in regards to what RtI programming looks like in schools and districts across the county (Burns & Ysseldyke, 2005; Jenkins et al., 2013). This type of research is, once again, helpful for those wishing to understand the theory of RtI and how that theory has been described in practice. Many of these descriptive studies arrive at conclusions that add similar findings to the knowledge base that has already been created through other literature. It seems as though these studies often re-affirm what we already know to be practical and useful in RtI implementation.

Finally, the educational research arena has begun to tinker with empirical research in examining the implementation of RtI. The big question has thus become—how does this help students? This gets to the heart of RtI and to the issue of bridging theory with practice. However, research like the current study is still needed to assist schools and districts in seeing the benefits of RtI. Graves et al. (2011) have designed a very useful study that examined the effect of RtI on student learning. However, this research presents data collected with only a sample of urban middle school children. Research like Graves et al. (2011) should be built upon to truly survey the implementation of RtI and how it affects student achievement across all grade levels. This is not to suggest that only controlled experimental design should be used. There are benefits to natural and field experiments where the researcher is unable to control all confounding variables, but the advantages are such that research takes place in a true, natural setting (Agnew & Pyke, 2007).

The literature in this microcosm of RtI implementation is fascinating, in that it is varied and offers specific conclusions that assist districts in developing RtI programs. The literature describes an experimental approach to looking at how RtI implementation directly affects student outcomes, and it uses a control and treatment group, where the treatment group undergoes a model of RtI. Future RtI research should be modeled after these controlled experiments. While this presents a significant challenge to schools and districts because they do not allow for laboratory conditions, multiple measures can be used to investigate implementation factors and their effect on RtI. For example, districts could collect data on reading or math the year prior to implementation, implement an RtI model, and then collect data the following year. A description of the RtI model would, of course, be essential—however, in this case, data from one year to another could be analyzed. In a climate where school achievement is governed by strict data, this would provide a marriage between implementation practices and student data outcomes affected by RtI implementation.

Since data are paramount in measuring school success and examining the effectiveness of RtI implementation, it is important to use reliable and valid measures upon which to gauge these successes. The RtI literature has outlined the important role assessment plays in implementation (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). Assessments are used not only to measure the success of implementation but also to identify students in need of intervention. The next section of this dissertation discusses the necessity of assessment in RtI through the lenses of identification and predictability of success on larger statewide assessments.

The Role of Assessment in Response to Intervention

The Center on Response to Intervention (2012) and the RtI literature overwhelmingly agree that assessment is necessary for successful identification (Deno, Fuchs, Marston, & Shin, 2001). Schools and districts must have assessment tools to determine which students require intervention. Additionally, these assessment tools, such as AIMSweb, should have a measure of predictability for student success on high-stakes, statewide assessments.

Assessments as Identification Tools

Multiple tools may be used for the identification process. Some educators review anecdotal student performance data from the teacher, others consider state-administered assessments, and many use classroom assessments to determine current student levels of performance (Fuchs & Fuchs, 2006). More recently, practitioners have used a CBM to identify students for necessary interventions and to monitor progress while receiving a leveled intervention. A CBM is a brief assessment tool, sometimes called probe, that is associated with the academic curriculum (McAlenney & McCabe, 2012). McAlenney and McCabe (2012) discuss the use of CBM and imply that it assists in identifying students who require interventions with more precision than teacher judgment. They further suggest that CBM measures are more accurate and reliable when it comes to monitoring the progress of students who are receiving an intervention program. The research conducted by McAlenney and McCabe (2012) is also important in discussing teacher perceptions of RtI. Thus, this study will be discussed in a later section in regards to the importance of gathering teacher perception information, as it is important to investigate their claim that it is more reliable to use the CBM than rely on teacher accuracy.

CBM probes in the specific area of reading are divided into three major categories: early literacy skills, oral reading fluency, and comprehension. Good and Kaminski (2007) state that first, in order to test early literacy skills, research suggests using the Dynamic Indicators of Basic Early Literacy Skills (as cited in Clemens, Hilt-Panahon, Shapiro, & Yoon, 2012) assessment or some similar measure that includes probes in Initial Sound Fluency (ISF), Phoneme Segmentation Fluency (PSF), Letter Naming Fluency (LNF), and Nonsense Word Fluency (NWF). These probes, or similar ones, are widely used across the county to assess early literacy skills (Clemens et al., 2012). Currently, AIMSweb (AIMSweb, 2014) has begun to gather momentum, as it is a largely web-based assessment tool that eliminates the paper-pencil aspect of keeping running records and hand scoring. AIMSweb uses the same probes in a web-based system to assess early literacy skills. A description of each Early Literacy assessment and a sample item can be found in Table 2.1. In addition, the AIMSweb online program has assessments that measure reading fluency, the R-CBM, and reading comprehension, and Maze-CBM (AIMSweb, 2014).

Table 2.1

Description of Early Literacy Assessment Probes

Probe	Description	Sample Item
Initial Sound Fluency (ISF)	Requires the student to identify the first sound heard in a word.	When presented with the word *cat*. The student says the */k/* sound.
Letter Naming Fluency (LNF)	Requires the student to identify upper and lower case letters of the alphabet.	When the student is presented with a list of letters, s/he correctly says the letter name.
Phoneme Segmentation Fluency (PSF)	Requires the student to identify and say each individual sound in a given word.	When the student is presented with the word *cat*, the student should say three sounds */k/ /a/ /t/* (the *a* is a short vowel sound).
Nonsense Word Fluency (NWF)	Requires the student to correctly sound out (or say) a made-up word.	When presented with the word *zed*, the child sounds out or says the made-up word. The child can also segment the phonemes for a correct response.

Note. Adapted from AIMSweb (2014) and Clemens et al. (2012).

It is important to note that AIMSweb does not currently test ISF but rather LSF, which requires students to identify sounds of both upper-case and lower-case letters. When students reach Grade 2, when early literacy skill assessments are no longer developmentally appropriate, they are then given other measures of reading. AIMSweb calls their assessment the Reading-CBM (R-CBM), which is measure of oral reading. The R-CBM (AIMsweb, 2014) or Oral Reading Fluency (ORF) measure

(Clemens et al., 2012) requires students to read a grade level text passage aloud in one-minute. The test administrator records errors. The Maze-CBM (AIMSweb, 2014) is a multiple-choice cloze reading passage that requires students to read silently for a prescribed amount of time and choose the correct word to complete the sentence.

Predictability of the CBM Assessment

School districts have adopted the use of CBMs to assist in the identification of students at risk of overall school failure, but also for identification of students who may not pass statewide assessments. It is through these statewide assessments, at least in New Jersey, that school districts are judged on their proficiency with the core standards. It is thus necessary to consider the literature that talks about the predictive nature of CBM assessments. One goal of RtI is to identify children who need academic intervention, and schools use these CBM assessments to make this identification. It is important to ensure that schools are identifying the correct children who require intervention, as measured by the state assessments at the end of the year. The predictability of these assessments is crucial because it allows districts to make educational decisions on a precursory, low-stakes assessment prior to students taking a high-stakes test, like a state assessment. If children are identified as needing intervention on the CBM in September, schools have a greater chance of intervening and giving those children the requisite skills needed to be successful in school and later on that state assessment.

A body of research has begun looking much more deeply into the predictive nature of CBM assessments on student growth in literacy (Clemens et al., 2012).

Clemens et al. (2012) examined the same cohort of students across kindergarten and first grade, looking for predictions of reading success on a first grade ORF. The results suggest that some early literacy probes are more reliable than others in predicting success in ORF in grade 1. Specifically, probes such as LNF and NWF were most accurate in predicting first grade reading growth (Clemens et al., 2012). The authors discussed important conclusions on using such CBM tasks to place students into RtI programs and in terms of overall student outcomes. While this initial assessment is essential to placing students in intervention programs, continual monitoring is also required with CBM measures (McAlenney & McCabe, 2012).

Hale et al. (2010) considered the predictive nature of comprehension assessments. The aim of their study was to administer students a series of CBM comprehension assessments: Maze comprehension questions, Maze Reading Comprehension Rate (RCR), and Maze Accurate Response Rate (MARR). The authors then compared correlations to Words Read per Minute and the Woodcock Johnson III (WJ-III) Broad Reading Cluster. Sixth, seventh, and eighth grade students were assessed and the results found that the RCR was the best predictor variable of the WJ-III. This result has important implications for school psychologists and learning consultants when assessing children for special education eligibility because it establishes a correlation between these assessment tools (Hale et al., 2010). However, this research shows little about the practical implications as an intervention service delivery model in school districts and in the classroom.

Further, this research fails to assist elementary schools in identifying children who struggle in reading.

Hale and colleagues (2010) do not consider classroom implications such as teacher-gathered data on comprehension—either through a classroom reading assessment or teacher-developed assessments—nor do they correlate to any statewide assessment system. However, it would be interesting to see how these comprehension assessments or the WJ-III correlate to a statewide assessment system. The research by Hale and colleagues (2010) could yield significant implications for classroom practice, identification for intervention, and identification for special education. Remember, RtI is also a service delivery model—not simply an eligibility criteria for special education. It is necessary to take the next step to see how identification for RtI dovetails with success on high-stakes, statewide assessments. The current study examined the predictability of several AIMSweb assessment measures at various times within the school year to determine their ability to accurately predict success on the NJASK, given that this assessment is the only measure of district accountability in the state where the data are collected. Thus, state and federal grants as well as teacher evaluation are tied to this assessment.

Hintze and Silberglitt (2005) conducted a longitudinal study considering the diagnostic uses and predictive nature of R-CBM assessments for high-stakes testing. The purpose of their research was to compare cut scores from the R-CBM and the Minnesota Comprehensive Assessment (MCA). In their study, over 1,700 students were given the R-CBM assessment of ORF eight times, from winter of Grade 1 through fall, winter, and spring of each grade level through Grade 3. In the spring of Grade 3, students also received the reading MCA. The results indicated the R-CBM had a strong predictive nature for the MCA, particularly when the R-CBM was administered chronologically close to the MCA. Further, the researchers found the R-CBM to be a good predictor of success on the MCA using the R-CBM as predictor and the MCA as the criterion variables. These results can assist schools in benchmarking students and making decisions regarding interventions and possible classification for special education. Hintze and Silberglitt (2005) present strong evidence that R-CBM is a good measure of success on other high-stakes tests. However, this research looks at one criterion variable, the MCA. In order to really assess the predictive nature of R-CBM assessments, it is important to consider other standardized reading measures, such as the broad reading clusters of the Woodcock Johnson Achievement Test, or even the NJASK.

Assessments play a dual role in RtI. First, assessments function as identification criteria for enrollment into intervention tiers. Second, they are predictive in nature, predicting success on future achievement tests. The current study seeks to investigate the dual purpose of assessment within the district's RtI model. It is imperative to continue examining the AIMSweb assessment as identification criteria for intervention, but also as criteria to predict a child's success on the NJASK assessment. The aim is to merge assessment concepts: as criteria to receive RtI services as well as a predictor of success on future, more high-stakes assessments. Doing so will be of practical importance for districts, as limited resources often present a challenge to student identification for specialized programs. Districts must have a way of identifying the most appropriate student population for intervention programs that go beyond the differentiated, general education classroom, and this dual purpose of assessment can assist districts in this manner. The next section of this chapter discusses how assessments have yet another purpose–planning for intervention instruction.

RtI and the Benefits of Targeted Instruction

The RtI model calls for various tiers of instruction, but what happens within those tiers of instruction is equally important. There is a current body of research that suggests that the tiers of RtI function most effectively when instruction is targeted to the students' needs (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). Considering the medical care analogy once again, think about the need for a specific treatment for heart disease. Once a patient is diagnosed with heart disease, further assessment is warranted and the patient receives a treatment of medication. A physician would treat high cholesterol with medication; the treatment for a blockage or plaque buildup would likely look different. Physicians do not place heart patients on all heart medications and do a cardiac catheterization just because the patient has a heart problem. However, in public education, if a child has a reading deficit, the child is often given the every strategy conceivable to remediate his issues (Mellard, McKnight, & Jordan, 2010). Is this effective? As heart patients, we certainly would not accept this as common practice, so why should children be given a battery of intervention strategies all at once? Once again, RtI advocates for direct, targeted instruction in a singular focal area.

Earlier in this chapter, the CBM and its use within an RTI framework for identifying children who require more targeted interventions were discussed. However, that is not the singular use of assessment, especially the CBM. The CBM also should be used to help determine the student's academic deficits, and the teacher should use this information to plan intensive instruction once the student is receiving the intervention (Stecker, Fuchs, & Fuchs, 2005). The following is a review of the literature that discusses school districts' use of such targeted instruction.

When contemplating intensive instruction, first we must operationally define what is considered intensive instruction. Fuchs, Fuchs, and Vaughn (2014) wrote a brief review in which they describe intensive instruction. They suggest that intensive instruction can come in two models. The first model indicates the varying levels of frequency and group size based on the tier in which a student is placed. The second model is Data-Based Individualization (DBI). DBI is a process whereby the teacher individually designs instruction for the student's area of need. The teacher uses data gathered through assessment, determines instructional tools to be used, sets a goal, implements the intensified instruction, and monitors the child's progress (Fuchs et al., 2014). This process is a clinical way of viewing student progress. It is a simple formula of diagnosis, intervention, monitoring, and adjusting. However, these researchers fail to address the issue of skill-based intervention. There remains a need for empirical data that suggests targeted instruction is what is effective in educational practice. The literature suggests that case studies and commentary articles provide evidence of the effectiveness of RtI. Fuchs et al. (2014) discuss the use of DBI, but fail to suggest developing instruction based on a hierarchy of reading skills. For example, would it be beneficial to develop DBI for letter naming before teaching letter sounds? Could we apply the concept of skill-based instruction to target student needs? Here, we begin to consider the practical nature of RtI instructional implementation. The research reviewed (Fuchs et al., 2014; Stecker et al., 2005) includes explanatory papers suggesting that children should be identified for interventions through RtI using assessment, and those assessments should continue to guide instruction. However, the current body of research is lacking specificity and empirical evidence to show that targeted instruction within the RtI framework is effective and increases student achievement outcomes. It is of importance to also note that this research is necessary for guiding teachers, as they are the professionals who implement the targeted interventions in the classroom.

An article by Smetana (2010) discusses how teachers fail to understand how the targeted nature of Tier 2, specifically, is designed to assist students with their deficits. Batsche et al. (2005) first describes the standard protocol approach (as cited in Smetana, 2010), in which students are given an assessment and subsequently grouped by need or deficit. This suggests that students who all have a deficit in reading comprehension would be grouped together at either Tier 2 or Tier 3. Smetana (2010), similarly to Fuchs et al. (2014), advocates for targeted, intensive instruction, and suggests that grouping students by need is an effective strategy. However, there is a lack of empirical evidence in this article that shows the impact of grouping students by deficit area. Smetana (2010) does present the case of a student who received interventions based on his target deficits identified by assessment tools, but still lacks solid research that suggests these targeted instructional groupings by deficit are working appropriately to improve student achievement.

While these studies present findings that suggest the target instruction component of RtI is beneficial and remedies student struggles in reading, the literature lacks controlled experimentation and fails to describe the structure of these targeted interventions—the latter concern being of particular importance to this dissertation. Simply put, existing research points to the significance and necessity of using tiered and targeted interventions, but does not fully describe how this translates into a day-to-day school setting. Similar to the review of literature regarding implementation practices, there exists a lack of empirical research driving the need for the targeted nature of instruction in an RtI model. However, some research (Gilbert et al., 2013; Scholin, Haegele, & Burns, 2013) begins to tackle the importance of targeted instruction by way of empirical research.

A recent research article by Gilbert and colleagues (2013) is one of the few controlled and randomized studies that investigate the use of the various tiers to remedy first grade struggling readers. The researchers studied over 600 struggling first grader readers at the beginning of the school year. Students were first given a universal screening tool to determine if they were at risk for reading difficulties. If so, students were given Tier 1 instruction and their progress was monitored. If students did not respond to the Tier 1 instruction, they were then given another assessment and divided into multiple groups. If students were responsive to Tier 1, they were kept in Tier 1 instruction. At-risk students were placed into two groups: a control and treatment group. The control group received a pretest on skills and then after the intervention was given a posttest. The treatment group was given a pretest and received small group tutoring for seven weeks. Those in the treatment group who were responsive continued small group tutoring. Those who were unresponsive were assigned to one of two groups, again either a treatment or control. This control group continued small-group tutoring, while the treatment group received Tier 3 one-on-one instruction. This is exactly the clinical model that RtI advocates.

The results indicate that there was a difference between the students who received Tier 2 tutoring as opposed to Tier 1 classroom instruction. Specifically, students in Tier 2 showed gains in word reading. However, there were no significant differences in reading ability between students who continued to receive Tier 2 instruction or those who moved to Tier 3 one-on-one instruction. This finding is concerning because it directly contradicts the theory and ultimately the goal of RtI. The authors question the efficacy of one-on-one tutoring in Tier 3. The theoretical research regarding RtI (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007) suggests that the more intensive the tier becomes, the greater the gains in student achievement. Gilbert et al. (2013) found that Tier 3—the most intensive—interventions did not yield any significant achievement gains as compared to other tiers. Future research should look closely as to how Tier 3 is delivered and by whom. Some research (Jenkins et al., 2013) describes paraprofessionals as those who deliver instruction. Perhaps the role of paraprofessionals should be explored as compared with teachers or reading specialists.

Gilbert and colleagues' (2013) controlled experiment was undoubtedly important; however, the researchers fail to explain the instructional strategies and protocols used in each of the groups as students move from Tier 2 to Tier 3. It was simply stated that the instructional focus of each group included letter-sound correspondence, sight-word recognition, phonemic awareness, decoding, spelling, and fluency. These were included in the instructional focus because they are considered essential components of reading instruction according to the National Reading Panel (Gilbert et al. 2013). Perhaps more gains would be seen in Tier 3 instruction if the instructional strategies and practices were based on student needs and if students were grouped according to those needs.

Gilbert et al. (2013) failed to place students in a skill-based, targeted group for instruction. What if a first grade struggling student did not need letter-sound recognition as an intervention? Would he or she still get intensive instruction on the skill? If so, is it necessary? The primary focus for future research must be on the targeted nature of RtI. The RtI model rests on the assumption that students receive targeted instruction based on an area of skill deficit. Simply putting first grade students in an intensive instructional group based on the National Reading Panel's recommendations of a comprehensive literacy program is unnecessary and inefficient.

Recent research by Scholin et al. (2013) presents empirical research as to how a small-group reading comprehension intervention assisted three students. The three participants were identified as needing intervention using the district's assessment measures and were placed in a reading comprehension group to remediate comprehension deficits. The students met three times per week in a separate setting outside the classroom. According to Palinscar & Brown (1984), the intervention consisted of research-based comprehension practices, such as summarizing, clarifying, and generating questions (as cited in Scholin et al., 2013). The results indicated that over a 17-week period, students' correct comprehension responses grew from an average of 10 to 24. This empirical research suggests that Tier 2 interventions held outside the classroom with moderate intensity yielded student growth outcomes. This is the beginning of empirical data that demonstrate interventions delivered using this model are effective at boosting student achievement; however, more research should be conducted on a larger scale to see the growth both school- and district-wide.

A case study by Stecker (2007) examined the issue of grouping students according to need. Stecker's research was not an empirically based, controlled experiment like that of Gilbert and colleagues (2013) and Scholin et al. (2013). Rather, Stecker (2007) describes the case study of Ruby Sue (a fictional student in a school). The article walks the reader through the RtI process as the student, Ruby Sue, is moved from Tier 1 through Tier 3 based on her need. Tier 2 is where the author first describes how the intervention program is going to be structured for this child: "she was at risk in nonsense word fluency. Ms. Cortez, a reading specialist, served as the intervention teacher and provided 30 minutes of supplemental instruction 3 days per week in phonemic awareness and phonics activities" (Stecker, 2007, p. 52). Stecker's work is an improvement in that it talks about the *type* of intervention Ruby Sue received based on her need and how she was grouped according to this need. While this is a good example of how RtI should function, this article lacks data and evidence, as this was a hypothetical example of the RtI framework in use. Though helpful at giving districts an understanding of the architecture and implementation practices of RtI, once again, there exists a need for specific evidence that suggests the nature of targeted and tiered instruction is effective in an instructional service delivery model for struggling students.

The research surrounding the need for targeted and tiered interventions presents some interesting concepts about the targeted, intensive nature of instruction in RtI. However, this body is research continues to need further investigation into how the structure and function of interventions in Tier 2 and Tier 3. The RtI model advocates that students be grouped according to need and receive instructional interventions based on that need (Fisher & Frey, 2010; Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). Empirical, controlled experiments have been conducted to provide the statistical evidence that this approach is most effective (Gilbert et al., 2013; Scholin et al., 2013). However, this research yields mixed results regarding the use of RtI in the school setting, in terms of the outcomes. Further evidence is needed to explicitly determine the effects of targeted interventions in RtI as a possible successful service delivery model for improving student outcomes.

It is hypothesized that that students who are identified as having a learning deficit in reading and are placed into a group based on that deficit (fluency, phonics, comprehension, etc.) will improve their reading achievement. The existing research begins to suggest that this hypothesis is warranted, but further empirical data are needed to confirm this. This study was designed to utilize data on the effectiveness of grouping students according to deficit in a tiered instructional model. As the district that is the subject of this study moves toward RtI, it has made significant changes in the way intervention services are delivered to students. Most significantly, the district has grouped students by reading deficit for remediation.

How RtI Affects Diverse Groups of Students

Students who are economically disadvantaged can often possess academic risk factors that affluent students do not experience (Eamon, 2001). RtI is a way of intervening in academic difficulties for all students, whether affluent or disadvantaged, but it is unclear if RtI is equally effective for various populations of students. The literature on RtI concerning minority populations or economically disadvantaged groups of students focuses mostly on urban areas (Abbott & Wills, 2012; Graves et al., 2011). This leaves districts in suburban or rural areas with minority populations and economically disadvantaged populations with little guidance as to how RtI can be effective. In other words, urban schools with this population of students have different methods for using RtI than suburban districts, and the research gives little insight as to these nuances.

Recall from earlier in this chapter that RtI runs under the assumption that approximately 80% of children in any given population will make adequate if not substantial progress with Tier 1 interventions only, and 20% of children will need Tier 2 or Tier 3 intervention to make meaningful gains (Fisher & Frey, 2010; Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007). What happens if an urban school shows that

80% of students are struggling readers and require interventions? Urban schools with large minority populations and large populations of economically disadvantaged students often struggle with needs that may be unanswered by the traditional RtI triangle (Fisher & Frey, 2010). So then, what effect does RtI have on schools that have a large population of disadvantaged youth who require RtI? Though it suggests some solutions, the research lacks concrete suggestions for schools that have a mix of populations. This literature review points out how urban districts can use RtI, but it also points to the lack of research applicable to diverse schools where populations encompass multiple socioeconomic statuses and ethnic groups.

An article by Abbott and Wills (2012) discusses the case of a school with a diverse student population, in that the school featured in the case "has experienced rapid growth of its English language learner population" (p. 37). They suggest that the traditional RtI triangle (where 80% of the population needs Tier 1 instruction only) will not meet the needs of this population of struggling readers. The authors describe how flipping the RtI triangle upside down can assist in meeting the needs of struggling learners in schools that have seen significant growth in English language learning populations. The authors outline an RtI triangle that calls for 60-80% of students to receive some reading intervention through an intervention period built into the school day. Classroom teachers, a reading specialist, and paraprofessionals delivered reading instruction during this block of time to keep group size small while giving a large portion of the school interventions. Essentially, all staff members became interventionists. Intervention instruction programs were chosen through the What Works Clearinghouse and implemented school-wide. The results showed that in year one of the study, students in Grade 1 entered school reading at 10 words per minute (WPM) and exited second grade at approximately 50 WPM. By year three of the study, students continued to enter school with 10 WPM, but left second grade at approximately 80 WPM. Abbott and Wills (2012) show some evidence that their flipped RtI triangle was successful in their school. However, it is unclear if the increase in WPM was due to the intervention or just the simple fact that a research-based intervention program was implemented from the What Works Clearinghouse. In addition, the authors do not explain in any great detail how the school was able to keep class size during this intervention period so small.

The present study targets a school district that is starting to experience the same challenges as in the school presented in Abbott and Wills' (2012) research. However, the district described in the current study has two (out of four) elementary schools that maintain their continued growth in English language learner student population, yet they do not identify 80% of the population as needing Tier 2 intervention. The other two elementary schools maintain a much less diverse population with very few English language learning students. Abbott and Wills (2012) describe the case of a singular school that required the inverted triangle due to the large need for intervention. The district that was the subject of this dissertation is presented with two issues when it comes to diversity. First, the populations of the four schools are very different and human resource allocation in the program RtI is a challenge. Specifically, all school buildings can claim a lowest

20% population, but are all of these low achieving students in need of intervention? Second, while the population of economically disadvantaged students is large, it does not require the inverted triangle. Research suggests that not all economically disadvantaged or urban districts require the use of the inverted triangle.

There are cases of urban schools with diverse populations that implement the RtI framework as intended with the traditional triangle (Fisher & Frey, 2010) and see results of dramatic student improvement in reading. One quasi-experimental study, in particular, found significant gains in students receiving RtI reading instruction (Graves et al., 2011). These researchers sought to compare two groups of sixth grade students: one group that received an evidence-based intervention and a control group that received typical reading instruction. At this school, 100% of students qualified for free and reduced lunch and 90% were considered English language learners. The authors gathered the 60 of the lowest performing students—students who performed below basic or far below basic as defined by the state of California—and assigned approximately half to the Tier 2 treatment group. The results indicated that the treatment group's performance grew by a mean of 10.2 WPM, while the control gained 2.1 WPM, making this difference in growth significant. The Tier 2 intervention clearly demonstrated greater growth for struggling students. In addition, students with special educational needs (N=7) in the treatment group also showed significantly greater gains compared with those in the control group.

Graves et al. (2011) suggest that RtI intervention programs can work without inverting the RtI triangle and intervening for virtually all struggling students in the school. In fact, Graves et al. (2011) maintained fidelity to the RtI principle that the bottom 20% of students receive the interventions. However, it would be interesting to also investigate how the RtI implementation affected students who were not considered English language learners. Moreover, research like this should be tested in a school that does not have 100% students on free/reduced lunch and 90% English language learners. The research on struggling readers in urban schools shows how these schools can intervene on the most significantly struggling students; however, there are suburban schools who also struggle with populations where perhaps half or a quarter qualify for free and reduced lunch or are economically disadvantaged. The literature has not yet fully examined how lower-achieving populations of students respond to specific RtI model interventions as compared to their more affluent classmates.

As mentioned earlier, the district that is the subject of the current research project struggles with a diverse population of students in its four elementary schools. Consider for a moment that a hypothetical school has approximately 30% of students on free and reduced lunch and about 25% of the students are English language learners. Imagine in the same district there is also a school that has 6% free and reduced lunch status students and 4% are considered English language learners. When implementing RtI, the theoretical model tells us that the lowest 20% of students require intervention (Fisher & Frey, 2010), but the lowest 20% of the population in the first school looks different than that of the second school. School districts like this seek literature that will guide them through the process of identifying the most appropriate 20% of the student population requiring intervention. The implications for allocating resources becomes essential in this example, as both schools will make the case that there is a lowest 20% of students needing intervention. The current literature does not tackle this issue, in that it does not provide a framework for diverse districts for developing an effective RtI program.

The existing literature gives valuable information to urban schools wishing to implement an RtI program. Their conclusions offer urban schools the opportunity to develop a program that fits the needs of urban students. However, the literature has yet to answer how RtI can affect diverse groups of students who attend the same school or even the same district. It would be interesting to consider whether RtI can influence the academic achievement of both an affluent, Caucasian underachiever in the same way it can influence a socioeconomically disadvantaged Hispanic or African-American student who attend the same RtI program in the same school. The current study investigated this very issue by looking at the socioeconomic status of students who receive intervention to examine differences among these populations. The district under study in this dissertation includes a diverse population of students and seeks guidance as to how to allocate resources to meet the needs of all students in schools that look socioeconomically diverse.

Teachers' Perceptions of the RtI Framework and Benefit to Students

Theoretical research on RtI suggests that this medical model of intervening in an area of deficit for students is effective at remediating academic difficulty (Mellard et al., 2010). The country, through IDEA legislation, has suggested that RtI is a way to give students the skills needed through intervention and prevent referral to special education services. One might ask, how do the teachers feel about this? What is the experience of educators across the county in implementing RtI? Would they suggest the same conclusion? A review article by Fuchs and Bergeron (2013) gathers viewpoints from educators who describe the successes and challenges of RtI. Of course, when implementing such a program there will be both successes and challenges, and the article overall concludes, "As described by school-based practitioners who have successfully implemented an RtI framework, RtI offers the potential to greatly enhance student learning and academic success" (Fuchs & Bergeron, 2013, p. 11). However, it is noted that the literature describing teacher perceptions of RtI does not compare perception to any student learning or academic success data. It is still left inconclusive if teacher perception of RtI implementation matches the student outcome measures (data, grades, etc.) once RtI has been implemented. It would be of interest to compare student achievement data and teacher perceptions of RtI implementation and its effectiveness in increasing student achievement and appropriately intervening on student academic deficits.

General Educator Perceptions

Qualitative research conducted by Stuart, Rinaldi, and Higgins-Averill (2011) examined teacher perceptions as agents of change through a three-year period of RtI implementation in an urban school district. The authors asked the question, "What are teachers' perceptions of RtI?" (Stuart et al., 2011, p. 54). The purpose of this study was to allow educators a forum to share their perceptions of the development and implementation of RtI in the school district. This occurred using 90-minute focus groups and individual interviews over the course of a twelvemonth period, which was also the second year of implementation. These semi-structured focus groups and interviews used only prompts to guide the discussion.

The results yielded four primary areas that were worthy of discussion. First, teachers' perceptions of the special education referral process consisted of remarks that spoke positively about reducing the number of special education referrals, allowing teachers more time to collaborate and problem-solve issues surrounding student struggles. Second, teachers found that using progress monitoring data assisted in informing instruction. Third, teachers found that RtI allowed for an increased opportunity for collaboration. Lastly, teachers reported themselves as being primary stakeholders in the transition to RtI. While this article begins to provide information regarding teacher perceptions of RtI implementation, the focus groups occurred in year two of implementation, giving a positively skewed perception of RtI by teachers. The barriers that had existed as well as the negative remarks of teachers in year one were captured, but no analyses were conducted to analyze the change in teachers' perceptions: could it be assumed that teachers just got used to it in year two of RtI implementation? The current research investigated the perceptions of teachers in the first year of implementation. This examination gives greater insight into the barriers of implementation when RtI is novel to a district. In addition, seeking information in the first year of implementation may give the district positive themes on which to build in the second year.

In response to such limited findings regarding the perceptions of educators on the implementation of RtI, as well as the limited guidance that has come from legislation, research has been conducted on a national level to solicit opinions of educators of their experiences with RtI implementation (Bineham, Shelby, Pazey, & Yates, 2014). Bineham et al. (2014) sought to answer questions regarding educators' understanding of the RtI model, implementation factors of RtI, and general knowledge of RtI. A 40-item survey was sent to randomly selected general and special educators, administrators, and support personnel in school districts across the country. The study focused on gathering data from elementary and high schools only. Results indicated that 95% of the participants answering the survey had general knowledge of RtI, meaning they had heard of it. In addition, many districts around the country were in the early stages of implementation. Further results showed that many educators described RtI in various ways, "RtI is a model, RtI is a process, RtI is a team, etc." (Bineham et al., 2014, p. 241-242). In regard to implementation, the results of the research yielded some confusion among educators. Specifically, many educators did not know what was taught in various tiers and many did not know how the special education eligibility process worked with RtI. These findings suggest that there are still unanswered questions regarding implementation of RtI. Bineham et al. (2014) suggest that educators can describe the components of RtI, but are still unclear as to how RtI is structured in professional practice and how assessment and tiered, targeted instruction can be used to assist struggling learners. Granted, this is a self-report survey consisting of varied districts; however, it is interesting that a national survey in the year 2014 (ten years after IDEA reauthorization) still shows confusion revolving around RtI. As the authors state, there continue to be gaps between theory and practice in RtI (Bineham et al., 2014). In addition, this research surveyed all school personnel in regard to their knowledge of RtI and synthesized this research in their findings, yet the results were not disaggregated into various school personnel groups. It is possible that school personnel knowledge of RtI depends on his or her position within the school. Oftentimes special education personnel have a better working knowledge of RtI due to the fact that they use RtI as identification for special education and their specific training revolves around interventions. There is a body of research that has gathered perspectives from special education personnel to determine if their view of RtI is more refined. This could present an accurate picture for districts as to the effectiveness of intervention programming.

Special Educator Perceptions

Sansosti, Goss, and Noltemeyer (2011) researched the perspectives of special education directors in secondary schools only on RtI. The purpose of this study was to gather an understanding of special education directors' perceptions of RtI regarding implementation barriers, among other aspects. This study also used a focus group method. Special education directors from 17 schools districts participated in three focus group sessions. Unlike Stuart et al. (2011), these authors used a protocol for the focus group with specific guiding questions. After the sessions were complete, the results indicated four themes. First, directors reported a need for strong systems and structures to be in place in order for implementation of RtI to occur. Second, directors reported the need for roles and attitudes of professionals to change as RtI was implemented. Third and fourth, evidence-based practice and professional development were reported as essential for successful RtI. These four themes are all presented as barriers to implementation of RtI; however, the authors suggest that these challenges should not lead to the abandonment of implementation, but rather that having this knowledge could allow administration to be proactive (Sansosti et al., 2011). This suggests that administrator knowledge of RtI is similar to that presented in Bineham et al., (2014), in that there are mixed understandings of RtI.

The literature informs policy makers and educators who intend to implement RtI of the perceptions that exist regarding the program. Stuart et al. (2011) explain that in year two of implementation, perceptions seem to get more positive, but barriers still exist. Bineham et al. (2014) show that significant variability in perceptions and some misunderstandings still exists across the county. Lastly, Sansosti et al. (2011) suggest that administration presents many barriers, as well. There is still some confusion regarding RtI when surveying educational professionals, even after ten years of research and implementation practices. More importantly, none of the literature presented here looks at teacher perceptions juxtaposed to the reality of implementing RtI. The literature lacks coherent and systematic research that gathers educators' viewpoints and compares these viewpoints to the actual practices and achievement data. The goal of the present study was to gather teacher perceptions in the first year of RtI implementation and describe the perceptions to gather evidence to possible the success of implementation. Specifically, this dissertation compared student data outcomes to teacher perceived student outcomes in the RtI model.

Conclusion

This literature review has provided evidence of the importance of RtI in identifying and remediating students' difficulties in reading. The review also discusses the newness of RtI programs across the county and suggests the necessity of the various research that has entered the educational field. However, the literature in RtI continues to leave questions regarding implementation practices, assessment practices, student achievement, and teacher perceptions unanswered. There is a growing need for empirical data to show that instructional practices such as RtI are is having a positive effect on student achievement. It is important to grow the body of research to make way for evidence of proven effectiveness of RtI. The current research was carried out to determine whether targeted and tiered instruction implemented using the theoretical framework of RtI improves student reading outcomes as measured by the AIMSweb probes. In addition, the current study examined the predictive nature of AIMSweb testing and gathered teacher perceptions of the newly implemented RtI model.

Research Questions with Hypotheses

1. Has the implementation of a targeted, tiered RtI program changed reading student achievement outcomes as measured by the AIMSweb probes? Are the same changes in reading performance measured as a function of socioeconomic status or ethnicity?

The first research question asks if there are changes to student achievement outcomes when RtI is implemented using the targeted, tiered model. Fuchs et al. (2014) describe the necessity of targeted and tiered instruction in RtI. Gilbert et al.

(2013) and Scholin et al. (2013) provide compelling evidence that the targeted and tiered instructional delivery model has produced positive student outcomes in reading. Further, Scholin et al. (2013) used an empirical approach to their research, providing clear evidence that the targeted, tiered model is effective in improving student reading achievement. The current research hypothesizes that Year 2 data will show significantly higher student reading scores on the AIMSweb probes than in Year 1 for students who received interventions in both years. Research question 1 also asks about achievement gains made in reading performance in diverse populations of students. Research by Graves et al. (2011) suggests that disadvantaged students show significant gains when receiving Tier 2 interventions. Thus, I hypothesize that students who have been identified as being behind receive Tier 2 or 3 intervention, and also who present with a lower socioeconomic status will make significant achievement gains after intervention in Year 2.

2. Is the AIMSweb assessment used to identify children for RtI accurate in terms of identifying a student's likelihood to be successful on the NJASK state test?

The second research question seeks to investigate the predictive nature of the AIMsweb assessment as a tool for intervention identification. Clemens et al. (2012) suggests that AIMSweb early literacy probes are reliable assessments when placing students in RtI. Hale et al. (2010) and Hintze and Silberglitt (2005) show that AIMSweb Maze and R-CBM are good predictors of success on other reading achievement tests. In this dissertation, I sought to understand the predictive nature of these assessments as New Jersey moves toward an RtI model. Based on prior research (Hale et al., 2010; Hintze & Silberglitt, 2005), I hypothesize that these assessments will be predictive of success on the NJASK, thus making them accurate tools for identifying students for reading intervention. I also hypothesize that the correlation between AIMSweb® probes and NJASK will allow the district to identify appropriate cut off scores for students who may be at risk and require intervention.

3. What are teachers' perceptions of the effectiveness of an RtI program in the first year post-implementation?

The final research question asks about the teacher perceptions of RtI. Bineham et al. (2014) and Sansosti et al. (2011) presented conflicting results regarding teacher and administrator perceptions of RtI. However, Stuart et al. (2011) showed positive perceptions of RtI in the second year of implementation. This dissertation investigated teacher perceptions of RtI in Year 1 and in the fall of Year 2. It is anticipated that descriptive data will show positive teacher perceptions of RtI, as it is the beginning of implementation. This hypothesis is based on the findings of Stuart et al. (2011) that suggest teacher perceptions were overwhelmingly positive when looking retrospectively at RtI implementation.

CHAPTER 3

METHODOLOGY

The purpose of this chapter is to outline the specific methodology used to gather data to answer the research questions. The current project uses a modified mixed methods approach. Onwuegbuzie, Johnson, and Collins (2009) explain mixed methods, "The process of mixed research – mixing or combing quantitative and qualitative research techniques , methods, approaches, concepts or language into a single study" (p. 115). The current research did not mix quantitative and qualitative data, but rather mixed quantitative and descriptive techniques to gather data. Specifically, a teacher survey was used to provide a descriptive, experience-orientation (Onwuegbuzie et al., 2009), while student achievement data was used for the quantitative aspect. The survey used in the current study, I consider, is of a participatory worldview (Creswell, 2009). The teacher-participants were agents of change as RtI has transitioned. The teachers were also experiencing this phenomenon of RtI change as it occurs, and their conception of this phenomenological change is significant (Moustakas, 1994). While this dissertation does not present a true mixed methods approach, that being the collection of quantitative and qualitative data, it does offer the descriptive perspective from the teachers who have experienced the transition to an RtI model.

First, the school district demographics and the participants of the study are described. Second, descriptions of the data tools used to measure student reading achievement are outlined, including the AIMSweb and other reading assessment tools. Third, noting that significant changes have been made to the manner in which RtI is delivered in the district, a description of the schedule and targeted instruction courses then appears in this chapter. Finally, details about the teacher survey content and administration are described, as is information on how the qualitative data from these surveys was coded.

Participants/Population

Secondary data analysis was conducted on pre-existing data from a large rural school district in New Jersey. The dataset used was a portion of the district's student database. The district has collected these data for elementary grades in both the 2013-2014 (Year 1) and the 2014-2015 (Year 2) school years to make placements and educational decisions in regard to programming for children. Table 3.1 displays the sample sizes at each grade level in each year of implementation as well as the teacher survey sample, and Table 3.2 depicts the sample sizes by ethnicity.

The district serves approximately 3,500 students in grades PreK-8. This includes six school buildings: two PreK-4 elementary schools, two K-4 elementary schools, a 5-6 school, and a 7-8 school. Students who attend this school district are sent to a regionalized high school for Grades 9-12. New Jersey School Performance Reports (2013) states the district has a rigorous curriculum, dedication to inclusion of special education students, and reports, "Students in the district consistently perform at or above their counterparts on statewide assessments and nationally-normed standardized tests …. [the district] is recognized for its innovative and research-based, developmentally appropriate instructional programs" (p. 1). The premise that the district prides itself on research-based programs is the thrust of RtI research and has led to this current investigation. This dissertation focuses on the newly-adopted RtI programs in grades K-4; therefore, the data included is from all four of the elementary schools.

Table 3.1

Sample Sizes for Each Year as Related to Research Questions

Year 1		Year 2	
RQ 1	RQ2	RQ 1	RQ 3
<u>Grade 1</u> Total: 119 intervention students ED: 44 Not ED: 75 <u>Grade 2</u> Total: 79 intervention students ED: 29 Not ED: 50 <u>Grade 3</u> Total: 68 intervention students ED: 18 Not ED: 50	<u>Grade 3</u> Total students: 339	<u>Grade 1</u> Total: 53 intervention students ED: 12 Not ED: 44 <u>Grade 2</u> Total: 66 intervention students ED: 27 Not ED: 39 <u>Grade 3</u> Total: 53 intervention students ED: 23 Not ED: 30	Teachers receiving option to complete survey: 22 Teacher responses: 16

Table 3.2

Sample Sizes by Ethnicity

Grade 1		Grades 2 and 3	
Black	5	Black	16
Hispanic	44	Hispanic	73
White	110	White	148
Mixed	8	Mixed	17
Asian	5	Asian	12

School Demographics

The district's K-4 elementary schools have varying demographics. It is important to show the school profiles, as it relates partially to the first research question. Elementary school demographics are presented in detail in Table 3.3. It is important to note that both School C and D qualify for Title I targeted assistance funds based on their socioeconomic diversity.

Table 3.3

School Demographics

School	English Speaking Students	White Students	Students with a Disability	Economically Disadvantaged Students	Limited English Proficient Students
School A	91%	83%	16%	6%	4%
School B	90%	84%	19%	5%	1%
School C	72%	64%	7%	28%	15%
School D	81%	72%	18%	18%	28%

Note. Adapted from New Jersey School Performance Reports (2012).

The district maintains records of student who qualify for free or reduced lunch status. This is used to identify school buildings that qualify for Title I funds, and this information is gathered by way of parent report in the beginning of each school year. Parents receive the application for free/reduced lunch in September and are identified by the State of New Jersey as qualifying for this status based on income.

Context of the Research

It is important to note that this dissertation focuses on the district's transition to an RtI model. This is due to the fact that the district has changed the implementation of intervention programming over the course of two school years. In the 2013-2014 (Year 1) school year, data were collected via AIMSweb and students were placed into a Reading Student Support Program. This meant that students received 30 minutes of general reading instruction per day, five days per week, in a supplemental pull-out program. During this pull-out period, teachers worked on basic reading strategies that covered all domains of reading, including phonics, fluency, and comprehension. Teachers even attempted to support the instruction that was occurring in the general education classroom. This pull-out period of reading instruction functioned much like a basic skills program. Much of the curricular materials and programs appearing in Appendix E were used when the district used the pull-out basic skills period of intervention. The AIMSweb data were used exclusively as a means for enrollment into the program, not as a tool to drive instructional intervention.

In an effort to move to a truer RtI model, the district employed different practices for the 2014-2015 (Year 2) school year. Table 3.4 shows the differences between Year 1 and Year 2 in regard to differences in the intervention model used. At the beginning of Year 2, the instruction became more targeted and tiered, and assessment was used to drive instructional outcomes. AIMSweb data were used to assist in making placement decisions, but other sources of data were also collected in an effort to properly identify each student's intervention needs. These other sources of data included the Developmental Reading Assessment-2 (DRA-2) and teacher input. Moreover, specific intervention courses were set up for each grade level. Course names were Phonics/Word Study, Phonemic Awareness, Fluency, and Comprehension/ Vocabulary (See Appendix E). Each of these courses existed on two levels. First, Level II meant the child required a Tier II intervention. This pull-out period removed the child from his or her general education class and placed the child into a specific course where she or he would meet with a group of students who required the same intervention skills. The group size was approximately 4-6 students and it met three times out of a 6-day cycle. Second, Level III intervention courses meant that a child required Tier III intervention. These interventions occurred in a pull-out setting where students would meet in their homogenous group of students (up to 3) or one-on-one with the teacher. These intervention courses met all six days out of a 6-day cycle.

Table 3.4

Differences by Year

Year 1	Year 2
No universal screening assessment used for placement	Universal screening assessment used for placement
Heterogeneously grouped students	Homogeneously grouped students
No tiered intervention model (one-size-fits all)	Tiered intervention model based on needs (i.e., creation of courses Appendix E)
Student placement into intervention or support loosely based on some assessments	Student placement into targeted intervention based on universal screening as well as other assessments
No targeted groupings based on skills needed	Targeted groupings based in skill need
Unfocused research-based practices	Focused research based practices based on targeted grouping
Interventions were year-long	Interventions are time bound

Measures

Tests of Early Literacy (TEL)

There are four measures that test early literacy skills for Kindergarten and Grade 1 over the course of a school year. Generally, these probes are administered in the fall, winter, and spring. Table 3.5 provides information on each of the four TEL probes: LNF, LSF, PSF, and NWF. It is important to note that not all TEL assessments are appropriate for both grades at each time during the year (fall, winter, spring). Table 3.5 below shows how each probe is administered across a school year as recommended by AIMSweb (2014).

Table 3.5

AIMSweb Probe Administration Timetable

Grade	Fall	Winter	Spring
Kindergarten	Letter Name Fluency (LNF)	Letter Name Fluency (LNF) Letter Sound Fluency (LSF) Phoneme Segmentation Fluency (PSF)	Letter Name Fluency (LNF) Letter Sound Fluency (LSF) Phoneme Segmentation Fluency (PSF)
Grade 1	Letter Name Fluency (LNF) Letter Sound Fluency (LSF) Phoneme Segmentation Fluency (PSF) Nonsense Word Fluency (NWF)	Phoneme Segmentation Fluency (PSF) Nonsense Word Fluency (NWF) Reading-CBM	Nonsense Word Fluency (NWF) Reading-CBM
Grade 2	Reading-CBM	Reading-CBM	Reading-CBM
Grade 3	Reading-CBM MAZE	Reading-CBM MAZE	Reading-CBM MAZE
Grade 4	Reading-CBM MAZE	Reading-CBM MAZE	Reading-CBM MAZE

Table 3.3 displays average reliability and validity scores for each TEL assessment based on data collected and reported in the technical manual (AIMSweb, 2012). For the purposes of this dissertation, I took the mean score reported from various assessment administrations.

Letter Naming Fluency (LNF)

This assessment requires students to identify both upper- and lower-case letters correctly. Students are presented with a handout (See Appendix A) that consists of 100 letters (10 on each line) and they have one minute to identify as many letters as possible. At the end of one minute the examiner uses a bracket to show where the student stopped. If the student is unable to successfully identify 10 consecutive letters, the examiner is to discontinue administration of the assessment. Once the assessment is complete, the examiner gives 1 point for each correctly identified letter and scores the results. If the child substitutes or omits a letter it is considered an error (AIMsweb, 2014). LNF received a test-retest reliability score of .90 and an alternate form reliability score of .80 (AIMsweb, 2012). The LNF measure was compared with the Woodcock-Johnson Revised Broad Reading, the Woodcock-Johnson Revised Reading Skills, and the Test of Phonological Awareness to determine validity. The results are presented with other AIMSweb TEL probes in Table 3.6 (Elliot, Lee, & Tollefson, 2001).

Letter Sound Fluency (LSF)

This task asks students to correctly identify the sound of lower-case letters in one minute. Students are presented with a handout (see Appendix A) that contains 100 lower-case letters (10 on each line), and they are asked to "tell the sounds of as many letters as you can" (AIMSweb, 2014). At the end of one minute, the examiner once again uses a bracket to show where the student stopped. The assessment is scored similarly to the LNF assessment, where students are given one point for each correct response. The test re-test reliability score of the LSF probe is .83 and the alternate form reliability score is .82 (AIMSweb, 2012).

Phoneme Segmentation Fluency (PSF)

This assessment asks students to say aloud each sound heard in words that are presented in one minute. In this task, the examiner says a word, for example, *cat*; the student is then asked to identify each sound she or he heard in the word. There is no student handout for this assessment, but the examiner has a copy of the words and corresponding segmented sounds (see Appendix A). Students are given one point for each correctly identified segmented sound. For example, the word cat would have three sounds: /c/ /a/ /t/. If students omit sounds, demonstrate incomplete sounds, or overlap sounds, no credit is given for that segment of the word (AIMSweb, 2014). The PSF probe received a test re-test reliability score of .85 and an alternate form reliability score of .84 (AIMSweb, 2012).

Nonsense Word Fluency (NWF)

This assessment requires students to read aloud or say each nonsense word presented in one minute. The student receives a handout and reads made-up words from the handout (see Appendix A). A bracket is used to identify where the student stopped after one minute. The student is scored based on correctly identified sounds read on each line, and lines consist of anywhere from 13 to 15 sounds (AIMSweb, 2014). The NWF probe received scores of alternate form reliability in

Kindergarten of .71 and in Grade 1 of .74 and .78 (AIMSweb, 2012). The NWF probe was not compared to the Woodcock-Johnson Revised assessment; instead the NWF was compared with other assessments in order to determine validity. These tests included the Illinois Standards Achievement Test (.61), Minnesota Comprehensive Assessment (.55), the R-CBM in Kindergarten (.68), the R-CBM in first grade (.72), and the Pennsylvania System of School Assessment (.51) (AIMSweb, 2012).

Table 3.6

Validity Scores of TEL Probes

Criterion	LNF	LSF	PSF
Woodcock-Johnson Revised, Broad Reading	.63	.58	.44
Woodcock-Johnson Revised, Reading Skills	.75	.72	.60
Test of Phonological Awareness	.50	.68	.52

Reading – Curriculum Based Measure (R-CBM)

The R-CBM assessment is given to students in Grades 1 through 4 to assess reading skills as measured by words read correctly in one minute (WPM). The mean alternate-form reliability of the R-CBM is between .93 and .95 across grade levels and seasons (fall, winter, spring) and the test-retest reliability ranged from .91 to .96 across grade levels and seasons (AIMSweb, 2012). Criterion validity was established for the R-CBM using the Illinois and North Carolina state reading assessments administered at the end of the school year, and validity scores correlate approximately .7 for Grades 3 through 5 and low-to-mid .60s for Grades 6 through 8 (AIMSweb, 2012) . This reading assessment is administered at each grade level, as depicted in Table 3.5. Students are presented with a passage appropriately normed for his or her grade level (see Appendix B). They are instructed to read aloud for the test examiner. If a student is unable to read a word, the examiner waits three seconds, tells the student the word, and counts it as an error. The reading passage is ended after one minute, and a bracket is used to show where the student stopped. The examiner scores the assessment by counting all of the words read correctly and dividing by errors. It is important to note that this assessment is administered using computer-based software. Therefore, the examiner simply uses an iPad to touch an incorrect word and to place the bracket at the end of one minute. The mathematical calculations are generated by the software. Shinn and Shinn (2002) wrote a manual discussing the various AIMSweb measures. They suggest, "The R-CBM works very well to help identify at risk students and monitor progress for most students. It is especially useful for accountability as a general outcome reading measure" (Shinn & Shinn, 2002, p. 7).

CBM Maze (Maze)

While the R-CBM measures student reading skill, it may be necessary to assess comprehension when other reading problems are suspected (Shinn & Shinn, 2002). The CBM Maze is a comprehension assessment that can assist in gathering more data on student reading skills. Similarly to the R-CBM, it can be given in the fall, winter, and spring of each year. It is a 3-minute reading passage that can be administered in a general classroom, small group, or individual setting. The Maze is a multiple-choice cloze reading task that is given to Grades 3 and 4 (see Appendix C). Students are asked to read a 150-400 word passage where the first sentence is intact, but every seventh word after that first sentence has cloze choices. One is the correct answer that will complete the sentence accurately and two distractors. After three minutes the students are instructed to stop reading. The assessment is scored by giving students a point for each correct word chosen (Shinn & Shinn, 2002). Reliability scores for the Reading Maze range from .68 to .78 depending on the grade level (AIMSweb, 2012). Validity correlations for the Maze range from .51 to .59 depending on the grade level.

New Jersey Assessment of Skills and Knowledge (NJASK)

The NJASK is New Jersey's state high-stakes test that assesses student skills in the areas of literacy, math, and science for students in Grades 3 to 8. Science is administered in Grades 4 and 8 only. For the purposes of this study, the literacy assessment will be the area of focus in Grades 3 and 4. The literacy assessment asks students to demonstrate proficiency with the New Jersey State Standards in reading and writing. The reading assessment contains three reading passages that consist of literature and informational texts. The writing assessment requires students to respond in writing in expository, narrative, or persuasive form. Specifically, in Grade 3 there are three reading passages with 18 multiple-choice questions and three open-ended responses. In Grade 4, there are three reading passages with 24 multiple choice and 3 open-ended responses. In both grade levels, there are two writing tasks scored on a 5-point rubric (New Jersey Department of Education, 2010). In total, the NJASK assessment is scored from 100-300. A student scoring between 100-199 is considered partially proficient, a score of 200-249 is considered proficient, and a 250-300 is considered advanced proficient.

Teacher Survey

Teachers were given a 12-question online survey developed by multiple members of the school administration regarding their perceptions of the transition to an RtI model (see Appendix D). The survey was meant to be an internal, district-developed, document that gave some indication of teachers' perceptions as the district moved toward a model of RtI. The survey was broken into three subsections. The first subsection, RtI Framework and Assessment, asked questions regarding teachers' general knowledge of RtI procedures and practices. The second subsection, RtI Implementation, gathered teachers' perceptions' regarding the implementation process of RtI in the district. The third subsection, RtI Effect on Student Achievement, asked questions related to teachers' perceptions of student achievement after RtI implementation. The survey questions each asked for a response on a 4-point Likert Scale. After each subsection, teachers were also asked to write general comments regarding that section. The survey was given to 22 intervention teachers only throughout the district. Teachers received an e-mail from district administration providing the link to the online survey through Survey Monkey.

Design and Procedure

The current data consists of two years, Year 1 and Year 2, worth of literacy scores collected through the AIMSweb system in the fall of each year. In the fall of

Year 1, AIMSweb data were collected in September and January. These data were collected according to Table 3.5, which shows the probes used at each grade level. The AIMSweb probes are administered by district-level intervention teachers only. Students are removed from their classroom and placed in a separate room with the teacher for a short period of time—generally 3-10 minutes depending on the probe. The teacher reads the directions for the assessment and students complete the required tasks. The teacher uses an iPad device to track errors on all of the Test of Early Literacy probes as well as the R-CBM probe. All teachers administering the assessment were trained by Pearson in September of Year 1, prior to the assessment administration.

The Maze assessment was also administered only in January of Year 1. Intervention teachers, who had been trained on the Maze assessment, held meetings with Grade 3 and 4 classroom teachers to turnkey the Maze assessment training. The goal of these meetings was to give the classroom teachers proper training on Maze administration. Each classroom teacher at these grade levels administered the assessment, and the intervention teacher collected and scored each assessment. In the fall and winter of Year 2, AIMSweb data (TEL, R-CBM, and Maze) were collected once again in the same manner as it was in Year 1.

In May of Year 1, students in Grades 3 and 4 also took the NJASK assessment in math, literacy, and science (for Grade 4 only). This assessment is administered by the classroom teacher in the general education setting for all general education students and students who receive intervention. The State of New Jersey requires annual training for teachers who administer this assessment. The training is conducted by building principals.

In the winter of Year 2, the survey was administered online via Survey Monkey to 22 intervention teachers. This included Reading Recovery teachers, Student Support teachers, and Literacy Coaches. Table 3.7 below shows the assessments administered.

Table 3.7

Assessments Administered by Year

Year 1			Year 2	
Fall	Winter	Spring	Fall	Winter
PSF	PSF	NJASK	PSF	PSF
NWF	NWF		NWF	NWF
R-CBM	R-CBM		R-CBM	R-CBM
	Maze		Maze	Maze
				Teacher Survey

Analysis Plan

The following narrative as well as Table 3.9 outline the plan for data analysis as related to each research question. As seen below, the first research question necessitates an analysis of mean scores on the various reading measures described above. Research question two requires a correlational analysis to determine the predictability of the AIMSweb assessments to the NJASK. This is important in determining which students will require further interventions through RtI because it allows the district to know what students will likely not be proficient on the high-stakes NJASK assessment. Lastly, research question three considers teacher perceptions as descriptive data regarding the success of RtI implementation.

Research Question 1

The first research question seeks to compare student outcomes on AIMSweb probe measures in Year 1 (pre-implementation) and Year 2 (post-implementation) in order to see if the implementation of RtI had any effect on student achievement as measured by these probes. In terms of the participating subjects, only students who received intervention programs in Year 1 and Year 2 are included in the data analysis. For instance, students who received intervention programs in Grade 3 during Year 1 are compared to students who received intervention programming in Grade 3 during Year 2. Essentially, the same grade level are compared, not the same cohort of students.

Multiple variables were considered for this analysis. The AIMSweb probes administered at each grade level in the fall and winter vary as seen previously in Table 3.5. Therefore, measures that were included in the analysis are listed below in Table 3.8 according to each grade level. In order to ensure consistency of the measure, the same measure was administered in fall and winter in each year according to the instructions from Pearson.

Table 3.8

Grade level and Probes Compared in Year 1 and Year 2

Grade	Fall	Winter
Grade 1	Phoneme Segmentation Fluency (PSF) Nonsense Word Fluency (NWF)	Phoneme Segmentation Fluency (PSF) Nonsense Word Fluency (NWF)
Grade 2	R-CBM	R-CBM
Grade 3	R-CBM Maze	R-CBM Maze
Grade 4	R-CBM Maze	R-CBM Maze

Table 3.8 above shows that the analysis conducted consisted of the same probe at both time periods. In Grade 1, a 2 x 2 univariate analysis of covariance (ANCOVA) was conducted (Year 1 vs. Year 2 and economically disadvantaged vs. not economically disadvantaged) on each the PSF probe and the NWF probe. The analysis of covariance is similar to an analysis of variance in that it compares means. The aim was to compare mean scores in Year 1 to the mean scores in Year 2, while being able to adjust for differences in the means based on previous reading abilities. Therefore, I used the fall reading score on each measure as the covariate to adjust for the winter reading score measure. This increases the sensitivity of the test of main effects and reduces error (Tabachnick & Fidell, 2007).

The dependent variables were the Winter PSF score or the Winter NWF probe and the covariates were the Fall PSF score and the Winter PSF score, respectively. The fixed factors in this analysis were year and economic disadvantaged status. These analyses will give insight into early literacy skills as measured in winter of Year 1 and Year 2 using the fall score as a covariate to adjust for differences in scores on the fall probe. In addition, this analysis seeks to examine differences among socioeconomic groups over the two-year comparison period. A 2 x 2 ANOVA (Year 1 vs. Year and economically disadvantaged vs. not economically disadvantaged) was conducted using the PSF and NWF Rate of Improvement (ROI) measure as the dependent variable. No covariate was necessary for the ROI scores.

In Grade 2 and 3, a 2 x 2 x 2 ANCOVA (Year 1 vs. Year 2; Grade 2 vs. Grade; and economically disadvantaged vs. not economically disadvantaged) was conducted using the Winter R-CBM score as the dependent variable and the Fall R-CBM score as the covariate. The fixed factors were year, grade level, and economic disadvantaged status. This analysis seeks to examine grade level and economic group differences on oral reading performance between Year 1 and Year 2, once again, using a covariate to adjust for differences on the Fall R-CBM score. A 2 x 2 x 2 ANCOVA (Year 1 vs. Year 2; Grade 2 vs. Grade 3; and economically disadvantaged vs. not economically disadvantaged) was also conducted using the R-CBM ROI score as a dependent variable.

In Grade 3, a 2 x 2 ANCOVA (Year 1 vs. Year 2 and economically disadvantaged vs. not economically disadvantaged) was conducted using the Winter Maze score as the dependent variable and the Fall R-CBM (there was no Fall Maze administration) score as the covariate. The fixed factors were grade level and economic disadvantaged status. This analysis intends to use Maze scores to analyze comprehension as a function of year and socioeconomic status, adjusting for Fall R-CBM score.

In order to examine differences among ethnicities, the above analyses were attempted, but yielded sample sizes too small to draw any conclusions. Therefore, one-way ANOVAs were conducted to look for differences in means using five ethnic categories of Asian, Black, Hispanic, Mixed, and White as fixed factors and each measure (NWF, PSF, R-CBM, and Maze) as dependent variables.

Research Question 2

The second research seeks to examine the R-CBM and the Maze assessment's capacity for accurately measuring student likelihood of passing the NJASK. Participants in these analyses include all Grade 3 students in the district (N=340). Fall and Winter AIMSweb probes, specifically, the R-CBM and Maze, were used for identification in intervention programs. This research question seeks to model a relationship between these probes and the NJASK to be sure placement into programs is accurate. In order to do so, it is important to know what cut off score on the R-CBM and Maze indicates a student's potential for not passing the NJASK. The variables considered for this analysis are the R-CBM and Maze raw score from fall and winter of Year 1 and the NJASK scale score from the spring of Year 1.

First, Pearson correlation analyses were conducted to describe the relationship between each AIMSweb probe and the NJASK assessment. As a follow-up, Pearson correlations were conducted to describe the relationship among each AIMSweb probe.

Second, in order to determine the discriminant validity of each AIMsweb probe to the NJASK, a ROC analysis was conducted to determine the sensitivity and specificity for possible diagnostic outcomes (Pepe, Janes, Longton, Leisenring, & Newcomb, 2004; Youngstrom, 2014). The current study seeks to identify outcomes of passing the NJASK assessment. The analyses used the Year 1 fall R-CBM score, winter R-CBM score, and Maze score as test variables and the NJASK as the state variable. Recall that any score 200 and above on the NJASK is considered proficient and any score 199 and below is not proficient. Therefore, these scores were converted into binary data with 0 representing not proficient and 1 representing proficient.

Research Question 3

The final research question seeks to gather descriptive data from a teacher survey. The goal of this question is to gather the perspectives of intervention teachers (N=16) as RtI has been implemented in the school district.

The teacher survey instrument consisted of open-ended responses based on teacher experiences with the implementation of RtI. Coding of the data followed the steps outlined by Moustakas (1994) for phenomenological data, as well as the steps outlined by Creswell (2009) for analyzing qualitative data. First, I organized and prepared the data for analysis by taking the comments under each of the 3 themes of the survey and placing each comment on index cards. Second, I read through each of the index cards to get a sense of the responses according to each theme. I looked for overall impressions of the information. These three groups were somewhat pre-existing due to the fact that the survey was divided into three sections related to RtI. I plan to use the results of the discourse that occurs in the survey to formulate classifications on which to code the data: "The researcher should use the guiding hypotheses and the related literature developed earlier in the proposal. This earlier grounding and planning can be used to suggest several categories that can serve to code the data initially for subsequent analysis" (Marshall & Rossman, 1995, p. 112). Third, the data was then organized into larger categories to be coded. Fourth, the coding process was used to describe the information. Fifth, a decision was made as to how the data would be represented in results. Lastly, the information was interpreted.

The third research question relates to teacher perceptions of RtI regarding positive and negative impact on implementation and student achievement. Thus, the context looks for positive and negative language usage related to RtI. Third, the statement themes were counted to see how often themes reoccur and a text-description were written to synthesize the essence of the statements.

Table 3.9

Analysis Plan for Research Questions

Questions Addressed	Research Question 1	Research Question 2	Research Question 3
What variables will be considered?	Grade 1 Early Literacy: The DV is Winter PSF and NWF scores, fixed factors include Year, SES status, minority status. Grade 2-3 Oral Reading: The DV is Winter R-CBM score, fixed factors include grade level, Year, SES status, minority status. Grade 3 Comprehension: The DV is Winter Maze score, fixed factors include Year, SES status, minority status.	Year 1 Fall and Winter R-CBM scores Year 1 Fall and Winter Maze scores NJASK proficiency score	Descriptive data will be used via a teacher survey.
What analysis will be done?	ANCOVA Grade 1 Early Literacy covariate is PSF Fall Score and NWF Fall score Grade 2-3 Oral Reading covariate is R-CBM Fall score Grade 3 Comprehension covariate is R-CBM Fall score	Correlation analysis of Year 1 Fall and Winter R-CBM and Maze to NJASK ROC analysis using Fall R-CBM, Winter R-CBM, and Winter Maze from Year 1 as test variables and NJASK as state variable	Creswell (2009) steps to descriptive analysis for survey data will be used.
What findings will be considered supportive of the hypothesis?	Analyses will show Year 2 mean Winter scores on each probe (NWF, PSF, R-CBM and Maze) will be statistically significantly higher than Year 1 scores	Fall and Winter scores are correlated with NJASK, suggesting the AIMSweb assessments are a good measure to identify at-risk students. ROC analysis will show the AIMSweb measures as having discriminant validity to NJASK.	The descriptive analysis will yield patters in teacher responses that give insight into RtI program implementation.

The Role of the Researcher

I take on a significant role in this research as both the author of this dissertation and an employee of the school district where the data were collected. I have been in the field of K-12 education for the past 11 years and have experience as an elementary classroom teacher as well as an administrator in two school districts. When I was in my role as Assistant Director of Special Services for the district under study, I was responsible for implementing a more comprehensive, effective, and efficient RtI program that would better meet the needs of our students in the area of reading. This past year, I have assumed the role of Assistant Superintendent and have continued this work, but in a larger capacity.

My work as an administrator attempting to implement an RtI program has led to my research questions and my predictions regarding the outcome of this study. I have had first-hand experience in the implementation process and have sought research to guide the change that was occurring in the district. My role in this dissertation is to synthesize the data in reference to the questions I pose. My aim is to assist school administrators in understanding the primary components of RtI and to have tangible action steps to be taken in order to see the growth in student reading achievement.

CHAPTER 4

RESULTS

Limitations to the Data

There are several limitations to the student measure data set, as these data were warehoused in the school district and the district used multiple databases to warehouse student achievement data. This created the opportunity for some data loss. First, there is an absence of data for Grade 4 students in Year 1. This leaves all Grade 4 data out of the analysis that compares R-CBM and Maze scores from Year 1 to Year 2; however, Grades 2 and 3 data are included. In addition, the absence of Grade 4, Year 1 data means that any correlation analysis conducted between measures, such as R-CBM and Maze to the NJASK, is limited to Grade 3 only. This is due to that the NJASK is administered in Grades 3 and 4 only; with Grade 4 data excluded, analyses involving NJASK can only look at Grade 3.

Second, the Maze was not administered in both the fall and the winter of Year 1 for Grades 3 and 4. Therefore, there is no Maze Rate of Improvement (ROI) score for Year 1, and Fall Maze cannot be used as a covariate for Year 1 in the final analysis. This limitation required the analysis to be conducted on raw scores comparing the Maze winter score from Year 1 to the Maze winter score for Year 2 by each grade level. In order to include a baseline measure of where students were academically prior to the beginning of their treatment, we utilized the R-CBM fall score as a covariate. Once again, there were no Grade 4 data; thus the Maze comparison from Year 1 to Year 2 is limited to Grade 3 only.

Third, the district implemented a full-day kindergarten program in Year 2. This led the district to place a suspension on intervention programs for kindergarten students in the fall of Year 2. As such, it is inappropriate to investigate a comparison of reading achievement in RtI for kindergarten students from Year 1 to Year 2 when, in fact, no intervention program existed in Year 2.

Fourth, the analyses that were conducted to determine differences in ethnicity were limited due to small sample sizes. The sample sizes for various ethnicities of students were also varied in size, meaning some sample sizes were small and others were large. These variations in sample size made it a challenge to conduct the ANOVAs and draw conclusions with any degree of statistical significance.

The final limitation of the data was anticipated. Grade 1 data consists of four AIMSweb probes given throughout the year. As noted in Table 3.5, the PSF and NWF probes are the only probes that are given in both the fall and the winter. Thus, ROI scores were conducted only for these probes. In addition, only the fall PSF and NWF scores were available to be used as covariates in analyses comparing winter scores in Year 1 and Year 2.

Analyses Relevant to the Research Questions

Research Question 1

Research question one examines the mean differences in student performance on AIMSweb probes in Year 1 and Year 2, while also considering differences in student performance based on economic status as well as ethnicity. The hypothesis was that there would be a difference in scores after RtI implementation: Year 2 scores would be greater than Year 1 scores. Recall that the measures being used to conduct this investigation are AIMSweb probes. The NWF and PSF probes were used to measure Grade 1 scores, the R-CBM probe was used to measure reading fluency scores in Grades 2 and 3, and the Maze was used to measure comprehension in Grade 3. In the following subsections, I report results from the analyses involving Grade 1 data, and then those involving Grades 2 and 3 data. These analyses include differences in economic status and ethnicity across Year 1 and Year 2, as well.

Grade 1

In Grade 1, the PSF and NWF measures were utilized. In order to examine differences between Year 1 and Year 2 scores, as well as examine whether these differences varied by students' socioeconomic status, a 2 x 2 ANCOVA (Year 1 vs. Year and economically disadvantaged vs. not economically disadvantaged) was conducted using Winter PSF as the dependent variable and Fall PSF as the covariate. No significant main effect of year was found, $F(1,167)=.19$, $p=.664$. Overall mean scores of PSF can be found in Table 4.1. The main effect of economic disadvantaged status approached, but did not reach significance, $F(1,167)=2.43$, $p=.120$, $\eta_p^2 = .014$. No significant interaction was found.

A second 2 x 2 ANCOVA analysis (Year 1 vs. Year 2 and economically disadvantaged vs. not economically disadvantaged) was conducted using Winter NWF as the dependent variable and Fall NWF as the covariate. No significant main effects or interactions were found within these variables. Overall mean scores for NWF are found in Table 4.1.

Table 4.1

Mean and Standard Error Scores of PSF and NWF across Year 1 and Year 2

	PSF Measure						NWF Measure					
	ED		Not ED		Overall		ED		Not ED		Overall	
Year	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Year 1	43.89	1.78	47.08	1.35	45.48	1.11	41.43	1.89	41.52	1.44	41.47	1.19
	(N=44)		(N=75)		(N=119)		(N=44)	(N=75)			(N=119)	
Year 2	42.43	3.48	46.61	1.88	44.52	1.92	35.82	3.66	40.50	1.96	38.16	2.06
	(N=12)		(N=41)		(N=53)		(N=12)		(N=41)		(N=53)	
Overall	43.16	1.98	46.84	1.16			38.62	2.08	41.01	1.22		

A final set of analysis was conducted using the ROI score for both PSF and NWF in Grade 1. Parallel 2 x 2 univariate ANOVAs 2 (Year 1 vs. Year 2 and economically disadvantaged vs. not economically disadvantaged) were conducted, first using PSF as the dependent variable and then using NWF as the dependent variable. A non-significant trend of economic disadvantaged status was found for PSF only, $F(1,168) = 3.26$, $p=.073$, $\eta_p^2 = .019$, and a non-significant trend between year and economic disadvantaged status was found in PSF only, $F(1,168) = 3.39$, $p= .067$, $\eta_p^2 = .020$.

Table 4.2

Rate of Improvement (ROI) Mean and Standard Deviation for PSF and NWF Measures

	PSF ROI Measure						NWF ROI Measure					
	ED		Not ED		Overall		ED		Not ED		Overall	
Year	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Year 1	.894 (N=44)	.837	.900 (N=75)	.835	.898 (N=119)	.832	1.20 (N=44)	.870	1.11 (N=75)	.679	1.15 (N=119)	.752
Year 2	1.19 (N=12)	.429	.611 (N=41)	.930	.743 (N=53)	.874	1.04 (N=12)	.744	1.01 (N=41)	.783	1.02 (N=53)	.770
Overall	.960	.774	.800	.877			1.17	.84	1.10	.720		

Two-tailed, independent sample *t*-tests were conducted in order to analyze the differences in economic disadvantaged status ROIs for the PSF measure for Year 1 and Year 2. Results indicate no significant difference in economic status in Year 1, $t(117)=.035$, $p=.972$, $r=.000011$. Results indicate a significant difference in economic status in Year 2 $t(51)=-2.1$, $p=.042$, $r=.094$. These analyses confirm that students who were identified as economically disadvantaged had greater ROI means, than those who were no economically disadvantaged in Year 2. Table 4.3 displays non-adjusted means reported in the *t*-tests.

Table 4.3

Means for t-test Rate of Improvement (ROI) Scores on PSF

	Economically Disadvantaged		Not Economically Disadvantaged	
Year	Mean	SD	Mean	SD
Year 1	.895 (N=41)	.93	.900 (N=75)	.835
Year 2	1.19* (N=12)	.43	.611* (N=44)	.837

Note. * indicates a significant difference.

Grades 2 and 3

In Grades 2 and 3, the R-CBM measure was utilized; in Grade 3, the Maze measure was also utilized. To examine potential score differences by year, grade, and socioeconomic status, a 2 x 2 x 2 univariate analysis of covariance (Year 1 vs. Year, Grade 2 vs. Grade 3, and economically disadvantaged vs. not economically disadvantaged) was first conducted on Winter R-CBM scores, with Fall R-CBM scores as the covariate. Results indicate no significant main effect of year,

$F(1,261)$=.031, p=.861, η_p^2 = .000, no significant main effect of grade, $F(1, 261)$=.000, p=.986, η_p^2 = .000, and a significant main effect of socioeconomic status, $F(1,261)$=6.185, p=.014 (M ED = 69.13, SE = 1.3; M Not ED = 73.3, SE = 1.00). Table 4.4 illustrates mean R-CBM scores by year and grade level according to economic disadvantaged status. No significant interactions were found. This suggests, overall, that students who are not economically disadvantaged perform better than those who are economically disadvantaged on the R-CBM reading fluency measure.

Table 4.4

Mean and Standard Error R-CBM Scores for Grade 2 and 3 in Year 1 and Year 2 by Economic Disadvantaged Status

	Economically Disadvantaged						Not Economically Disadvantaged					
	Grade 2		Grade 3		Overall		Grade 2		Grade 3		Overall	
Year	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Year 1	68.36 (N=29)	2.38	68.49 (N=18)	2.90	68.42 (N=47)	1.88	72.29 (N=50)	1.75	73.89 (N=50)	1.82	73.1 (N=100)	1.24
Year 2	68.60 (N=27)	2.5	71.07 (N=23)	2.58	69.83 (N=50)	1.76	74.46 (N=39)	2.01	72.58 (N=30)	2.50	73.52 (N=69)	1.53
Overall	68.48	1.79	69.78	1.94	69.13* (N=97)	1.30	73.37	1.35	73.23	1.64	73.30* (N=169)	.998

Note. * indicates a marginally significant difference.

A 2 x 2 x 2 ANOVA (Year 1 vs. Year 2, Grade 2 vs. Grade 3, and economically disadvantaged vs. not economically disadvantaged) was then conducted using the R-CBM measure ROI scores as the dependent variable. There were no significant main effects of grade or year. A non-significant trend of economic disadvantaged status was found, $F(1,260) = 3.55$, $p = .061$, $\eta_p^2 = .013$. No significant interactions were found. This trend might suggest that in Grades 2 and 3, students who are not economically disadvantaged had greater ROI) gains in reading rate overall. Table 4.5 illustrates the ROI means.

Table 4.5

Rate of Improvement (ROI) Means by Grade, Year and Economic Disadvantaged Status

	Economically Disadvantaged						Not Economically Disadvantaged					
	Grade 2		Grade 3		Overall		Grade 2		Grade 3		Overall	
Year	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE	Mean	SE
Year 1	1.34 (N=30)	.707	1.26 (N=18)	.701	1.31 (N=48)	.70	1.50 (N=50)	.73	1.51 (N=50)	.652	1.50 (N=100)	.69
Year 2	1.38 (N=26)	.61	1.4 (N=23)	.72	1.38 (N=49)	.66	1.65 (N=41)	.63	1.38 (N=30)	.70	1.53 (N=71)	.669
Overall	1.36	.658	1.32	.705	1.35* (N=97)	.675	1.57	.686	1.46	.669	1.52* (N=171)	.679

Note. * indicates marginally significant difference.

Finally, in Grade 3 a 2 x 2 ANCOVA (Year 1 vs. Year 2 and economically disadvantaged vs. not economically disadvantaged) was conducted using Winter Maze score as the dependent variable and the Fall R-CBM score as the covariate. The results of the analysis indicate a significant main effect of year, $F(1,116) = 5.91$, $p = .017$, $\eta_p^2 = .049$, whereby a higher mean score was found in Year 2. The results indicate no significant main effect of socioeconomic status. Refer to Table 4.6 for mean Maze scores. These findings suggest students in intervention programs made greater gains in comprehension, as measured by the Maze, in Year 2 compared with Year 1.

Table 4.6

Mean and Standard Error Maze Scores in Grade 3

	Economically Disadvantaged		Not Economically Disadvantaged		Overall	
Year	Mean	SE	Mean	SE	Mean	SE
Year 1	9.41 (N=18)	.831	9.86 (N=50)	.480	9.63* (N=68)	.475
Year 2	10.56 (N=23)	.712	12.00 (N=30)	.65	11.28* (N=53)	.472
Overall	9.98 (N=41)	.551	10.93 (N=80)	.402		

Note. *indicates significant difference.

Ethnicity

Recall that research question one also seeks to answer questions regarding achievement based on ethnic backgrounds. In order to examine differences among AIMsweb probes by students from different ethnic groups, we would ideally conduct four univariate analyses of covariance using ethnicity as a fixed factor among other variables, such as economic disadvantaged status, year, and grade. However, this was not possible in the present study due to unacceptably small sample sizes for some of the cells. Therefore, ethnicity was analyzed independent of all other fixed factors. [1]. The adjusted means for all probes are presented in Table 4.7.

Table 4.7

Adjusted Winter Means by Ethnicity

	PSF		NWF		RCBM		Maze	
Ethnicity	Mean	Std. Error	Mean	Std. Error	Mean	SD	Mean	SD
Asian	44.52	5.30	52.15	5.45	77.78	3.50	12.21	1.32
Black	46.39	5.27	29.22	5.46	61.78	3.02	10.60	1.34
Hispanic	44.41	1.83	39.75	1.85	70.57	1.43	10.34	.615
Mixed	48.59	4.16	35.06	4.32	76.01	2.92	9.03	1.15
White	46.23	1.14	41.74	1.17	72.48	.996	10.51	.436

An ANCOVA was conducted using the Winter PSF score as the dependent variable and ethnicity as the independent variable with the Fall PSF as the covariate. The effect of ethnicity was not significant, $F(4, 166)= .296$, $p = .880$, $\eta_p^2= .007$).

A parallel ANCOVA was conducted using the Winter NWF score as the dependent variable, ethnicity as the independent variable, and Fall NWF as the covariate. The effect of ethnicity was significant $F(4, 166)=2.89$, $p = .024$, $\eta_p^2= .065$). Tukey post-hoc comparisons revealed that Black students performed worse than Asian students on the NWF (See Table 4.8).

[1] Several alternate analyses for ethnicity were conducted using the school year and grade in different analyses. All of these analyses yielded essentially the same results for the impact of ethnicity, and no main effects or interactions involving grade or year in school were significant. Therefore, I report only the analyses using ethnicity as the independent variable.

Table 4.8

Post-Hoc Test for Winter NWF

Ethnicity	Mean	Black	Hispanic	White	Mixed	Asian
Black (N=5)	29.22	-				
Hispanic (N=44)	39.75	NS	-			
White (N=110)	41.74	NS	NS	-		
Mixed (N=8)	35.06	NS	NS	NS	-	
Asian (N=5)	52.15	.016	NS	NS	NS	-

An additional parallel ANCOVA was conducted using the Winter R-CBM score as the dependent variable, ethnicity as the independent variable, and Fall R-CBM score as the covariate. The effect of ethnicity was significant $F(4,260) = 4.21$, $p = .003$, $\eta_p^2 = .061$). Tukey post-hoc comparisons revealed a number of pairwise differences (See Table 4.9). Mixed race and Asian students performed better on the R-CBM than did White students, who performed better than Black students.

Table 4.9

Post-Hoc Test for Winter R-CBM

Ethnicity	Mean	Black	Hispanic	White	Mixed	Asian
Black (N=16)	61.78	-				
Hispanic (N=73)	70.57	NS	-			
White (N=148)	72.48	.023	NS	-		
Mixed (N=17)	76.01	.008	.015	.009	-	
Asian (N=12)	77.78	.004	.007	.008	NS	-

Three analyses of variance were also conducted using the PSF, NWF, and R-CBM ROI scores as dependent variables and ethnicity and year as the fixed factors. Adjusted means for ROI scores on each probe are found in Table 4.10. Results indicate a significant main effect of ethnicity on the PSF measure, $F(4, 163) = 2.43$, $p = .05$, $\eta_p^2 = .056$, and a marginally significant main effect on the NWF measure $F(4, 163) = 2.36$, $p = .056$, $\eta_p^2 = .055$. However, post-hoc Tukey comparisons revealed no significant differences between pairs of ethnic groups.

Table 4.10

Rate of Improvement Means by Ethnicity

	PSF		NWF		RCBM	
Ethnicity	Mean	Std. Error	Mean	Std. Error	Mean	SD
Asian	1.18	.37	1.67	.33	1.74	.19
Black	1.63	.47	.76	.42	.93	.17
Hispanic	1.01	.14	1.16	.13	1.42	.08
Mixed	1.05	.34	.384	.31	1.68	.16
White	.70	.18	1.1	.08	1.48	.06

A significant main effect of ethnicity was also found on the R-CBM measure for Grades 2 and 3, $F(4, 258) = 3.5$, $p = .008$, $\eta_p^2 = .051$; post-hoc Tukey comparisons revealed that Black students demonstrated a lower ROI on the R-CBM measure in Grades 2 and 3 than students who identified as White, Mixed race, or Asian (see Table 4.11).

Table 4.11

Post Hoc Tests for R-CBM

Ethnicity	Mean	Black	Hispanic	White	Mixed	Asian
Black (N=5)	.93	-				
Hispanic (N=44)	1.42	NS	-			
White (N=110)	1.48	.014	NS	-		
Mixed (N=8)	1.68	.014	NS	NS	-	
Asian (N=5)	1.74	.014	NS	NS	NS	-

Summary of Results for Research Question 1

This research question examined differences in reading achievement as measured by AIMSweb probes between Year 1 and Year 2. Few significant differences were found on PSF, NWF, and R-CBM measures in Year 2 (post-implementation of RtI). However, a significant difference was found in Year 2 as measured by the Maze comprehension assessment. Additionally, a significant difference in PSF ROI was found in Year 2. The results indicated significant differences on AIMSweb probes by various ethnic groups. Black students did not perform as well as Asian students on the NWF measure, and on the R-CBM, Mixed race and Asian students performed better than White students, who performed better than Black students.

Research Question 2

A correlation analysis was conducted to compare the relationship between the R-CBM and Maze AIMSweb probes with the NJASK. This analysis was conducted using Grade 3 data from Year 1, as there is also no statewide assessment data for

Year 2. Table 4.12 displays correlations between the NJASK Scale Score and the three Grade 3 AIMSweb probes.

Table 4.12

Pearson Correlations between AIMSweb probes and NJASK Scale Score

AIMSweb Probes	N	Pearson Correlation	Sig. 2-Tailed
R-CBM Year 1 Fall	339	.642	.000
R-CBM Year 1 Winter	339	.667	.000
Maze Year 1 Winter	338	.538	.000

The correlation analysis above suggests the AIMSweb probes(R-CBM Fall and Winter, the R-CBM ROI and the Maze) are highly correlated with the NJASK Scale score (scored from 100-300). The strongest correlation is between the R-CBM Year 1 Winter and the NJASK Scale Score, r=.667, p<.01, suggesting the R-CBM Winter benchmark has a strong positive relationship with the NJASK scale score. The weakest, yet still significant, correlation is r=.538, p<.01.

While the data above gives correlational information regarding the each of the AIMSweb probes and the NJASK assessment, further correlations were conducted to determine the relationship between the AIMSweb probes. It is important to understand how each measure is inter-correlated because each probe measures a domain of reading achievement. These correlations will show the relationship each probe has to the other. Table 4.13 reports the correlations between the probes.

Table 4.13

Correlations between AIMSweb probes

AIMSweb Probes	R-CBM Year 1 Fall	R-CBM Year 1 Winter	Maze Year 1 Winter
R-CBM Year 1 Fall	--	.928**	.746**
R-CBM Year 1 Winter		--	.739**
Maze Year 1 Winter			--

Note. **Sig. (2-tailed), p<.01

The AIMSweb probes are significantly correlated with one another. The highest correlation is between the R-CBM Year 1 Fall and Year 1 Winter, r=.928, p<.01. This suggests a strong relationship between the reading rates in the Fall and Winter.

A Receiver Operator Characteristic (ROC) analysis was then conducted to determine the diagnostic applicability of these three AIMSweb probes, as each of the AIMSweb probes are highly correlated with the NJASK Scale score and with each other. The ROC analysis assists in determining the discriminant validity of the AIMSweb probes in distinguishing students who may or may not pass the NJASK assessment. The ROC curve shows combinations of sensitivity and specificity for possible diagnostic tools (Pepe et al., 2004; Pintea & Moldovan, 2009; Youngstrom, 2014), like the AIMSweb probes. The area under the curve (AUC) represents accuracy of the AIMSweb probe in diagnosing reading struggles relating to passing the NJASK. A result of 1 would suggest that a probe has perfect diagnostic accuracy and a score of .50 would suggest the diagnostic accuracy of the probe is by chance (Youngstrom, 2014). The ROC analysis also serves as a statistical tool to assist in determining appropriate cut scores (Youngstrom, 2014) for students who may be eligible for intervention due to risk of possible reading failure on the NJASK.

Findings of the ROC analysis are presented in Table 4.14 for each of the AIMsweb probes.

Table 4.14

Area under the curve ROC analysis for R-CBM Fall and Winter and Maze Winter

AIMSweb Probe	AUC	Standard Error	Sig.
R-CBM Fall	.852	.029	.000
R-CBM Winter	.890	.022	.000
Maze Winter	.826	.026	.000

Values greater than .50 are considered to have sensitivity scores that allow for accurate prediction of success on the NJASK. Each of the AIMSweb probes would be highly discriminant in predicting a student's success in passing the NJASK. Figure 4.1 illustrates the area under the curve for each of the AIMSweb probes. The areas under the curve for the AIMSweb probes are significantly better than chance, falling between .862 and .890.

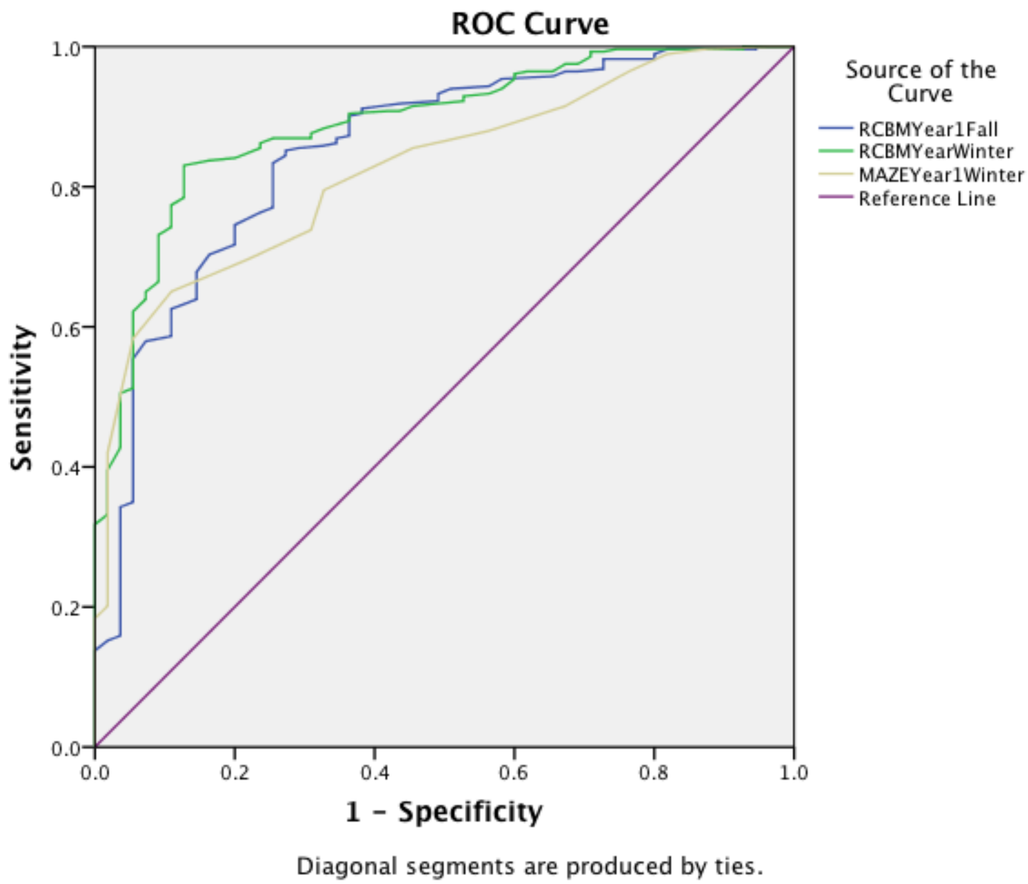

Figure 4.1. ROC Analysis Curve

The ROC analysis established that the R-CBM measures and the Maze measure provide high discriminant validity to the NJASK assessment. The ROC can also be used to determine appropriate cut scores. Research using the ROC analysis suggests using the most northwestern corner of the graph, visible in Figure 4.1, to determine the appropriate cut score, as this would maximize a true positive and a true negative result (Pintea & Moldovan, 2009). In order to do so, a sensitivity score of approximately .80 was chosen with a specificity score of approximately .20. The table below shows cut off scores for each AIMSweb probe.

Table 4.15

Optimal Cut-Off Score for AIMSweb Probes

Probe	Cut off Score	Sensitivity	Specificity
R-CBM Fall	76	.809	.745 (1-.255)
R-CBM Winter	99	.837	.836 (1-.164)
Maze Winter	11	.800	.637 (1-.327)

These results suggest that a student whose R-CBM score falls at or below a 76 in the fall should be considered for intervention. Similarly, a student who has an R-CBM score of 99 or below in the winter should be identified as needing intervention, as should a student with a score of 11 or below on the Maze assessment. This information can be useful in identifying students for interventions throughout the school year.

Summary of Results for Research Question 2

Research question two sought to examine the relationship between various AIMSweb measures and the NJASK. The results of this research question reveal strong correlations among the AIMSweb probes as well as strong correlations between each probe and the NJASK high-stakes test. The ROC analysis further suggests AIMSweb probes are accurate in identifying students who will be successful on the NJASK assessment and presents appropriate cut scores for possible entry into intervention programming.

Research Question 3

Data from a teacher survey administered by the district was collected to examine teacher perceptions of implementation of RtI in Year 2. The survey was administered to RtI interventionists (support skills teachers) approximately four months into implementation in Year 2. A copy of the survey can be found in Appendix D. The results below are organized as follows: First, demographic information regarding teacher education level, experience, etc. are reported. Second, as the survey comprised questions addressing three different components of the RtI implementation experience, results from each of those three components are described separately. The second section of the survey presented statements to the teachers and asked them to respond as strongly agree, agree, disagree, or strongly agree. Generally, statements that were reported by the teacher as either agree or strongly agree, suggesting a positive result for RtI implementation. Lastly, the open-ended comments regarding each component are reported. Of the 22 teachers who received the survey, 16 chose to respond.

At the beginning of the survey, teachers were asked to report on their experience and background as an educator. Of the responding teachers, 44% had taught between 5-10 years and 56% had taught 11 years or more. None of the teachers had less than 5 years of experience. However, when asked how long teachers had been in their current Student Support (RtI), Reading Recovery, or Literacy Coach positions, 44% reported 1-4 years, 50% reported 5-10 years, and 6% reported 11 or more years. Of the reporting teachers, 31% had a Bachelor's degree while 69% reported having a Master's degree. Lastly, 25% of teachers reported being assigned to school building A, 19% to building B, 31% to building C, and 25% to building D.

Teacher Understanding of the RtI Framework and Assessment

The next section of the survey asked teachers to rate their understanding of RtI's framework and assessment. The results are summarized in Table 4.16.

Table 4.16

Number of Teachers Reporting on Understanding RtI (N=16)

RtI Framework and Assessment	Strongly Agree	Agree	Disagree	Strongly Disagree
I understand the RtI Framework and triangle.	10	6	0	0
The purpose of RtI is to refer and identify students with disabilities.	1	1	13	1
The purpose of RtI is to assist students with academic deficits to avoid referral and identification of special education.	5	9	2	0
AIMSweb probes are used to make instructional decisions.	0	10	4	2
AIMSweb probes are used to make RtI placement decisions	2	13	1	0

These results indicate that all 16 teachers either agree or strongly agree that they understand the RtI triangle and the framework. Teachers generally did not think the RtI triangle was to be used as referral to special education: 14 out of 16

(88%) teachers disagreed or strongly disagreed. However, 14 (88%) teachers do see RtI as a way of intervening with students who struggle academically. There are mixed results when it comes to asking teachers if the AIMSweb probes allow for instructional decision making. There were no strong perceptions that it allows for this, as 10 (63%) teachers report agreeing with this statement, but six teachers report that they strongly disagree or disagree with the statement. Fifteen (94%) teachers report that AIMSweb is primarily used for RtI placement decisions.

In summary, the majority of teachers report either agreeing or strongly agreeing with statements about understanding RtI. Also, the vast majority of teachers agree or strongly agree that RtI should be used for intervention purposes. However, the only exception was that teachers disagreed with the statement that RtI was for special education identification.

Teacher Perceptions of RtI Implementation

The second section of the survey asked teachers to report their perceptions of RtI implementation. These questions asked teachers to consider to what degree they agree or disagree with statements regarding their preparedness for implementation, change of instructional practice, and using assessment to inform targeted instruction.

Table 4.17

Number of Teachers Reporting on RtI Implementation (N=16)

RtI Implementation	Strongly Agree	Agree	Disagree	Strongly Disagree
I feel prepared to implement the RtI framework with appropriate interventions.	4	9	2	1
Since the implementation of RtI, I have changed my instructional practices to target the specific needs of my students.	7	7	1	1
The assessment data accurately placed students into targeted intervention groups	1	12	2	1

Table 4.17 summarizes teachers' perceptions of their own preparedness to implement the interventions through the RtI model. Thirteen (81%) teachers reported feeling prepared for appropriate interventions, while three teachers reported disagreement or strong disagreement with feeling prepared. Fourteen (88%) teachers reported changing their instructional practices to target specific needs of students; however, two teachers strongly disagreed or disagreed with the statement regarding changed instructional practices. Lastly, 13 (81%) teachers agreed or strongly agreed with the statement that the assessment data accurately places students into targeted groups. Three teachers disagreed or strongly disagreed with that statement.

In summary, teachers reported that they agree or strongly agree with many statements regarding the implementation of RtI. Specifically, 83% of the responses in this section of the survey fell within the agree or strongly agree portion of the Likert Scale.

Teacher Perceptions of the Effectiveness of RtI

The final section of the survey asked teachers to report on their perceptions of RtI and its effect on student achievement. Teachers were asked to consider to what degree the implementation has changed student achievement outcomes.

Table 4.18

Number of Teachers Reporting on RtI and its Effect on Achievement

RtI Effect on Student Achievement	Strongly Agree	Agree	Disagree	Strongly Disagree
The percentage of my students who meet progress monitoring goals has increased since using the targeted and tiered RtI approach.	2	11	3	0
The targeted interventions I use in my instruction result in academic growth for my students.	5	10	0	0
Targeted intervention courses/groups meet student needs.	1	10	4	1

Table 4.18 shows the results of this section on perceptions of student achievement based on the implementation of RtI. Thirteen (81%) teachers reported that they agree or strongly agree that students are meeting progress monitoring

goals at an increased rate since the implementation of the targeted and tiered approach. Additionally, 15 out of 15, or 100% (1 teacher did not respond to this question) of teachers reported they agreed or strongly agreed that targeted interventions result in academic growth. Lastly, 11 teachers (69%) report that the targeted intervention courses meet student needs. Like the previous section of the survey results, these results also indicate some agreement or strong agreement with statements regarding the increase of student achievement outcomes as a result of RtI, but almost one-third of teachers disagree or strongly disagree that interventions meet student needs. Specifically, 83% of the results on this section of the survey fell within the agree or strongly agree portion of the Likert Scale.

Using Creswell's (2009) steps to analyzing written comments on a survey, commonalities were noted for the open-ended responses provided at the end of the survey. The following narrative describes the common themes found when reading the open-ended comments given by the teachers. Once again, these results are presented by category: component one is understanding RtI, component two is using assessment in RtI, and component three is the effect of RtI on student achievement.

The most prevalent trend in component one is that RtI is a targeted, tiered, and temporary intervention for students who have gaps in their understanding, specifically their reading abilities. Additionally, AIMSweb, DRA, and running records are data collection tools that are collaboratively used to identify and place students into appropriate RtI intervention courses, as well as help teachers design instruction to meet student needs. These ongoing assessments also provide an opportunity for students to enter and exit the program. This reveals that RtI is designed to meet the specific needs of students with the ultimate goal of exiting the program once those goals are achieved.

A trend that emerged in component two is an inconsistency in the implementation of RtI across the district. The comments suggest that RtI teachers are each having different experiences and results with the program due to the perceived lack of resources and the impression that the instructional groups are not as targeted as teachers had originally hoped for.

In component three, it was found that targeted learning groups are meeting most student needs, especially fluency groups. However, it was acknowledged that there are other uncontrollable factors, such as home support and classroom instruction, that can affect student achievement.

Summary of Results for Research Question 3

To answer this research question, descriptive teacher perception data was gathered as RtI implementation began in the school district. The results indicate an overall positive perception of RtI implementation. The majority of teachers report a feeling of preparedness as they implement RtI. The majority of teachers also report that the AIMSweb tools provide accurate assessment data to identify student needs. Lastly, some teachers report that the strategies they use as well as the targeted intervention groups are meeting student needs, but it is clear that this is not a strong trend based on the survey.

CHAPTER 5

DISCUSSION

The goal of the current study was threefold. First, the study sought to examine student reading achievement outcomes in a diverse school district post-RtI implementation as measured by the AIMSweb probes. Second, this study considered the relationship between the AIMSweb measures and the NJASK high-states test in the State of New Jersey, thus, evaluating the appropriateness of AIMSweb as an identification criteria for RtI. Lastly, the study considered the perceptions of teachers in the first year of implementation of RtI.

This chapter focuses on presenting a summary of the findings related to each research question. This chapter will also discuss the findings along with implications for RtI implementation in elementary schools. Of course, limitations to this research as well as future directions are discussed.

Discussion of Findings Relating to Research Questions

Measures Finding Differences Post-Implementation

The first research question of this dissertation sought to determine the impact RtI implementation has on student reading achievement as measured by the AIMSweb probes, specifically PSF and NWF in Grade 1, R-CBM in Grades 2 and 3, and Maze in Grade 3. In addition, this research question sought to identify how socioeconomic and racial/ethnic status relates to how students respond to an intervention model.

Research in the field of RtI suggests that targeted and tiered interventions (Fuchs & Fuchs, 2006; Fuchs & Fuchs, 2007; Fuchs et al., 2014) are necessary to improve student achievement as opposed to general basic skill instruction groups. In addition, previous research on targeted intervention groups provides evidence of improved reading scores (Gilbert et al., 2013; Scholin et al., 2013), suggesting that the use of direct and targeted instruction based on reading need assists in improving reading achivement . The present study's findings were consistent with previous research. Specifically, in Grade 3, students earned higher scores on the Maze assessment, suggesting greater gains in reading comprehension in Year 2. This is consistent with existing literature (Gilbert et al., 2013; Scholin et al., 2013) in which students received higher reading comprehension achievement scores after the RtI tiered and targeted model had been implemented.

The increase in Maze scores in Year 2 is particularly interesting because the Maze assessment was the only measure that produced this result. That is, post-RtI implementation, gains were made only in reading comprehension, not on any early literacy measure and not on the R-CBM measure, which Grade 3 students also take as a measure of reading achievement. Scholin et al. (2013) discussed the need for more reading comprehension intervention strategies, such as summarizing, activating prior knowledge, and questioning in the upper-elementary grades. In addition, other researchers state that the upper-elementary grades require more cognitively complex comprehension instruction (Block & Pressley, 2003). Scholin et al. (2013) conducted research on a small scale with only three students, providing somewhat limited evidence for targeted comprehension instruction within the RtI framework. The current research study, however, found consistent evidence using an entire grade level of children who had received RtI interventions, suggesting that students who received targeted instruction make greater reading achievement gains in comprehension. This may suggest that the implementation RtI could serve as an effective to improve student reading comprehension abilities. Specifically, students should be divided into various reading skill groups or courses where the students will receive targeted instruction related to their reading deficits. Of course, further research should be conducted in comparable districts replicating these intervention implementation protocols.

It is important to note that Grade 3 students also received the R-CBM measure of ORF. It is unclear why greater reading gains were demonstrated on the Maze measure for this group of students, but parallel improvement was not seen on the Grade 3 R-CBM probe as well. There are a number of possible explanations to account for the differences observed in the Grade 3 results. First, research in RtI has long considered literacy learning to be a continuum (Stahl & McKenna, 2013), suggesting a cognitive model based on the developmental progression of reading. Stahl and McKenna (2013) introduced a model that is a hierarchy of reading skills, from low-level skills such as phonemic awareness to high-level skills such as comprehension. Grade 3 is a pivotal developmental year where the focus of instruction shifts from low-level literacy skills to more complex comprehension skills.

Second, while there may be a shift in the developmental progression of reading skills in Grade 3, there may also have been a possible instructional shift that occurred because of the RtI interventions. Paris (2005) suggests that not only is there a developmental progression to these skills but that some of the early literacy skills are constrained, thus making those skills easier to teach. For example, there are a limited number of letters and sounds to teach; therefore, when teachers consider planning instruction for struggling readers they revert to teaching the basic skills of early literacy because it is easier and there is a discrete end to the skill (Stahl & McKenna, 2013). Perhaps the RtI model, which requires teachers to design intervention instruction based on student need, forces the teacher to plan comprehension instruction. Recall that the RtI model that the district implemented divides intervention courses into groups: Phonemic Awareness, Phonics/Word Study, Fluency, and Comprehension/Vocabulary. A child who is placed into the Comprehension course should not be receiving phonics instruction—therefore, the teacher must plan for comprehension interventions. Specifically, the school district now has children placed in these reading courses in Year 2. Prior to Year 2, students were enrolled in a Reading Support course where teachers may have reverted to teaching constrained, basic skills because it was easier (Paris, 2005; Stahl & McKenna, 2013). However, these teachers now teach comprehension because it is part of the RtI model.

Lastly, research on middle school students further suggests that explicit comprehension instruction during upper-elementary grades has a positive impact on student comprehension (Faggella-Luby & Wardwell, 2011). It can be assumed that teachers in Year 2 taught using more explicit comprehension strategies based on Appendix E. These explicit strategies could have had an impact on comprehension as measured by the Maze.

Recall that the Maze measure also did not have a specific Fall covariate. The R-CBM was used as the covariate for the Maze assessment in both Year 1 and Year 2. This could present a potential problem for the conclusion that intervention programming affected reading comprehension instruction; however, the R-CBM's use as a covariate is reasonable, particularly because of the high correlation between the Maze and the R-CBM as seen in Chapter 4. It is reasonable to conjecture that even if the Fall Maze scores were available as a covariate; the result would still indicate growth in comprehension in Year 2.

Findings Related to Socioeconomic Status and Ethnicity

Research has been conducted on a national level as part of a growing educational concern over diversity issues and achievement in schools (NAEP, 2013a). RtI could be a strategy for intervening and closing the achievement gap between underrepresented groups of students and their majority counterparts (McKinney, Bartholomew, & Gray, 2010).

Research question one also aimed to examine differences among socioeconomic groups as well as ethnic groups. Research by Graves et al. (2011) suggests that disadvantaged students show significant gains when receiving Tier 2 interventions. The current research found results consistent with Graves and colleagues' (2011) research. Results from the Grade 1 PSF measure demonstrated that students who were economically disadvantaged showed greater ROI in Year 2.

It is interesting that this was only the case in Grade 1 with the PSF probe. Beyond this measure, all other findings indicate that economically disadvantaged students score *lower* and remain lower than their peers who are not economically disadvantaged, as seen by the results of other ROI measures This is consistent with the idea that students who are disadvantaged have associated risk factors that can influence academic achievement (Eamon, 2001). This dissertation found similar trends. Students who were identified as being economically disadvantaged have lower mean scores on measures of reading competence. Hernandez-Finch (2012) presents a list of considerations for implementing RtI for students from culturally, socially, and ethnically diverse backgrounds. In an affluent district, such as the district examined in this dissertation, it would be beneficial to consider culturally responsive teaching in order to observe greater gains for students from minority backgrounds. In order to do so, it is important to explore culturally sensitive assessment measures or develop multiple-criteria measures to reduce bias and over-identification of students from diverse backgrounds as needing intervention, while also maintaining teaching methods that are sensitive to the needs of diverse students (Hernandez-Finch, 2012).

A possible explanation for the higher growth rate in Grade 1 as opposed to Grades 2 or 3 is the sensitivity and individuality of teaching in Grade 1 as well as the early nature of reading intervention. Evidence suggests that literacy instruction takes a greater priority in primary grade levels (Snow, Burns, & Griffin, 1998) and becomes less emphasized as students move into the intermediate elementary grades. In fact, current research suggests that varied instructional strategies are paramount in early literacy (Morrow & Asbury, 2003). Gradually, as students get older and move through the grade levels, teaching and learning becomes less personalized and adaptive. Research also suggests that the earlier the intervention takes place in a schooling career, the more responsive the child will be to the intervention (Al Otaiba et al., 2011).

The Nonsense Word Fluency measure did not yield any significant differences in grade one, while the Phoneme Segmentation Fluency measure did reveal trends related to socioeconomic status. The fact that differences were found in PSF and not NWF could be related to the nature of the economically diverse population as well as ethnicity. The vast majority of the district's economically disadvantaged population is identified primarily Spanish speaking. Research suggests that the basic phonemes in English and Spanish are similar (Goldstein & Fabiano, 2005; Raynolds & Uhry, 2010). When a child who is Spanish speaking is asked to read nonsense words, they may with more success because the words rely on phoneme identification only. Phoneme segmentation, however, uses real English words where digraphs, blends and other vowel patterns may influence a child's ability to successfully identify the phonemes. Simply put, when the words presented are not real students rely on phonetic pronunciation only, thus making the accuracy look similar to English speaking students.

This trend was also observed in the analyses of ethnicity. It has been noted that the Hispanic population did not differ significantly from other ethnic populations on many measures, namely the NWF measure. Once again this could possibly be a result of the phonetic similarities between English and Spanish.

AIMSweb as an Accurate Assessment Tool

Research question two examined the nature of assessment in RtI. This research question is two-fold. It is well known that appropriate assessment is an essential component of RtI (Deno et al., 2001). First, analyses were conducted to determine if AIMSweb probes that are used in the district are, in fact, accurate in predicting success or failure on the New Jersey high-stakes state test. Second, further analyses were conducted in order to determine the most appropriate cut score on the AIMSweb probes, in hopes they will assist in identifying the most appropriate children for RtI programming.

The findings indicate that the AIMSweb probes are highly correlated with the NJASK. This is consistent with previous research where high correlations of AIMSweb probes with other assessments of reading are noted (AIMSweb, 2012; Clemens et al., 2012; McAlenney & McCabe, 2012). This also provides strong evidence that the R-CBM and Maze assessments given in Grades 3 early in the school year can identify students who are at risk of failing the state assessment. This can assist districts in early identification of students who need interventions.

Previous research on middle school students in Grades 6, 7, and 8 suggests the Maze assessment is correlated with other comprehension assessment measures (Hale et al., 2010); the current study established that the Maze assessment is also an accurate comprehension tool for students in Grade 3. This is important, as Grade 3 is a critical developmental year for reading comprehension (Connor, et al., 2014). In addition, the use of the Maze assessment can give teachers accurate diagnostic information about reading comprehension in a quick and efficient manner. Many reading comprehension assessments, such as the DRA, Basic Reading Inventory, and the WJ-III, require significant resources and time to administer. The WJ-III generally requires a trained and certificated school psychologist to administer the assessment. The current study provides evidence that teachers can use the three-minute, thorough but efficient Maze assessment as a tool for measuring reading comprehension as a way to make instructional and intervention decisions.

Research question two also examines the use of AIMSweb assessments to identify children who require RtI programming and aimed to extend evidence that AIMSweb is an accurate assessment tool. Previous research (Hintze & Silberglitt, 2005) found that the R-CBM is a good predictor of success on state assessments, but their research was limited in scope, meaning it only used other norm referenced reading achievement tests. The current research used the ROC analysis to find detailed information about the accuracy of the AIMSweb assessments in terms of accuracy and predictability of success on the NJASK, a criterion referenced, high-stakes achievement test in New Jersey. The ROC analysis determined that each of the AIMSweb probes given to Grade 3 students had good discriminant validity when it came to the NJASK. Furthermore, cut scores were established for the R-CBM and the Maze assessment in order to best determine which students required intervention.

These findings are important for schools as they identify students who require RtI. It is understood that resources are limited in school districts. While districts would prefer to identify and service all students who are struggling, this is virtually impossible due to the limited nature of staffing and fiscal resources. Thus, districts must have cut off points that determine the students who are most in need of intervention programming. The current study has provided this information for New Jersey as it relates to the NJASK high-stakes assessment.

Strong evidence has been provided that R-CBM and Maze could be used early in the school year to determine student need for interventions. These assessments, however, are not a guaranteed method of identification for interventions. Educators often combine statistical evidence with anecdotal evidence in order to make these determinations. There must still be a place for anecdotal records in instructional decision-making. However, the results of this study can assist districts in opening up a collaborative conversation about the criteria that should be used in determining the need for intervention.

It is important to note that the evidence presented in the current study is limited to Grade 3. These analyses could be replicated for any grade level that receives the AIMSweb probes and the NJASK assessment—though there is no high-stakes state test in Grades kindergarten through 2. Correlational and ROC analyses should be conducted on other measures of early reading success at these grade levels. This could assist in determining the accuracy of the AIMSweb probes as well as the cut scores for identifying children who require RtI in earlier grades.

Teacher Perceptions

The final research question sought to determine educator perspectives of RtI implementation in the district. Research by Stuart et al. (2011) demonstrates a positive perception of RtI in the second year of implementation. The current study was conducted in the first year of implementation, but the results seemingly mirror the results of previous research (Bineham at al., 2014). Gathering perceptions of teachers is crucial, as they are the ones implementing the RtI program in the classroom. Their perceptions can influence the success of the program, future directions for the program, and student achievement within the program. The results of this study indicate areas of focus as the RtI program moves forward in implementation.

RtI implementation or any school change can be a challenge for educators who are required to transform the focus of their instruction. The self-report of the intervention teachers in this study suggest that the vast majority of teachers feel that the implementation has been successful. In Year 2, teachers are asked to use the AIMSweb assessments along with other district level assessments as criteria to make identification decisions regarding RtI. In addition, teachers have been directed to place students into targeted groupings where students will receive instruction based on an area of deficit.

Interestingly, when teachers were asked about RtI's effect on student reading achievement, many teachers reported that RtI is an effective way to meet student academic needs, while about one-third did not First, most teachers reported that the targeted and tiered nature of instruction has led to greater gains measured by progress monitoring goals. Progress monitoring of a student occurs weekly. This is a process where teachers give a brief reading assessment and record the data (i.e. words read correct in a minute). This suggests that teachers feel the RtI framework has led to greater student achievement as measured by progress monitoring assessments which are given weekly. In between benchmark periods (fall to winter), teachers monitor student progress and report progress as greater after implementation of the RtI model. While there is no empirical research to support this claim, it is interesting that teachers have this perception. It is difficult to know if this is truly the case, because many other factors could lead teachers to feel this way, such as administrative support, higher-achieving students in Year 2, and access to more resources.

Second, all teachers reported that the targeted interventions they used resulted in academic gains for students. This is the only question where all teachers agreed with the statement. However, it could be that this question is a self-fulfilling prophecy of teacher success. Simplistically, teachers are likely to report that their instructional strategies result in student progress. This question is flawed in that it asks more about how the teacher feels about his or her ability to teach and support academic growth rather than how RtI has influenced their teaching to subsequently influence student achievement.

Finally, the majority of teachers reported that the newly designed targeted intervention courses outlined in Appendix E have resulted in meeting student needs. More than half of the teachers who have been using the RtI framework feel it is making a difference for students in need. Importantly, this finding also suggests there are still teachers who are not convinced of the benefits of the RtI model. While the vast majority of teachers report understanding how the model is used and the possible benefits for students, some still have yet to be convinced of the true benefits for their specific students.

Limitations to the Current Study

As mentioned in Chapter 4, there are limitations to the data set alone, but there are also limitations to the analyses and the conclusions presented in this chapter. This section of Chapter 5 presents the overall limitations to the current study.

There are limitations to the findings in regard to the increase of Maze scores in Year 2. To begin, there is no way of knowing exactly what intervention course or group students in Grade 3 was placed in. The secondary data that were received from the school district did not identify specific students or their specific intervention courses. It is known, however, that approximately half of the Grade 3 class were placed in a comprehension and vocabulary course where comprehension instruction was the targeted skill. The other half of Grade 3 students were placed in either phonics or fluency classes that, theoretically, did not focus on comprehension instruction. Ideally, further analyses should be conducted to see if there are differences in Maze scores in each of these groups of students, provided that individual student placement was recorded.

The second limitation to this study is the lack of classroom observation. Appendix E shows the skills, strategies, resources, and techniques that should be taught at this district at each grade level for each RtI targeted course. However, no systematic classroom observations of these teaching techniques were conducted. It was an administrative directive to identify students who require RtI services and to subsequently divide students into these targeted groups, and this was evidenced through enrollment rosters; however, once the child was enrolled in a specific RtI course, there is no evidence that the strategies listed in Appendix E were actually implemented. Thus, it is difficult to conclude that it was the specific implementation of comprehension strategies that is the primary contributor to increased scores in Year 2 on the comprehension assessment.

In the present study, correlation of AIMSweb probes to NJASK was limited to Grade 3 students. As stated previously, the data received from the school district lacked all Grade 4 data. A singular grade level of data on the correlation between NJASK and AIMSweb is productive for that grade in this specific school district, but is not generalizable to any other grade or school district. Additionally, no conclusions can be drawn between the AIMSweb probes for Grade 1, as there are no other reading tests of comparison. Specifically, there is no high-stakes reading achievement measure administered in Grade 1. Further research might compare the relationship between AIMSweb probes in Grade 1 and another measure of reading achievement.

The teacher survey was also substantially limited in nature as it was not developed using metrics from previous research on RtI implementation. Recall that the current research was limited to secondary data analyses. The survey was administrator-developed in hopes of allowing teachers to reflect on their experiences with RtI and to provide directions for moving forward in RtI implementation. The fact that the survey was administrator-developed within the district limits the interpretation of the findings to descriptive results only. It is appropriate to describe the responses and look for trends and commonalities among the survey response, but it is difficult to use the survey as a test of the implementation's success.

The survey was limited not only in the manner in which it was developed, but also in the possible results it provided. The district administrators, seeking input from teachers, sent out the survey. Knowing that administrators will read the comments, it is likely that teachers may report their perceptions as more positive for social desirability purposes. Teachers may not want administrators to perceive their reporting as excessively negative. This could have resulted in findings that suggest a more positive perception of RtI implementation than is actually reality. Caution should be used in interpreting the comments written by teachers.

The nature of secondary data analysis also limited the scope of the research because it did not allow for follow-up focus group questions or discussions. Focus group discussions would have been beyond the scope of secondary data analysis. It has been demonstrated that focus groups can offer further teacher perspectives (Sanger, Friedli, Brunken, Snow, & Ritzmanl, 2012) by analyzing the discourse used during these discussions. Specifically, discussions would have allowed for more detailed responses regarding implementation.

The current study does not allow positive inferences to be made regarding the causality of RtI implementation and increased reading achievement as measured by the Maze. This was not a controlled experimental (or quasi-experimental) research design and inferential statements regarding the outcomes of student achievement cannot be made with any degree of plausibility. In order to be able to make stronger inferential statements regarding these outcomes, experimental design research should be used to control for confounding variables.

Future Directions for Research

The tenor of education has changed significantly since this study began. The State of New Jersey has abandoned the NJASK and replaced it with the Partnership for Assessment of Readiness for College and Career (PARCC) to assess literacy and mathematics. The questions raised in this dissertation about the relationship between the AIMSweb measures and the NJASK should now be asked of the AIMSweb assessments and the PARCC assessment, especially due to the newness of the PARCC assessment. This analysis could provide school districts with valuable information about the relationship between ORF and comprehension and success on the PARCC assessment. If a relationship exists, school districts could also determine cut scores for students who require intervention in order to be successful on the PARCC assessment.

PARCC and the NJASK are both criterion-referenced assessments of achievement; therefore, similar results would be expected. All criterion-based reading assessments focus on understanding written text—however, PARCC differs from the NJASK in two primary ways. First, it is considered to be more rigorous (PARCC, 2015) than the NJASK. Second, the PARCC assesses the new Common Core Standards (Common Core, 2015) rather than the New Jersey Core Curriculum Content Standards.

The AIMSweb measures could also be a useful tool to assist in understanding or assessing the accuracy of the diagnostic decisions made by the Child Study Team.

The ROC analysis gives great insight into the diagnostic accuracy of certain assessments. This diagnostic tool could assist school districts in identifying students for special education services. If, for example, a particular AIMSweb score is highly associated with special education eligibility, it could warrant early identification into RtI to remediate reading difficulty prior to eligibility. These AIMSweb scores could also be used to identify the prevalence of special education identification and once again assist in identification.

This dissertation provides some evidence that implementation of RtI results in changing student outcomes. The conclusions that can be drawn, particularly from research question one, are limited because there is no observational data that teachers changed instruction in the classroom to be more targeted and tiered. Thus, future research should examine effectiveness—and individual differences in effectiveness—of RtI implementation using student scores in conjunction with observation protocols to see instruction as it is occurring in the classroom. The RtI model of targeted and tiered instruction demands that instruction within these tiers be flexible to meet the needs of students. These observations could act as evidence that instructional delivery coincides with the model of RtI instruction.

REFERENCES

Aaron, P. G., Joshi, R. M., Gooden, R., & Bentum, K. E. (2008). Diagnosis and treatment of reading disabilities based on the component model of reading: An alternative to the discrepancy model of LD. *Journal Of Learning Disabilities*, *41*(1), 67-84.

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.

Agnew, N. M., & Pyke, S., (2007). *The science game: An Introduction to research in the behavioral sciences* (7th ed.). Ontario, CA: Oxford University Press.

AIMSweb®. (2014). *AIMSweb assessment and RtI solution*. Pearson, NCS. Retrieved from: http://www.aimsweb.com/

AIMSweb®. (2011). *State predictors user guide.* Pearson, NCS. Retrieved from: https://aimsweb.pearson.com/downloads/AW%20StatePredict_UG.pdf

AIMSweb®. (2012). *AIMSweb technical manual*. Pearson, NCS. Retrieved from: https://aimsweb.pearson.com/downloads/AIMSweb_TM.pdf

Al Otaiba, S., Folsom, J. S., Schatschneider, C., Wanzek, J., Greulich, L., Meadows, J., ... & Connor, C. M. (2011). Predicting first-grade reading performance from kindergarten response to tier 1 instruction. *Exceptional Children*, *77*(4), 453-470.

Allington, R. (2009). *What really matters in response to intervention, research-based designs*. Boston, MA: Pearson.

A Nation at Risk. (1983). *A nation at risk.* The National Commission on Excellence in Education. Retrieved from https://www2.ed.gov/pubs/NatAtRisk/risk.html

Benjamin, L. T. (2007). *A brief history of modern psychology*. Malden, MA: Blackwell Publishing.

Bineham, S. S., Shelby, L., Pazey, B. L., & Yates, J. R. (2014). Response to intervention: Perspectives of general and special education professionals. *Journal Of School Leadership*, *24*(2), 230-252.

Block, C. C., & Pressley, M. (2003). Best practices in comprehension instruction. In L. M. Morrow, L. B. Gambrell, & M. Pressley (eds), *Best practices in literacy instruction* (2nd ed., pp. 111-126). New York, NY: Guilford.

Buffum, A., Mattos, M., & Weber, C. (2009). *Pyramid response to intervention: RTI, professional learning communities, and how to respond when kids don't learn*. Bloomington, IN: Solution Tree Press.

Burns, M. K., & Ysseldyke, J. E. (2005). Comparison of existing responsiveness-to-intervention models to identify and answer implementation questions. *California School Psychologist, 10*, 9-20.

Caplan, G. (1964). *Principles of preventive psychiatry*. Oxford, England: Basic Books.

Center on Response to Intervention (2012). *Universal screening*. Washington, D.C.: American Institutes for Research. Retrieved on December 2, 2014 from: http://www.rti4success.org/essential-components-rti/universal-screening

Clemens, N. H., Hilt-Panahon, A., Shapiro, E. S., & Yoon, M. (2012). Tracing student responsiveness to intervention with early literacy skills indicators: Do they reflect growth toward text reading outcomes? *Reading Psychology, 33*, 47-77.

Common Core. (2015). *Common core state standards initiative*. Retrieved from: http://www.corestandards.org/.

Connor, C. M., Spencer, M., Day, S. L., Giuliani, S., Ingebrand, S. W., McLean, L., & Morrison, F. J. (2014). Capturing the complexity: Content, type, and amount of instruction and quality of the classroom learning environment synergistically predict third graders' vocabulary and reading comprehension outcomes. *Journal Of Educational Psychology*, *106*(3), 762-778.

Creswell, J. W. (2009). *Research design: Qualitative, quantitative and mixed methods approaches* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Deno, S. L., Fuchs, L. S., Marston, D., & Shin, J. (2001). Using curriculum-based measurement to establish growth standards for students with learning disabilities. *School Psychology Review*, *30*(4), 507-524.

Eamon, M. K. (2001). The effects of poverty on children's socioemotional development: An ecological systems analysis. *Social Work*, *46*(3), 256-266.

Education for All Handicapped Children. (1975) Public Law 94-142.

Elementary and Secondary Education Act. (1965). Public Law 89-10, 89th Congress, H.R. 2362.

Elliot, J., Lee, S. W., & Tollefson, N. (2001). A realibility and validity study of the dynamic indicators of basic early literacy skills – modified. *School Psychology Review, 30*, 33-49.

Faggella-Luby, M., & Wardwell, M. (2011). RTI in a middle school: Findings and practical implications of a tier 2 reading comprehension study. *Learning Disability Quarterly*, *34*(1), 35-49.

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

Fountas, I. C, & Pinnell, G. S. (2009). *Leveled literacy intervention*. Portsmouth, NH: Heinemann.

Fuchs, W. W., & Bergeron, B. S. (2013). Viewpoints from the field: Impressions from teachers and administrators on the challenges and successes of RTI implementation in Illinois. *Illinois Reading Council Journal*, *41*(2), 3-12.

Fuchs, D., Fuchs, L., (2005) Responsiveness-to-Intervention: A Blueprint for practitioners, policymakers, and parents. TEACHING Exceptional Children, *38*(1), 57-61.

Fuchs, D., & Fuchs, L. S. (2006). Introduction to response to intervention: What, why, and how valid is it? *Reading Research Quarterly*, *41*(1), 93-99.

Fuchs, L. S., & Fuchs, D. (2007). A model for implementing responsiveness to intervention. *Teaching Exceptional Children*, *39*(5), 14-20.

Fuchs, D., Fuchs, L. S., & Bahr, M. W. (1990). Prereferral intervention: A prescriptive approach. *Exceptional Children*, *56,* 493-513.

Gilbert, J. K., Compton, D. L., Fuchs, D., Fuchs, L. S., Bouton, B., Barquero, L. A., & Cho, E. (2013). Efficacy of a first-grade responsiveness-to-intervention prevention model for struggling readers. *Reading Research Quarterly*, *48*(2), 135-154.

Glover, T. A., & DiPerna, J. C. (2007). Service delivery for Response to Intervention: Core components and directions for future research. *School Psychology Review, 36(4)*, 526-540.

Goldstein, B. A., Fabiano, L., & Washington, P. S. (2005). Phonological skills in predominantly English-speaking, predominantly Spanish-speaking, and Spanish-English bilingual children. *Language, Speech, And Hearing Services In Schools*, *36*(3), 201-218.

Graves, A. W., Duesbery, L., Pyle, N. B., Brandon, R. R., & McIntosh, A. S. (2011). Two studies of tier II literacy development: Throwing sixth graders a lifeline. *The Elementary School Journal, 111*(4), 641-661.

Greenwood, C. R., & Kim, J. M. (2012). Response to intervention (RTI) services: An ecobehavioral perspective. *Journal of Educational & Psychological Consultation, 22*(1), 79-105.

Hale, J., Alfonso, V., Berninger, V., Bracken, B., Christo, C., Clark, E., & ... Elliott, C. (2010). Critical Issues in Response-to-Intervention, Comprehensive Evaluation, and Specific Learning Disabilities Identification and Intervention: An Expert White Paper Consensus. *Learning Disability Quarterly*, *33*(3), 223-236.

Hemphill, F. C., & Vanneman, A. (2011). *Achievement gaps: How hispanic and white students in public schools perform in mathematics and reading on the national assessment of educational progress* (NCES 2011-459). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Retrieved November 15, 2014 from: http://nces.ed.gov/nationsreportcard/pdf/studies/2011459.pdf

Hernandez-Finch, M. E. (2012). Special considerations with Response to Intervention and Instruction for students with diverse backgrounds. *Psychology in Schools 49(3),* 285-295.

Hintze, J. M., & Silberglitt, B. (2005). A longitudinal examination of the diagnostic accuracy and predictive validity of R-CBM and high-stakes testing. *School Psychology Review*, *34*(3), 372-386.

Individuals with Disabilities Educational Improvement Act. (2004). Pub. L. No 108-446, 118 Stat. 2807. Retrieved on July 27, 2013 from http://www.copyright.gov/legislation/pl108-446.html

Jenkins, J. R., 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.

Johnston, P. H. (2011). Response to intervention in literacy: Problems and possibilities. *The Elementary School Journal, 111*(4), 511-534.

Marshall, C., & Rossman, G. B. (1995). *Designing qualitative research* (2nd ed.). Thousand Oaks, CA: Sage.

McAlenney, A. L., & McCabe, P. P. (2012). Intruction to the role of curriculum-based measurement in Response to Intervention. *Reading Psychology, 33*, 1-7.

McKinney, E., Bartholomew, C., & Gray, L. (2010). RTI and SWPBIS: Confronting the problem of disproportionality. *NASP Communiqué, 38*(8), 1-5.

Mellard, D., McKnight, M., & Jordan, J. (2010). RTI tier structures and instructional intensity. *Learning Disabilities Research and Practice, 25*(4), 217-225.

Morrow, L. M., & Asbury, E. (2003). Current practices in early literacy development. In L. M. Morrow, L. B. Gambrell, & M. Pressley (eds.), *Best practices in literacy instruction* (2nd ed., pp. 43-62). New York: Guilford.

Moustakas, C. E. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage Publications.

National Assessment of Education Progress. (2013a). The nation's report card: Reading 2013. Retrieved July 27, 2014 from http://nationsreportcard.gov/reading_math_2013/#/achievement-gaps

National Assessment of Education Progress. (2013b). The nation's report card. Retrieved July 27, 2014 from http://nationsreportcard.gov/reading_math_g12_2013/#/

New Jersey Administrative Code, 6A: Chapter 14: Special Education. Retrieved on July 27, 2014 from http://www.state.nj.us/education/code/current/title6a/chap14.pdf

New Jersey Department of Education. (2010). *Assessment*. Retrieved November 22, 2014 from http://www.state.nj.us/education/assessment/es/njask/

New Jersey School Performance Reports. (2013). Retrieved on November 15, 2014 at http://education.state.nj.us/pr/

No Child Left Behind. (2002). Public Law 107-110, 107th Congress, H.R. 1.

Paris, S. G. (2005). Reinterpreting the development of reading skills. *Reading Research Quarterly, 40*, 184-202.

Partnership for Assessment of Readiness for College and Careers (PARCC). (2015). Retrieved from: http://www.parcconline.org.

Pepe, M., Janes, H., Longton, G., Leisenring, W., & Newcomb, P. (2004). Limitations of the odds ration in gauging the performance of a diagnostic, prognostic, or screening marker. *American Journal of Epidemiology, 159*, 882-890.

Pintea, S., & Moldovan, R. (2009). The receiver-operating characteristic (ROC) analysis: Fundamentals and applications in clinical psychology. *Journal Of Cognitive And Behavioral Psychotherapies*, *9*(1), 49-66.

Raynolds, L. B., & Uhry, J. K. (2010). The invented spellings of non-Spanish phonemes by Spanish–English bilingual and English monolingual kindergarteners. *Reading And Writing*, *23*(5), 495-513.

Ransford-Kaldon, C., Flynt, E. S., & Ross, C. (2011). A randomized controlled trial of a response-to-intervention (rti) tier 2 literacy program: Leveled Literacy Intervention (LLI). *Society For Research On Educational Effectiveness*, conference abstract.

Robinson, G. G., Bursuck, W. D., & Sinclair, K. D., (2013). Implementing RTI in two rural elementary schools: Encouraging beginnings and challenges for the future. *Rural Educator, 34*(3), 1-9.

Sanger, D., Friedli, C., Brunken, C., Snow, P., & Ritzman, M. (2012). Educators' year long reactions to the implementation of a Response to Intervention (RTI) model. *Journal Of Ethnographic & Qualitative Research*, *7*(2), 98-107.

Scholin, S. E., Haegele, K. M., & Burns, M. B. (2013). A small-group reading comprehension intervention for fourth- and fifth-grade students. *School Psychology Forum*, *7*(2), 40-49.

Shepherd, K., & Salembier, G. (2010). Leading, learning and literacy: Implementing a response to intervention approach in the riverside elementary school. *New England Reading Association Journal, 46*(1), 38-48.

Shinn, M. R. & Shinn, M. M. (2002). *AIMSweb® training workbook: Administration and scoring the Reading Maze for use in general outcome measures.* Pearson. Retrieved November 22, 2014 from https://aimsweb.pearson.com/downloads//AdminandScoringReadingMAZE10292002.pdf

Smith, S. L., Peters, M., Sanders, M., & Witz, K. (2010). Applying a response to intervention framework for noncategorical special education identification. *Communiqué*, *38*(8), 9-11.

Snow, C. E., Burns, M. S., & Griffin, P. (1998). *Preventing reading difficulties in young children*. Washington, DC: National Academy Press.

Stahl, K. A. D., & McKenna, M. C. (2013). *Reading assessment in an RTI framework*. New York, NY: Guilford Press.

Tabachnick, B. G., & Fidell, L. S. (2007). *Using multivariate statistics* (5th ed.). New York, NY: Pearson Education.

Vanneman, A., Hamilton, L., Baldwin Anderson, J., & Rahman, T. (2009). *Achievement gaps: How black and white students in public schools perform in mathematics and reading on the national assessment of educational progress* (NCES 2009-455). National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education. Washington, DC. Retrieved November 15, 2014 from http://nces.ed.gov/nationsreportcard/pdf/studies/2009455.pdf

Wanzek, J., Roberts, G., Otaiba, S. A., & Kent, S. C. (2014). The relationship of print reading in tier I instruction and reading achievement for kindergarten students at risk of reading difficulties. *Learning Disability Quarterly*, *37*(3), 148-160.

White, R. B., Polly, D., & Audette, R. H. (2012). A case analysis of an elementary school's implementation of response to intervention. *Journal of Research In Childhood Education*, *26*(1), 73-90.

Youngstrom, E. A. (2014). A primer on receiver operating characteristic analysis and diagnostic efficiency statistics for pediatric psychology: We are ready to ROC. *Journal of Pediatric Psycology, 39(2)*, 204-221.

APPENDIX A

TEST OF EARLY LITERACY PROBES

AIMSweb® Letter Naming Fluency - Benchmark Assessment #1 (Kindergarten - Fall)

Given To: ____________ Given By: ____________ Date: ________

u	D	P	S	R	A	X	y	l	n	**/ 10 (10)**
C	V	g	W	A	G	J	z	c	E	**/ 10 (20)**

AIMSweb® Letter Sound Fluency - Benchmark Assessment #1 (Kindergarten - Fall)

Given To: ____________ Given By: ____________ Date: ________

t	d	n	r	p	c	z	v	w	k	**/ 10 (10)**
m	b	t	f	v	z	i	c	d	p	**/ 10 (20)**

AIMSweb® Phoneme Segmentation Fluency - Benchmark Assessment #1 (Kindergarten - Winter)

Given To: ____________ Given By: ____________ Date: ________

sort	/s/ /or/ /t/	weight	/w/ /ai/ /t/	**/ 6 (6)**
match	/m/ /a/ /ch/	touch	/t/ /u/ /ch/	**/ 6 (12)**

AIMSweb® Nonsense Word Fluency - Benchmark Assessment #1 (Kindergarten - Winter)

Given To: ____________ Given By: ____________ Date: ________

fec	zok	miv	yoc	kod	**/ 15 (15)**
kol	rez	suz	rev	wev	**/ 15 (30)**

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APPENDIX B

R-CBM SAMPLE PASSAGE

The black and white dog was very smart. He hid his bones 12
all over his yard. He hid his bones in the shadows of the trees. 26
He hid his bones under the swing set. He even hid his bones 39
in the sand of the sandbox. 45

The dog was always happy. He was never without a bone. 56
The dog's teeth were very sharp and white, but he never bit 68
anyone. He only chewed on bones. 74

One day the dog was sleeping. A rat came into his yard. 86

"I will take this dog's bones," said the rat. "He is sleeping. 98
He will never know that I have taken them." 107

So the sneaky rat snuck around the yard and stole every 118
bone. Then he slipped under the fence and climbed up a tree. 130
He had all the bones with him in a bag. 140

"I will watch the dog from this branch. I will see what he 153
does when he opens his eyes." 159

The dog opened his eyes. He was hungry. He got up to 171
dig up a bone. He dug. The hole was empty. 181

"I am sure that I hid a bone here. I hid it right in the shadow 197
of this tree." He looked around. 203

Then he heard the rat laughing. He looked up and saw the 215
rat on the branch. 219

"I took your bones!" the rat yelled. 226

Just then the bones fell out of the tree. The dog ran under 239
the fence and got them all. He chased the rat away. 250

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APPENDIX C

MAZE SAMPLE PASSAGE

Answer Key

All summer I've wanted the three-speed mountain bike in the bike shop window. It is shiny black. It has (the, friend, **hand**) brakes. It even has a holder (look, **for**, at) my water bottle. I spent every (pocket, **Saturday**, wanted) this summer admiring the shiny, black (bright, had, **three**) speed bike.

Today Dad drove a (**friend**, owner, wanted) and me to the bike shop. (**In**, At, This) my pocket, I had the money (bottle, **I**, even) saved for the bike.

"I will (and, **buy**, look) the shiny, black, three-speed bike (that, shop, **today**)," I said to my friend.

"Maybe (**you**, wanted, Dad) should look around first," Dad said. (**When,** Maybe, That) I entered the bike shop, I (the, saved, **saw**) many other bikes. I told the (tires, green, **shop**) owner that I wanted to buy (shiny, **the**, and) shiny, black, three-speed bike.

"Maybe (**you**, tires, had) should look around first," the owner (drove, **said**, very).

I looked at a bright green (at, travel, **dirt**) bike. It had cool tires and (the, **a**, around) sticker with the word "Fearless." I (said, **looked**, first) at a big red bike. It (**was**, want, fast) a ten-speed bike that was (with, **very**, cool) light. The bike shop owner said (**it**, admiring, wheels) could travel very fast. I looked (in, was, **at**) scooters and trikes. I looked at (sticker, red, **bikes**) with training wheels and bikes with (**only**, summer, black) one wheel. Finally, it was time (word, **to**, in) buy a bike.

"Do you know (**which**, when, fast) bike you want to buy?" Dad (looked, **said**, shiny).

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APPENDIX D

TEACHER SURVEY

Please respond to the following questions regarding your background as a teacher.

***1. How many years have you been teaching total?**

- 1-4 years
- 5-10 years
- 11+ years

***2. How many years have you been teaching Student Support, Reading Recovery, or acting as a Literacy Coach?**

- 1-4 years
- 5-10 years
- 11+ years

***3. What is the highest degree you have earned?**

- Bachelor's degree
- Master's degree
- Education Specialist degree
- Doctoral degree

***4. In what building are you primarily assigned?**

- Barley Sheaf
- Copper Hill
- Desmares
- Robert Hunter

Please indicate whether you agree or disagree with the following statements. The statements are divided into 3 categories: RtI Framework and Assessment, RtI Implementation Practices, RtI Effect on Student Achievement

***5. RtI Framework and Assessment – Please respond to the following statements regarding your understanding of the components of the RtI framework.**

	Strongly Agree	Agree	Disagree	Strongly Disagree
I understand the RtI framework and triangle				
The purpose of RtI is to refer and identify students with disabilities				
The purpose of RtI is to assist students with academic deficits to avoid referral to and identification of special education				
AIMSweb probes are used to make instructional decisions				
AIMSweb probes are used to make RtI placement decisions				

***6. Please comment regarding your understanding of the RtI Framework and Assessment:**

***7. RtI Implementation – Please respond to the following statements regarding implementation of RtI.**

	Strongly Agree	Agree	Disagree	Strongly Disagree
I feel prepared to implement the RtI framework with appropriate interventions				
Since the implementation of RtI, I have changed my instructional practices to target the specific needs of my students				
The assessment data accurately placed students into targeted intervention groups				

***8. Please comment regarding the effectiveness of RtI Implementation:**

***9. RtI Effect on Student Achievement – Please respond to the following statements regarding how RtI has effected student achievement.**

	Strongly Agree	Agree	Disagree	Strongly Disagree
The percentage of my students who meet progress monitoring goals has increased since using the targeted and tiered RtI approach	○	○	○	○
The targeted interventions I use in my instruction result in academic growth for my students	○	○	○	○
Targeted intervention courses/groups meet student needs	○	○	○	○

***10. Please comment regarding the effect RtI has had on Student Achievement:**

Thank you for your participation in this survey.

APPENDIX E

YEAR 2 INTERVENTION COURSE NAMES

Focus Group Course		**Assessment**	**Instructional Strategies**	**Materials/Resources**	**Time & Duration**	**Setting Size**
Phonemic Awareness II • Rhyme • Alliteration • Sentence segmentation • Syllables • Onset & Rime		Developing Phonemic Awareness in Young Children-Phonological Assessment DRA Word Analysis	Rhyming Words activities Choral reading of poems and nursery rhymes Clapping sounds heard Marking place sound is heard in word	Developing Phonemic Awareness in Young Children Poems Nursery Rhymes Project READ Spelling Through Phonics Words Their Way- DVD Word Jurneys Heinmann Phonics- K-2 Making Words Road to the Code Reading A-Z	3 days out of a 6 day cycle 20 minutes	6-8 students
Phonics and Word Study II • Letter recognition • Letter-sound correspondence • Onset & Rhyme • Word Study • Syllable patterns • Morpheme structures		DRA Word Analysis Project READ Unit/Book Assessments	Guided Reading Plus-Word Study Strategies Making and Breaking Words Changing letters in word to make new words- Ex: bat to rat to chat to rut Words Their Way-DVD Activities	Developing Phonemic Awareness in Young Children Poems Nursery Rhymes Project READ Spelling Through Phonics Words Their Way- DVD Word Jurneys Heinmann Phonics- K-2 Making Words Road to the Code District Word Study Program (preteach &reteach) I've Dibel'd , Now What Reading A-Z	3 days out of a 6 day cycle 20 minutes	6-8 students

Fluency II • Letter recognition • Letter-sound correspondence • High frequency words • Oral reading		NAEP Oral Reading Fluency Scale- Timed Assessment	Guided Reading Plus-Word Study Strategies Making and Breaking Words Practice with Project Read phrases and short passages Rereading familiar text Raz Kids Fluency Have students read books for younger grades and record on iPad	Guided Reading Plus-Word Study Strategies Project READ Raz Kids Reader's Theatre Fluency Passages Poems Fluency Apps Word Callers Reading A-Z	3 days out of a 6 day cycle 30 minutes or 20 minutes (depending on focus)	6-8 students
Comprehension and Vocabulary II • Word identification • Word meaning • Word categorization • Word structure (root/base) • Sentence structure • Story structure • Monitoring for meaning • Main idea, synthesis, and summarizing • Strategy Instruction		DRA Progress Monitoring Teacher's College Reading Assessment?	Guided Reading Plus- Writing Portion Written and oral retellings Reader's response notebooks Instructional read alouds Model integrating strategy that you use when reading • How do I determine if I need to use a strategy? • What strategy will I use?	Early Success Soar to Success Graphic Organizers Interventions that Work Raz Kids Reading A-Z Learn Zillion Readworks-Nonfiction Newsela	6 days out of a 6 day cycle 30 minutes	12-15 students

Tier 3

Focus Group Course		**Assessment**	**Instructional Strategies**	**Materials/Resources**	**Time & Duration**	**Setting Size**
Phonemic Awareness III • Rhyme • Alliteration • Sentence segmentation • Syllables • Onset & Rime		Reading Recovery- Observation Survey Project READ Unit and Course Assessments	Reading Recovery Lesson format: - Familiar Reread - Running record - Word Work - Writing - New book Activities from Project READ & FCRR	Reading Recovery Road to the Code Project Read Developing Phonemic Awareness in Young Children Apps and Websites Florida Center for Reading Research (FCRR)	6 days out of a 6 day cycle 30 minutes	1-3 students
Phonics and Word Study III • Letter recognition • Letter-sound correspondence • Onset & Rhyme • Word Study • Syllable patterns • Morpheme structures		Project READ Unit and Course Assessments DRA Word Analysis	Reading Recovery Lesson Format Activities from Project READ & FCRR Poems	Reading Recovery Road to the Code Project Read Apps and Websites *I've Dibel'd Now What?* Fountas & Pinnell- K-2 Phonics Reading A-Z	6 days out of a 6 day cycle 30 minutes	1-3 students
Fluency III • Letter recognition • Letter-sound correspondence • High frequency words • Oral reading		NAEP Fluency Scale	Reading Recovery Lesson Format Repeated readings Paired readings Poems FCRR Activities Have students read books for younger grades and record on iPad	Reading Recovery Project Read Fluency Apps- Raz Kids Fluency	6 days out of a 6 day cycle 30 minutes	1-3 students

Comprehension and Vocabulary III • Word identification • Word meaning • Word categorization • Word structure (root/base) • Sentence structure • Story structure • Monitoring for meaning • Main idea, synthesis, and summarizing		DRA	Reading Recovery Lesson Format Reciprocal Teaching strategies Oral and written retellings Story summary Guided Reading Plus Lessons	Reading Recovery Early Success Soar to Success Graphic Organizers Learn Zillion Interventions that Work Raz Kids *Leveled Literacy Intervention-Grade 2 Pilot*	6 days out of a 6 day cycle 30 minutes	1-3 students