

The Effect of My Reading Coach on the Change in Reading Scores

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Abstract

The focus of this study was to determine whether the sixth version of My Reading Coach Platinum v.2 (MRC) was successful in meeting the needs of struggling readers in District L. Specifically, research questions sought to determine whether the differences in reading growth were significant among students who participated in MRC and those who did not use MRC and whether or not those differences were affected by gender or grade level. Additionally, research questions focused on the significance of the relationships among students who participated in MRC reading growth and completion rates as well as time spent on task using MRC and whether this was affected by students' gender.

The results of the data analysis indicated that the change in reading scores between students who participated in the MRC and those who did not participate was not significant, regardless of gender. The results indicated a significant main effect of the participants' grade level on the change in reading scores. Due to the weak relationships between the change in reading scores among MRC participants and completion rate as well as time spent using MRC not being statistically significant, gender analyses could not be completed.

The results of this study provided data on the effects of MRC intervention software as used in District L. The findings may have implications for other districts across the nation with similar demographics, to determine whether MRC increases student success in reading. This study will add to the body of educational research relating to reading interventions.

Dedication

This dissertation is dedicated to my family, my husband, Terry, and my two sons, Trevor and Tyler. This work was completed because each of them encouraged me to stay focused by asking me, “When are you going to be done?” I love you all very much, and I appreciated you having my back to reach my goals.

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Chapter One

Introduction

Reading is an essential skill that is the basis of a solid educational foundation. Deshler, Palincsar, Biancarosa, and Nair (2007) clarified that students who are considered good readers typically excel in academics more than students who struggle with reading. During the early elementary school years, most children learn to read through various instructional methods and reading programs delivered by their classroom teacher. However, some children do not experience the same success in reading even though it was delivered by the same teacher (Foorman & Torgesen, 2001). The need to bridge the gap between good readers and struggling readers has always been a focus in schools. However, since the No Child Left Behind Act of 2001 (NCLB) when legislation implemented harsh consequences for schools not making adequate yearly progress, educators have been challenged to address how to bridge these gaps in literacy (Tankersley, 2005).

According to Juel (1988), 87% of students who struggle with reading at the end of first grade continue to struggle with reading through the end of fourth grade. Juel further stated that 75% of students who underperformed in third grade remained behind throughout high school. As a result, many adolescents failed or dropped out of school because their reading skills did not meet the demands placed on them when they entered college or the workforce (Deshler et al., 2007). Educational initiatives emphasize the critical role of early reading instruction, recognizing that students who are not reading at grade level during the primary grades continue to have trouble with reading (Francis & Stuebing, 1996). More recently, the National Center for Educational Statistics (2013)

reported that almost 40% of fourth grade students were consistently reading at a *Below Basic* level on the National Assessment of Educational Progress (NAEP) assessments.

In response to the crisis of struggling readers, reading intervention studies have shown students who are at risk for failing reading can be helped through intense reading instruction (Denton, Fletcher, Anthony, & Francis, 2006). Foorman and Moats (2004) summarized the components of effective reading instruction for struggling students to include early intervention with alphabetic awareness while integrating reading for meaning in one-on-one or small group instruction. To become successful readers, students need a foundation in phonemic awareness, an understanding of using new vocabulary, and a background knowledge of what they are reading (Tankersley, 2005). My Reading Coach (MRC) by MindPlay (2008) is a technology-based reading intervention program that claims to address all of these critical components.

Background

This study was conducted in a suburban school district southeast of Kansas City, Missouri. During the 2012-2013 and 2013-2014 school years, District L educated over 17,500 students, including about 9,200 students in 18 elementary schools (Missouri Department of Elementary and Secondary Education, 2014). Seven of these elementary schools have used MRC for reading intervention since the 2009-2010 school year.

To meet the demands of NCLB legislation and support struggling students, District L began to pilot the Response to Instruction (RtI) model during the 2010-2011 school year (Associate Superintendent of Instruction, personal communication, March 12, 2014). RtI is a system adopted by the Missouri Department of Elementary and Secondary Education as well as various states and school districts across the United

States to support students who are not meeting grade level expectations. Elementary students were assessed in skill-based areas, such as reading. Students who were below grade level were assigned an instructional group designed to target specific skill defects. Instructional RtI groups were in addition to regular classroom instruction. Data were collected weekly to monitor student progress and guide further instruction. The primary purpose of RtI in District L was to offer instant intervention to maximize learning. Therefore, MRC has been an available tool for students in seven elementary schools since the start of RtI (Associate Superintendent of Instruction, personal communication, February 4, 2014).

District reading specialists and principals were able to choose which reading intervention software program to implement in each respective school. MRC was selected by seven of the 18 elementary schools. Individual building administrators decided which technology reading intervention to use with students (see Appendix A). Table 1 shows the population of each elementary school and the reading intervention chosen at the 18 elementary schools in the school district. Administrators at the schools that selected MRC did so because the program addressed initial reading skills, such as phonics, whereas other programs presented appeared to concentrate on other reading disabilities. MRC was the first technology reading intervention program in District L that would take students back to basic reading skills and progress to comprehension (Associate Superintendent of Instruction, personal communication, February 4, 2014).

Table 1

2012-2013 and 2013-2014 Elementary School Enrollment and Intervention Program

School	2012-2013 Enrollment	2013-2014 Enrollment	Intervention
A	529	513	Reading Assistant
B	435	442	Reading Assistant
C	416	422	None
D	522	545	MRC
E	473	468	MRC
F	577	580	None
G	326	314	Accelerated Reader
H	353	370	None
I	535	565	None
J	571	594	MRC
K	1,001	1,017	MRC
L	617	638	Reading Assistant
M	573	569	Reading Assistant
N	471	463	Reading Assistant
O	439	429	MRC
P	585	541	MRC
Q	385	370	None
R	399	376	MRC

Note. Adapted from “District and School Information,” by Missouri Department of Elementary and Secondary Education, 2015 retrieved from <http://mcds.dese.mo.gov/quickfacts/Pages/District-and-School-Information.aspx>. Column 4 information retrieved from the results of the survey found in Appendix A.

My Reading Coach (MRC). MRC is a reading intervention software program created by MindPlay Company. MindPlay was founded in 1981 by Judith Bliss. The focus of the company has always revolved around educational resources and software to help students who struggle to learn how to read. In 1986, MindPlay marketed a variety of educational software programs. Through a combination of continuous research of best instructional practices for students who struggle with learning to read, along with the evolution of technology, the MRC program was developed and put on the market in 1998. There have been six major revisions to the MRC software. The sixth version, My Reading Coach Platinum v.2, was released in October 2008 and was the version used in the current study. In addition to MRC, MindPlay is the maker of RAPS 360, a diagnostic assessment system, and Fluent Reading Trainer (FLRT), a reading fluency integration software program (MindPlay Director of Educational Services and Customer Support, personal communication, April 21, 2014).

MRC was designed to be flexible for educators to use it as individual intervention, small group intervention, or entire class instruction. MRC was used in District L as an individual intervention. MindPlay suggested MRC be used independently by students on the computer 80% of the time and one-on-one teacher-led lessons 20% of the time.

There are 61 lessons available in MRC. The age of the elementary student determined the number of lessons to be completed to establish proficiency in reading foundational skills. MindPlay claims that first grade students demonstrate competency upon completion of the first 32 lessons, second graders completing the first 46 lessons, and all other grade levels completing 61 lessons. Teachers have the ability to adjust

individual learning prescriptions (MindPlay, 2008). MindPlay also indicated that the amount of time students spent in MRC is equally important to the number of lessons completed. Individual time for each student was automatically recorded within MRC. MindPlay (2008) guarantees reading improvement after a student engages in 50 or more hours on MRC.

Students new to the MRC program are automatically prompted to complete a diagnostic assessment of reading foundational skills. Based on this pre-assessment, the program automatically prescribes an individual learning plan within MRC. This pre-assessment is only administrated at the start of the program. The students begin the assessment at their current grade level, not ability level. Results from the test are used to identify gaps in the student's encoding and decoding ability and determine the level of competency. After that, the program will assign lessons according to each student's needs.

Aside from the software component of MRC, there are one-on-one offline supplemental lessons for every skill to use with students who struggle with a specific lesson. It is recommended that teachers intervene and work directly with students who need remediation to master a skill. Supplemental teacher-directed activities are part of the MRC program (MindPlay, 2008).

In District L, students used MRC individually at a computer using headphones to listen to the commands of the instruction. Based on the results of the placement test, appropriate lessons are assigned to each student. Lessons are delivered to the student through an interactive teacher on video. The online lessons provide consistent and correct modeling of phonemic awareness and phonics skills. The recommended time

each student should spend using MRC is four to five times per week for 45 minutes over 10-20 weeks or until all 61 lessons are completed (MindPlay, 2008). MindPlay (2008) denotes it can take students 40 to 60 hours to complete the entire program. This timeframe was determined after the study conducted by Bliss, Larrabee, and Schnitzler (2002). This early study of MRC is still used as of the time of the current study as a benchmark to measure time spent in MRC.

MRC software automatically records and stores data on all student interaction within the program. Data includes time on task, MCR assessment scores, lessons included and excluded in a student's individual program based on MRC assessment, number of lessons completed, letters and sounds mastered and needed to master, and number of attempts to master specific letters and sounds. These data are assessable to the teacher to use for formative assessments. Additionally, the student receives periodic and specific feedback to maximize learning while using the program. Reading growth is supposed to occur for students who engage with MRC for 20 hours or more (MindPlay company representative, personal communication, November 12, 2013).

There are reports within MRC used to monitor student progress. The report associated with this study is the Phonics Student Performance Report. This report is used to monitor individual student performance on each phonic lesson and activity. The report displays a list of every lesson and activity that a student has already completed in MRC (MindPlay, 2008). There are six parts to the report:

- list of all activities in each completed lesson;
- time on task in hours, minutes, and seconds;

- current status of lessons such as in progress, complete, mastered, placed at (with placement test results), reviewed at (with review test results), or no record;
- score as a percentage indicating correct responses for each activity;
- indication if the activity was repeated; and
- date the student last worked on each activity. (MindPlay, 2008, p. 84)

The teacher can access MRC reports to monitor students' progress in the program. The data on the report can be used to pinpoint potential, current, or reoccurring problems for students.

Statement of the Problem

Reading difficulties and disabilities present challenges that can last a lifetime (Connor, Alberto, Compton, & O'Connor, 2014). Educators put forth great efforts to meet the needs of students who struggle in reading. Under the mandated ruling of NCLB, school districts are required to invest time and money in reading invention programs. Until the current study, administrators in District L had not assessed whether MRC was successful in meeting the needs of these students who struggled with reading.

Purpose of the Study

The focus of this study was on whether MRC was successfully meeting the needs of struggling readers in District L. The purpose of this study was seven-fold. The first purpose was to determine whether there was a difference in reading growth among elementary students who participated in MRC reading intervention program and those who did not as measured by a difference in AIMSweb Reading-Curriculum Based Measurement (R-CBM) fall 2012 to spring 2013 or fall 2013 to spring 2014 assessment

scores. The next purpose was to determine whether the change in reading scores among any of the aforementioned participants was affected by student gender or grade level. Additionally, this study was conducted to determine whether there was a relationship between participating students' reading scores and completion rates of the MRC program and whether the relationship differed by student gender. The final purpose of this study was to determine whether there was a relationship between participating students' change in reading scores and time spent on task in the MRC program and whether the relationship differed by student gender.

Significance of the Study

Research has provided evidence about the content, format, and timing of early reading intervention (Foorman & Moats, 2004). The focus of this study was how the technology intervention of MRC directly affected growth in reading. The results of this study could help District L determine if the MRC program by MindPlay supported reading growth. This study may assist District L as well as districts across the nation with similar demographics, to determine whether MRC increases student success in reading. This study will add to the body of research relating to reading interventions. Finally, this study will be valuable to other districts considering the purchase of MRC.

Delimitations

“Delimitations are the self-imposed boundaries set by the researcher on the purpose and scope of the study” (Lunenburg & Irby, 2008, p. 134). The following delimitations may affect the ability to generalize the findings beyond District L:

- Reading progress was based on two measurements: MRC reports, which are used to measure students' progress throughout the program, and the

AIMSweb Reading Curriculum-Based Measurement (R-CBM), which is a screening and progress monitoring assessment tool.

- The sample of this study included elementary students from one suburban school district during the 2012–2013 and 2013-2014 school years.

Assumptions

“Assumptions are postulates, premises, and propositions that are accepted as operational for the purposes of the research” (Lunenburg & Irby, 2008, p. 135). This study included the following assumptions:

- Teachers assigned students to complete the MRC program because the students’ reading intervention needs matched those of the MRC program.
- Students assigned to MRC were at least one year or more below their current grade level in reading.
- Students using MRC completed MRC activities and the R-CBM assessment to the best of their ability.
- Administration and scoring of R-CBM assessments were accurate.

Research Questions

Research questions specify the focus and the purpose of the study (Creswell, 2014). The following research questions guided this study:

RQ1. To what extent is there a difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program?

RQ2. To what extent is the difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated

in the MRC program and those who did not participate in the MRC program, different between males and females?

RQ3. To what extent is the difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program, different among grade levels?

RQ4. To what extent is there a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate?

RQ5. To what extent is the relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate different between males and females?

RQ6. To what extent is there a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the MRC program?

RQ7. To what extent is the relationship between change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the program different between males and females?

Definition of Terms

Researchers define key terms essential to a study and used throughout the study to provide clarity to the topic (Lunenburg & Irby, 2008). The following terms are referenced throughout this study:

AIMSweb. AIMSweb is a computerized system that organizes results and reports of R-CBM formative assessments during a school year (Shinn & Shinn, 2002).

Completion rate. For the purpose of this study, completion rate of the MRC program is defined as the number of lessons each student completed in MRC out of the total 61 lessons (MindPlay, 2008).

Phonemic awareness. Phonemic awareness is the ability to detect the smallest identifiable parts of speech, called phonemes, and understand how phonemes can be separated, blended, and manipulated (Vaughn & Linan-Thompson, 2004).

Phonics. Phonics is a term often used as a general term for various instructional reading strategies that are used to teach the relationship between speech and print (Beck, 2006).

Overview of the Methodology

This quasi-experimental quantitative study involved seven elementary schools that used MRC and 11 elementary schools that did not use MRC during the 2012-2013 or the 2013-2014 school years in one suburban school district. The population included elementary students in grades second through sixth. The sample included elementary students in grades second through sixth who were identified as reading below their current grade level and placed in MRC by a teacher and elementary students in grades second through sixth who were identified as reading below their current grade level and not placed in MRC. A factorial analysis of variance (ANOVA) was used to examine the change in reading scores from fall 2012 or 2013 to spring 2013 or 2014 using the R-CBM assessment scores between students who participated in the MRC program and those who did not by grade level and gender. Pearson product moment correlation coefficients and

Fisher's z tests also were conducted to test the hypotheses associated with the research questions.

Organization of the Study

This study is organized into five chapters. Chapter one included an introduction to the study, background information, a statement of the problem, the purpose of the study, the significance of the study, delimitations, assumptions, research questions, the definition of terms, and an overview of methodology. Provided in chapter two is a review of the literature, which includes the history of reading interventions, an examination of phonics-based approaches, the rationale behind computer-based assisted reading instruction, and current research on MRC. Provided in chapter three is the research design, population and sample, sampling procedures, instrumentation including measurement and validity and reliability, data collection procedures, data analysis and hypotheses testing, and the limitations of this study. Presented in chapter four are the results of the hypothesis testing. Chapter five includes a summary of the study, major findings related to the literature, and conclusions.

Chapter Two

Review of Literature

Reading is a critical component to success in our society. The ability to read is valued for social and economic advancement (Snow, Burns, & Griffin, 1998). Perhaps the most influential legislation passed as an effort for all children to learn to read proficiently was the No Child Left Behind Act of 2001 (NCLB). NCLB was designed to ensure that all students are proficient in reading, science, and mathematics by the 2013-14 school year (Taylor, Stecher, O'Day, Naftel, & Le Floch, 2010). This federal mandate forced public schools to evaluate current programs and determine how to abide by the NCLB guidelines to ensure all students become proficient learners. In the area of reading, NCLB caused educators to examine research to find the most effective means to grow strong readers and help those who struggle with learning to read.

This chapter presents the literature applicable to reading intervention and reading achievement. First, a historical perspective on phonemic awareness and phonics reading intervention strategies in American society is provided. Second, an overview of research-based methods of phonemic awareness and phonics reading interventions are discussed. Third, effective methods of computer-assisted reading intervention programs are investigated. Finally, an analysis of studies that focused on My Reading Coach, a reading intervention program that emphasizes growth in phonemic awareness and phonics, is included.

Reading Instruction in America

In the latter part of the nineteenth-century and into the early part of the twentieth-century, educators considered the primary function of reading was to develop an

appreciation for and a permanent interest in reading. During the early part of the twentieth-century, public schools began to take notice of other elements of reading such as silent reading, speed of reading, and reading disabilities (Smith, 2002). Educators and researchers recognized reading delays and started to focus on possible causes. One theory was that individuals with reading delays were unable to see print and suffered from “word blindness.” Word blindness was thought to be an inherited defect. By the late 1920s, the theory of “word blindness” was no longer believed as a possibility (McCormick & Braithwaite, 2008).

The first article about remedial reading, written by Uhl, was published in *Elementary School Journal* in 1916. In this article, Uhl discussed the ten most common reading errors based on a reading test administered to students in third through eighth grades. He prepared suggestions for remedial practice to correct these errors (as cited in Harris, 1967). Uhl used the term “remedial reading” for the first time. In 1920, the first university-based reading clinic was founded at the University of California Los Angeles. This clinic was directed by Fernald, who later became known for developing instructional procedures for severely delayed readers. Soon after, in 1922, the first university textbook devoted to remedial reading was published. The text was called *Deficiencies in Reading Ability: Their Diagnosis and Remedies* by Clarence T. Gray (as cited in McCormick & Braithwaite, 2008). The era of the 1920s marked the beginning of educators examining the variety of causes of reading delays and discovering strategies to help those who struggle with learning to read.

In the 1930s, teaching phonics became the major approach to learning to read. However, educators took different paths to teaching phonics. Typically, teachers taught

phonics by a mechanistic method, meaning students sounded out words by learning strict phonetic rules and rigid procedures (Walker, 2008). In the last half of the 1930s, Walker perceived that educators viewed phonics instruction as outdated and incorrect in teaching individuals how to read. There was a conception among some teachers that phonics was of no value. Teachers began to abandon phonics as a method of teaching students to read (Smith, 2002). By the 1940s, phonics was no longer taught in schools (Walker, 2008).

During the first half of the 1940s, there was a reduction in the output of research and reading materials due to the United States involvement in World War II. During this time, teachers taught reading using whole-word-recognition or look-say approaches (Smith, 2002). In the early 1950s, teachers continued to accept the whole-word method as the predominate approach to teaching students to read. In 1955, an influential book by Flesch, *Why Johnny Can't Read*, focused completely on low reading achievement as the cause of little progress in U.S. schools. The publication of this book led to renewed public attention on phonics instruction and remedial reading programs (McCormick & Braithwaite, 2008). Teachers returned to teaching phonics as a last resort to instructing struggling readers (Walker, 2008).

In the 1960s, basal reading series were popular, included a manual, which outlined how to teach each story and provided directions for how to teach phonics (Walker, 2008). Remedial reading programs continued to develop using a variety of reading strategies. In 1965, Congress passed the Elementary and Secondary Education Act (ESEA), which marked the beginning of Title I Reading Programs (McCormick & Braithwaite, 2008). A comprehensive study by Bond and Dykstra (1967), called the First Grade Studies, was published, and influenced how educators taught children how to read.

This study compared first-grade reading programs from 1964 to 1967 among 27 different reading projects. Bond and Dykstra concluded that to improve reading instruction, teachers needed better training and materials. They reported that no one approach to teaching reading was distinctly better in all situations. Furthermore, Bond and Dykstra stated that systematic phonics was an effective way to teach reading, regardless of the method used to teach phonics or the students' socioeconomic status.

In the 1970s, reading instruction continued to change due to Bond and Dykstra's (1967) study. Different approaches to reading instruction among teachers were considered as long as some phonics instruction was included. Furthermore, Bond and Dykstra's findings contributed to a change of basal reading programs, which included more phonics. At the same time, President Nixon declared the 1970s as the right to read decade and started the program called the National Right to Read Effort (NRRE) (Allen, 1971). The NRRE did heighten an interest in reading instruction, but the program did not meet its goals for eliminating reading problems in the United States (McCormick & Braithwaite, 2008).

In the 1980s, educators once again shifted away from teaching phonics and taught more whole-language. Basal readers included literature-based stories (Walker, 2008). In 1983, President Reagan included concerns for low achieving reading scores in his report, *A Nation at Risk*. Due to this report, Congress assigned the National Reading Panel (NRP) to recommend the scientific studies that were worthy of consideration in the design of reading instruction. The recommendation from the NRP report was that phonemic awareness and phonics skills need to be developed during kindergarten and first grade (Allington, 2002). By the end of the 1980s and through the 1990s, whole-

language once again became accepted by some educators for teaching reading (Walker, 2008).

Even though teachers continued to use whole-language tactics primarily in the 1990s, they simultaneously used some phonetic approaches (Walker, 2008). In the mid-1990s, the Elementary and Secondary Education Act (ESEA) of 1996 was known as the first time the federal government became involved in the area of instruction. This involvement was controversial because the U.S. Constitution gives the states responsibility for education. The key component of ESEA was Title I funding to support supplementary reading instruction in high-poverty schools. The funding was to be used in addition to the current reading instruction already available in schools (Allington, 2002).

In the late 1990s, *Preventing Reading Difficulties in Young Children* by Snow et al. (1998) was another major publication with research-derived recommendations. Snow et al. explained how to work effectively with students who read on average and delayed levels. The emphasis was based on a belief that phonics needed to be included in reading instruction as well as a renewed support for using multiple approaches to teaching phonics (Walker, 2008). This notion was in agreement with Bond and Dykstra (1997) who discovered through their research that there is not one approach to reading instruction that is better in all situations.

The National Reading Panel (NRP) published a report in 2000 that summarized decades of research and included five essential components of reading instruction for elementary students. These components included teaching phonemic awareness, phonics instruction, building vocabulary, improving the fluency of reading, and comprehending

text. This report was significant in the development of NCLB in 2001 (McCormick & Braithwaite, 2008). NCLB was an extension and reauthorization of the ESEA and not a replacement (Allington, 2006). Educators have included these five components in reading programs because of the NRP report. The components have a heavier emphasis on the use of remedial reading classes. Schools that receive NCLB funding must provide evidence of inclusion of all five of these components (McCormick & Braithwaite, 2008).

Research-Based Methods of Phonemic Awareness and Phonics

History has shown that the implementation of phonemic awareness and phonics into reading instruction works to teach struggling readers the skills needed to read (Ehri, Nunes, Stahl, & Willows, 2001). Of the five skills, phonemic awareness and phonics must be learned and developed first. These two skills are the gateway to further reading development with vocabulary, fluency, and comprehension skills. Phonemic awareness and phonics instruction are related, but different from one another, which can cause confusion for educators and parents (Ehri et al., 2001).

Students who have mastered phonemic awareness have the ability to detect phonemes, the smallest parts of speech, and understand how to separate, blend, and manipulate the phonemes to read words (Vaughn & Linan-Thompson, 2004). Phonemic awareness is an auditory process that focuses on understanding phonemes in spoken words, not printed text (Ehri et al., 2001). Students who have acquired phonemic awareness have the skills to separate and manipulate sounds as well as blend and segment sounds into spoken and eventually written words (Heggerty, 2004).

In contrast, the term phonics is often used as a general term for various instructional reading strategies that are used to teach the relationship between speech and

print (Beck, 2006). Phonics programs are used to teach students how to decode written words in order to read isolated words or words within context (Ehri et al., 2001). Effective phonics programs include a sequence of teaching a set of letter-sound relationships. The goal of phonics instruction is to teach children the connection between letters and sounds, sounds of letters in written and spoken words, and the process of blending sounds to read words. A child who reads phonetically can apply phonic skills to reading regular and irregular words as well as known and unknown words both in isolation and in context (Vaughn & Linan-Thompson, 2004).

Phonemic awareness. Before children can read, they must master phonemic awareness to blend sounds together which leads to decoding words (Ehri et al., 2001). Two meta-analyses have provided data supporting phonemic awareness instruction: NRP in 2000 and Visual Learning by Hattie in 2009. In 2000, the National Institute of Child Health and Human Development (NICHD) reviewed more than 52 peer-reviewed phonemic awareness experimental studies and concluded that positive benefits are evident from explicit instruction in phonemic awareness. Hattie (2009) evaluated 14 meta-analyses and 425 studies including both phonemic awareness and phonics. Hattie (2009) determined the benefits of teaching phonemic awareness were repeated multiple times across experiments.

The NRP (2000) concluded there are several parts to phonemic awareness instruction that can be used to assess and improve reading skills. These parts include phoneme isolating sounds, identifying similar sounds, categorizing sounds in a sequence, blending sounds together, segmenting sounds into separate sounds, and omitting sounds from words. Focusing on strengthening phonemic awareness has proven to help

kindergarten and first grade students who were learning to read, students who have reading disabilities, students from a range of socioeconomic groups, and students who are English language learners. The meta-analysis of teaching phonemic awareness confirms it is a key element in teaching students to read; however, phonemic awareness alone is not a complete reading program. The NRP report indicated that for phonemic awareness instruction to be effective, it should be flexible and fit the needs of the learner regardless of time spent on instruction (as cited in NICHD, 2000).

Whether instruction was delivered by a teacher or a computer program, teaching that focused on one or two types of phonemic awareness skills led to greater outcomes (Hattie, 2009). Outcomes were greater for preschool than for higher grade levels and were more effective when delivered in small groups. The effects of phonemic awareness instruction were as great with low socioeconomic status students as with middle and high socioeconomic status students. Hattie stated that these data support the claims that purposely teaching phonemic awareness is an effective and necessary part of teaching students how to read.

The National Reading Panel (2000) suggested that teachers use data obtained from a phonemic awareness pretest to modify instruction for the individual needs of each student. This practice is known as progress monitoring. Progress monitoring is a key element in teaching phonemic awareness and should be used to guide instruction and be a predictive indicator of later reading ability. An evaluation will identify which phonemes the student knows and does not know. A good evaluation system will allow the teacher to determine which of the three components of phonemic awareness are problematic. These three components include deleting sounds, segmenting sounds inaccurately, and

blending sounds inaccurately. Progress monitoring provides data to the teacher to identify if a student is at-risk of failing to acquire phonemic awareness skills and monitors student progress.

Foorman and Torgesen (2001) stated that phonemic awareness instruction showed the most improvement in students' reading when alphabetic letters were included, few manipulations of phonemic units were presented at one time, and instruction was taught to small groups of students. Phonemic awareness instruction should be systematic, focused, and clear for 15-20 minutes a day. Learning goals should be obvious and easily determined by anyone listening. Time should be allowed for the teacher to model phonemic sounds, for students to respond individually, and for continuous and constant progress teacher monitoring (Vaughn & Linan-Thompson, 2004).

Phonics. Phonics instruction was designed for students in the early elementary grades who are learning to read and for individuals having difficulty learning to read (National Reading Panel, 2000). Phonics instruction teaches children how to read words using the alphabetic code (Ehri et al., 2001). To read phonically is a complex task. Individuals first need to know the associations among the 44 speech sounds along with the 100 spellings that represent these sounds. This knowledge must then be applied to reading familiar and unfamiliar words in isolation and in context (Vaughn & Linan-Thompson, 2004). This tailored instruction focuses on essential skills and awareness necessary to learn how to read and should never be the only components of an entire reading program (Vaughn & Linan-Thompson, 2004).

Evaluating the effectiveness of phonics instruction has been assessed numerous times in various research studies. In 1967, Chall published reviews of early reading

programs. She found that early phonics intervention using a systematic format of sequential sets of phonics lessons led to improved reading more so than later interventions and less structured instruction. According to Chall's (1967) reviews, children who were taught using whole-word methods were more skilled in comprehension at the beginning of learning to read. However, by the second and third grades, students who were taught phonics had better techniques for reading new words as well as for comprehending text. Chall's (1967) review supported phonics instruction, but did not recommend a certain type of instruction.

Ehri et al. (2001) published a meta-analysis using 38 studies resulting in comparisons among 66 treatment-control groups. The study by Ehri et al. (2001) was conducted to answer questions about the impact of systematic phonics instruction on reading growth when compared with instruction that does not concentrate on phonics. The students who participated in the study were enrolled in kindergarten through sixth grade. Reading ability varied among the participants and included students who were normal achieving readers and not screened for reading ability, at-risk readers, documented having a reading disability, or low achieving in reading. Not all studies in Ehri et al. (2001) meta-analysis were included in the phonemic awareness training studies by the National Reading Panel.

In one analysis by Ehri et al. (2001), three different phonics programs were compared: synthetic phonics, larger-unit phonics, and miscellaneous phonics programs. Synthetic phonics were instructional programs that centered on students learning how to transfer letters into sounds and then merge those sounds into words. Larger-unit phonics focused on analyzing and blending subparts of words and phonemes. Miscellaneous

phonics programs included programs that were systematic, but used different methods than those used in synthetic and larger-unit categories. Miscellaneous phonics also included any programs that were unclear about the instructional approach. The conclusion drawn from this analysis was that systematic phonics methods are shown to be more effective than non-phonics methods. These findings provided evidence that validated that systematic phonics instruction is important when teaching students how to read.

Another analysis by Ehri et al. (2001) in the same study examined whether phonics instruction helped children learn to read more effectively than instruction that did not teach phonics. Data in this part of the study included children whose reading was measured at either the end of reading program or the end of the school year. These findings supported that phonics instruction significantly contributes to growth in reading skills than do non-phonics instructional programs.

Additionally, Ehri et al. (2001) examined data to determine if phonics instruction is advantageous for elementary students who have difficulty learning to read and if phonics instruction is an effective method to use in preventing reading failure in students who have been identified as at risk of having problems learning to read. Phonics instruction produced reading growth among kindergarten and first grade students at risk of developing reading problems as well as disabled readers, who included students identified in the study by Ehri et al. as having poor reading skills with average IQs. Ehri et al. concluded that using systematic phonics instruction was more effective than using non-phonics instruction to assist in preventing reading difficulties among identified at risk students and disabled readers.

Furthermore, Ehri et al. (2001) determined that systematic phonics instruction had positive results for children despite their socioeconomic status (SES) levels. The findings were derived from studies that were conducted in typical classrooms that included students from diverse ranges of SES levels. Results indicated that the majority of students, regardless of age, ability, and SES background, made gains by being involved in phonics programs. Therefore, Ehri et al. have used several different perspectives to show that systematic phonics instruction is beneficial to students who are learning to read, regardless of SES.

Hattie's (2009) meta-analysis of phonics instruction further supports the power of teaching phonics. This meta-analysis included 12,124 subjects and evaluated the effects of phonics instruction with an outcome of $d = 0.60$ which indicates a high zone of desired learning outcomes. The effects were as great with low SES students as with middle and high SES students. Given these results, Hattie concluded that using direct phonics instructional methods are most powerful in teaching phonics skills and teaching individuals to read.

Hattie's (2009) research supports that implementing phonemic awareness first and then providing direct phonics instruction second has a positive effect on reading skills with young students and individuals who struggle with learning to read. Numerous computer programs are available to supplement classroom instruction to assist individuals with these reading readiness skills. Many of these programs have been designed to include the recommendations of the National Reading Panel (NRP) and match best practices for teaching phonemic awareness and phonics instructions. However, only a few have been researched and shown effective.

Computer-Assisted Instruction

Hattie (2009) published a meta-analysis of 76 studies on computer-assisted instruction. This evaluation included 4,498 studies, 8,096 effects, and about 4 million students. This evaluation was not specific to phonics instruction, but rather included the use of computer-assisted programs that involved various uses including tutoring, managing, simulation, enrichment, programming, and problem solving across curricular areas. Most of the studies in the analysis compared classes that used computers and those that did not use computers rather than comparing students using computers to learn in different ways (Hattie, 2009).

Hattie (2009) used studies from 1975 through 2006. The overall findings showed the effect size across all studies using computer-assisted instruction to be $d = 0.37$ and the Common Language Effect average was 25% (p. 220). No correlation of the effect sizes was found comparing the earlier years to the latter years due to more sophisticated technology. No differences across grades or ability level of students were found. Differences across subjects were found, but differences were not related to the time spent on the computer intervention (Hattie, 2009).

Hattie's (2009) meta-analysis showed that computer-assisted instruction used as a supplement had greater advantages rather than computer-assisted tutoring that used as a substitute or replacement for teacher instruction. Furthermore, the use of computer-assisted instruction was more effective when the teacher planned for students to use the computer and provided multiple opportunities for learning, which included tutorials and drill and practice. Tutorials included structured learning and showed to have the greatest effect when compared to other computer-assisted practices.

Two of the studies included in Hattie's (2009) meta-analysis were by Lou, Abrami, and D'Apollonia (2001) and Luik (2007). Lou et al. (2001) found that the effects were higher when the learner had control over the learning, such as pacing and timing, rather than the system being in control. Lou et al. also found the effects were more positive when the computer tasks were challenging, rather than moderately challenging. Luik supported these findings and identified six categories of what effective drilling software programs should include to be motivating to the learner. These include experiences in which the learner was in control of the pacing, the presentation of information was engaging, questions were easy to understand, replying was simple to manipulate, and feedback of learning was positive with valuable information to help the learner continue through the program. Therefore, Hattie (2009) purported that the use of computers was more effective when it was student-paced, challenging, and provided programmed feedback that matched the learning.

In regards to the usefulness of computer-assisted instruction, Hattie's (2009) meta-analysis showed that computers could have positive effects on students' learning. One of the advantages of using computer-assisted instruction was that the method of the delivery of content was different from teacher instruction. The content delivered was consistent and could sway the learner to move along faster. Students were able to experience different teaching strategies while practicing the same learning concepts. Programs with the highest effects allowed the student to be in control of the learning while working on clear goals with immediate feedback of skills and progress. Finally, the feedback from software was unbiased to gender, age, socioeconomic status, or academic ability (Hattie, 2009).

WordMaker. Jeffs, Evmenova, Warren, and Rider (2006) examined the outcomes of students using WordMaker, a computer-assisted reading software program. The WordMaker program focuses on spelling and word coding skills through a variety of systematic and sequential phonics instruction. The program was designed based on the Four-Blocks Literacy Model. The Four-Blocks Model is a comprehensive language arts model that integrates all curricular areas to provide students multiple ways to develop the communication skills of reading, writing, speaking, and listening (Sigmon, 2000). WordMaker is designed to encourage students to experience learning through discovery and to transfer previous knowledge to new skills. WordMaker includes customized, individual feedback (Jeffs et al., 2006).

Jeffs et al. (2006) were interested in the advantages and/or disadvantages that the WordMaker software program had in improving vocabulary and spelling skills over a 10-week period among first graders at various reading levels. Students' progress was measured by comparing results of a pretest to a posttest. The study included 18 first-grade students, 8 males and 10 females, from a public elementary school located in a rural North Carolina. Due to the scarcity of computers in the classroom, the students were divided into three random groups. The groups were not divided according to reading ability; therefore, each group represented all ability levels. Each day the students rotated among three stations. One rotation was one-on-one computer engagement using WordMaker. This rotation allowed all 18 students to work on WordMaker each school day for ten weeks. By the end of ten weeks, the students completed 16 lessons, a small amount of the possible 140 WordMaker lessons (Jeffs et al., 2006).

The results of the study indicated that using WordMaker software with first graders made a significant impact in the areas of vocabulary and spelling. Fifteen out of 18 students showed improvement from the pretest to the posttest. Furthermore, Jeffs et al. (2006) found that WordMaker software program had a positive impact on students regardless of their reading levels, including students who have been identified with reading disabilities. Overall, 83% of these first graders had gains made according to the pre- and posttest scores. These findings propose that in addition to regular classroom reading instruction, WordMaker is an effective add-on reading program that is likely to increase reading and writing skills, including phonics (Jeffs et al., 2006).

Lexia. Macaruso, Hook, and McCabe (2006) completed an analysis of Lexia, a supplementary computer assisted reading program. This program provides six areas of reading instruction that is systematic and personalized based on individual skill levels. The six areas include phonemic awareness, phonics skills, structural analysis to decode words, reading fluency, vocabulary, and reading comprehension. When using Lexia, learners complete lessons that are paced and adjusted to meet their individual needs. The Lexia program provides teachers with norm-referenced performance data and analysis as well as data-driven action plans that are unique to each student (Lexia Learning, 2015). The software is intended to be used two to four times each week in 20–30 minute sessions (Macaruso et al., 2006).

Macaruso et al. (2006) discussed the findings of his research on the Lexia reading intervention program when used as a supplement to regular reading instruction. Lexia offers two programs: Phonics Based Reading (PBR) for kindergarten through fifth grade students and Lexia Strategies for Older Students (SOS). PBR includes three progressing

levels with 17 skill activities and 174 separate units. The SOS program consists of five progressing levels with 24 skill activities and 369 separate units. Both computer-assistive reading programs consist of activities for phonic support with the goal to enhance fluency and word recognition. Macaruso et al. used first graders to compare the reading performance of students using Lexia to students not using Lexia.

The participants in the study by Macaruso et al. (2006) included ten first-grade classes in a Boston school district. In each elementary school, one classroom was the treatment group and the other classroom was the control group. At the end of the study, there were 83 students in the treatment group (46 male, 37 female) and 84 students in the control group (41 male, 43 female). Students in both groups received 30 to 60 minutes of similar phonics instruction using the same reading curriculum based on Scott Foresman Reading series and/or Bradley Reading and Language Arts. Only the treatment group received additional assistance using Lexia. In addition to these two groups, the researchers conducted separate analyses for low-performing students who were eligible for Title I services, meaning these were low-achieving students who received additional academic support.

Macaruso et al. (2006) administered a pretest to students in November 2001. The students began using PBR with the starting level selected by the teacher. The students worked independently through the activities. A majority of the students only used PBR. However, 14 of the 83 students in-treatment group did complete PBR and were moved to the SOS activities. These 14 students worked on the basic levels of SOS. This level focused on strengthening phonics skills. The software includes a tracking system of sessions and skills completed by each student. The mean number of sessions completed

was 64 with a range of 37–91 sessions, and the mean number of skill units completed was 140 with a range of 45–324 (p. 4). The same test was re-administered in June 2002 and served as the posttest. The posttest followed the completion of using Lexia for the school year.

Macaruso et al.'s (2006) findings indicated that the students who used Lexia made significant reading gains during their first grade school year. Posttest scores of the treatment group were slightly greater than the end-of-year posttest scores of the control group. One comparison was of the students who were low performing and eligible for Title I services within the treatment group and control group. The treatment group had significantly greater posttest scores than the control group. Posttest results of the Title I students in the treatment group were similar to the posttest results of non-Title I students (Macaruso et al., 2006). These findings suggest that Lexia is an effective supplement program especially for students who are performing low in reading.

In 2011, Macaruso and Rodman reported on two additional studies evaluating the Lexia program. The first study was conducted in 2008 and included preschool classes. Macaruso and Rodman's (2011) second study extended their 2008 results to a larger sample size of kindergartners who performed low in early reading skills. Many of the students in the first study were also included in the second study. Students in both studies attended an urban public school.

In the first study, Macaruso and Rodman (2011) assessed the benefits of using computer-assisted intervention during the school day. Students who performed low in reading were divided into two groups, the control group and the treatment group. Pretest measures showed no significant differences between the two groups in reading. Teachers

who had students in the treatment group were responsible for including time for Lexia into their schedule and using the program as recommended.

The students started on the level one of Lexia to strengthen basic phonological reading skills. They progressed to level two that focused on identifying letter–sound patterns in words. Students progressed through the levels at an individual rate to higher units with more complex skills. In the end, only students who used Lexia an adequate amount of time were included in the results. Adequate was set at 600 minutes or 40 fifteen-minute sessions over four months. Only 12 students met this criterion (Macaruso & Rodman, 2011).

At the end of the four-month study, Macaruso and Rodman (2011) reported that the treatment group showed significant gains on pre and posttest scores whereas the control group showed no gains. The effect size for this study was in the moderate to high range. Therefore, gains in reading for the treatment group using Lexia was greater than the control group not using Lexia (Macaruso & Rodman, 2011).

The second study by Macaruso and Rodman (2011) was conducted to extend the findings from the first study. In this study, they used kindergarteners and a larger sample size of 47 in the treatment group and 26 in the control group. Some of the preschoolers in the first study were kindergartners in the second study. Students were administered a pretest at the start of the school year and a posttest at the end. Even though both groups made significant gains in reading over the school year, the treatment group had greater gains in reading. These results showed that there were added benefits for students who used Lexia. Overall, both low performing preschoolers and kindergarteners did benefit

from practice provided by the Lexia computer-assisted integration program (Macaruso & Rodman, 2011).

Read, Write, and Type (RWT) and Lindamood Phoneme Sequencing Program for Reading, Spelling, and Speech (LIPS). Torgesen, Wagner, Rashotte, Herron, and Lindamood (2010) examined two supplemental reading programs that were both designed to provide instruction from a teacher, who is trained in the respective program, and foundational reading skills practice on the computer. One teacher-led and computerized program was RWT; the other teacher-led program was LIPS with the supplemental use of a computerized version of Poppin Readers, created for this study. Torgesen et al. wanted to find out if there were differences in the impact between the two reading intervention approaches, if one approach showed more rapid growth in reading skills, and if a proportion of the students remained impaired in reading skills after the intervention. Torgesen et al. randomly assigned students to one of three groups: RWT, LIPS, and a control group.

According to Torgesen et al. (2010), the RWT program required instruction by the teacher along with 40 computerized lessons that included animation, digitized speech, and stories that lead students through phonetic activities to practice spelling and writing. RWT was designed to help students learn by starting with basic alphabetic skills that engage students in writing and spelling activities. RWT includes incorporates instruction with practice in phonemic awareness, letter–sound recognition, and phonemic decoding skills while encouraging students to express themselves using phonics in their written language using keyboarding skills on the computer. Teachers are expected to teach the

skills prior to the computer portion of the students' learning such as keyboarding technique, phonemes, and phonemic awareness.

In addition, Torgesen et al. (2010) stated that the LIPS requires teacher-led instruction in phonemic awareness. Teachers are to lead students to learn articulatory gestures for each phoneme as the students build their skills in applying phonemes in words they read and spell. Students in the LIPS group spent a majority of their intervention time building skills in phonemic awareness and decoding with their teacher and the other amount of time practicing reading on the computer through a version of Poppin Readers that was created for this study and followed the sequence of the LIPS program.

In the study by Torgesen et al. (2010), participants included two cohorts of first grade students in three elementary schools in two back-to-back school years. At the start of first grade, all students were screened using a letter-sound knowledge test. The pretest screenings were able to identify the students who performed at the bottom 35% and who were at risk of developing reading problems. Over the two years, 108 participants completed the study, of which 55.6% were male. Over the two-year study, 34 students received instruction in the RWT group, 35 students were in the LIPS group, and 39 students were in the control group. Students in the control group received reading instruction and support from their classroom teachers who did not receive any training pertaining to RWT or LIPS.

During each school year, Torgesen et al. (2010) arranged for each group of first graders to be taught by teachers who were trained for this study. Students received four weekly 50 minute sessions of RWT or LIPS instruction each week. No students were

pulled out of the classroom during whole class reading instruction. Approximately 75% of the students received RWT or LIPS intervention in addition to regularly reading instruction. The remaining approximate 25% of the students were pulled from class for individualized instruction. Approximately half of each reading session was direct instruction from the teacher with the other half spent engaged on the computer.

In the study by Torgesen et al. (2010), teachers kept track of time spent on RWT and LIPS and small group instruction. Students who used RWT spent more time on the computers than students who used LIPS; however, students in the LIPS group received more face-to-face instruction in small groups led by their teacher. Teachers reported that the computer activities included with the RWT program were more engaging than computer activities used to support the LIPS program.

The results of this study indicated that computer-assisted interventions are an effective method to provide supplemental reading instruction. At the end of first grade, students who received the LIPS intervention had slightly higher growth in reading scores from pretest to posttest results than the students who received RWT interventions. Nonetheless, students who participated in either of the computer-assisted showed stronger outcomes than the control group. At the end of second grade, students who were in the RWT and LIPS groups during first grade continued to outperform the control group in all areas (Torgesen et al., 2010).

Cheug and Slavin (2013) conducted a systematic research review to examine the effectiveness of various educational technology applications stating claims to improve the achievement of elementary students who struggle with reading. Overall, a total of 20 studies and 7,000 students in first through sixth grade were part of the analysis. Cheug

and Slavin (2013) examined studies that focused on using various technology applications with struggling readers in elementary schools to evaluate the effects on reading achievement.

Cheung and Slavin (2013) located all possible studies from 1980 through 2012, using preset criteria to screen potential studies. The researchers located and reviewed over 250 research abstracts and approximately 120 full-text articles. They included studies with first through sixth grade students who were identified as having a reading disability, in the lowest 33% of their classes, or received reading services such as Title I, special education, or other reading intervention services. They also included studies that used any type of educational technology. Educational technology was defined in this study to include computers, multimedia devices, or interactive whiteboards. The studies needed to have two groups of students: a control group not using technology and a treatment group that used a technology-assisted reading program. Studies had to provide pre-and post-assessment data. The dependent measures had to be quantitative measures of reading performance. The minimum duration of a study was 12 weeks. The studies had to take place in a realistic school setting.

Some of the technology applications used in the meta-analysis included these programs: Fast ForWord, Jostens (an earlier version of what is now Compass Learning), Lexia, LIPS, ReadAbout, READ 180, and RWT. Overall, Cheung and Slavin (2013) found that these technology applications had a positive effect on struggling readers; however, it was a small effect compared to regular classroom instruction. These programs represented three types of integration: tutorial, supplementary, and comprehensive. The tutorial programs with the largest effect size were RWT and LIPS.

The supplementary type programs included Jostens and Lexia. These programs had a larger number of studies included in the analysis. The comprehensive programs included READ 180, ReadAbout, and Fast ForWord. The comprehensive programs did not produce positive effects (Cheung & Slavin, 2013).

My Reading Coach

According to the MindPlay Company (2008), MRC has been used with K-12 students, adults, English Language Learners (ELL), bilingual students, and students with learning disabilities such as dyslexia. MRC is a multimedia software program intended to supplement regular classroom curriculum. The program provides differentiated instruction based on each student's initial placement test. The structure of the software has allowed supplementary reading intervention to be predominantly independent by the student and minimized the need for constant teacher-student interaction. In return, MRC has allowed students more time to strengthen reading skills.

The earliest use of MRC was as an intervention tool used with small groups of students who were referred to and attended MindPlay's tutoring center in Arizona. Early case studies conducted by MindPlay at the tutoring center helped to drive the use of MRC being used in a school setting. The tutoring center success provided the initial steps that led to MRC being used as a pilot program in schools to gather real data (MindPlay Director of Educational Services and Customer Support, personal communication, April 21, 2014).

In 1998, MindPlay researched time intervals at which a struggling reader begins to show reading progress and the amount of time it takes a struggling reader to complete the entire MRC program. This study was conducted by Bliss (2000) at the Urban League

Charter Middle School for grades 6-8 in Tucson, Arizona. The population of this study included 12 students who were predominately Hispanic and African American with low socioeconomic backgrounds and were considered at-risk academically. The results of this study determined the average amount of time to complete MRC was 34 hours. Bliss noted that the lower the stanine level of the students at the start of the program equaled more time for the students to complete the program. The scores of the students indicated that improvements in reading were made.

Also starting in 1998, MindPlay began a second study, which was a two-year evaluation of MRC to determine to what extent a student's reading comprehension was affected by the program. Bliss's (2000) study was conducted at a high school in Tucson, Arizona. Twenty remedial English students were selected for the initial pilot for Year 1. For Year 2 of the study, two groups of students were selected: 42 remedial English students and nine additional remedial English students who repeated the program for a second time. Students spent an average of 40 hours on MRC from September to April of the following year. At the end of the study, 42 students completed the study. The Degrees of Reading Power (DRP), a nationally standardized comprehension test, was used for the pretest and posttest. On the DRP, an increase of 8 raw score points is equal to one full year's growth within a normal population of students. Students who were in the initial 60th percentile and above gained 7 points, 23-59% percentile gained 17 points, 11th-22nd percentile gained 11 points, and below 10th percentile gained 11 points. In summary, students who struggled with reading made gains using MRC (Bliss, 2000).

After the NRP published its report that included the five components of an effective reading program, the framework of MRC changed. The five components

recommend by the NRP included: phonemic awareness instruction, phonics, reading fluency, building vocabulary, and reading comprehension. The framework of MRC was evaluated to ensure it met the reading standards addressed in this report. MRC could address four of these five components: phonological awareness, phonics, comprehension, fluency, spelling, and grammar.

During the 2001 and 2002 school years, Bliss, Larrabee, and Schnitzler (2002) conducted another study to evaluate how many MRC lessons a student would need to complete before the students showed progress in reading comprehension. Twenty-six second grade students at an elementary school in Tucson, Arizona were involved in this study. DRP was used for the pretest and posttest. Results were calculated after the students used MRC an average of 27 hours over a 12-week period. At the time of the study, MRC included 47 lessons (the version used in this study had 61 lessons). Of the 26 students, none completed all 47 lessons, two students completed 41-43 lessons with an improvement score of 12 points, eight students completed 31-40 lessons with an improvement score of 6 points, 29 students completed 21-30 lessons with an improvement score of 5 points, and 25 students completed 15-20 lessons with an improvement score of 3 points. Results of this study indicated that MRC was an effective program for second grade students as all students showed improvement.

Vaughan, Crews, Sisk, and Garcia (2004) published a study that set out to determine the effect of MRC on the literacy development of students who were categorized as Title I and English language learners in the second grade. This yearlong study involved both schools using the Scholastic Literacy Place 2000 reading program for traditional reading instruction and then each school used a different invention program of

either Success for All or MRC. MRC was the only computer-assisted instruction software utilized in the study.

Vaughan et al. (2004) assumed the classroom reading instruction for all students, Scholastic Literacy Place 2000, to be a comprehensive literacy program that produced comparable gains in literacy development. Students in the study did not receive double instruction in word study and language development. One group of students received their instruction through Success for All and the other group through MRC. Schools were not forced or encouraged to replace word study and language development programs for this study. MRC was chosen for intervention because the word study component best matched the Scholastic Literacy Place 2000 reading curriculum.

Student comprehension was measured by a pretest and posttest using the DRP assessment. DRP scores were used to analyze reading differences at the beginning of the year and compared to the end of the year. In the end, second grade students, especially second language learners, using MRC and Scholastic Literacy Place 2000 had improvements in reading comprehension. Vaughan et al. (2004) stated that the ELL students who used MRC had more gains than the other sub-group in the study. Their DRP scores had a positive change of 18.29 units. Non-ELL students who participated in the MRC group improve reading comprehension scores by 3.62 units. The results of this study indicated that second grade students who used Scholastic Literacy Place 2000 and MRC benefited from that learning more than the students who used Scholastic Literacy Place 2000 and Success for All. Additionally, the use of the MRC program was particularly beneficial to second language learners.

In 2006, Vaughan, Serido, and Wilhelm published an experimental scientific study that was conducted during the 2005-2006 school year. The study took place to determine the effect of MRC on reading achievement of students in first through fourth grades from four schools in three states. The participants included 524 students in first through fourth grades from public schools in Arizona, Illinois, and Texas. Boys represented 45% of the participants; girls represented 41%, and 14% were missing gender information.

Vaughan et al. (2006) evaluated data to discover if students who used MRC for reading intervention showed improvement in overall reading achievement as compared to students who did not use MRC. Of the students who used MRC, Vaughan et al. (2006) wanted to determine the number of MRC lessons students needed to complete successfully before students showed improvement in reading. Finally, Vaughan et al. (2006) wanted to analyze if MRC had the same benefits for all subgroups. In the fall of 2005, before the use of MRC, the pre-assessment Group Reading Assessment and Diagnostic Evaluation (GRADE) and was administrated to all students in the study. A post-assessment using GRADE was administrated in late May 2006.

Students were randomly assigned to the experimental or control group. The control group engaged in regular classroom instruction and other supplementary activities that did not include MRC. Students in the experimental group used MRC as a supplementary component in addition to the regular literacy program at their school for three to four hours each week in a computer lab. The computer lab teacher or classroom teacher worked with students on the non-technology supplementary activities, as prescribed in MRC.

At the end of the study, Vaughan et al. (2006) compared differences in scores on GRADE pretest compared to posttest between the two groups including the change in students' percentile scores in vocabulary, reading comprehension, and overall reading achievement. Students using MRC performed higher than those who did not use MRC. There was also a meaningful difference in the growth in overall reading achievement with the intervention students outperforming the control students.

In addition, Vaughan et al. (2006) observed significant differences in reading achievement when comparing the number of students who were reading below grade level at pre-and post-testing based on the comprehension score from the GRADE assessment. A higher proportion of students in the intervention group was reading at or above grade level on the posttest. The pretest showed 64.7% of the intervention students were reading below grade level and 33.1% at the posttest (decrease of 31.6%). The pretest showed 68.3% of the control group students were reading below grade level and 46.6% at the posttest (decrease of 22.3). Overall, the results of the study indicated that at pre-test 66.7% of the students were reading below grade and 40.4% were reading below grade level at the post-test (a decrease of 26.4%) (Vaughan et al., 2006, p. 9).

Vaughan et al. (2006) determined that the number of MRC lessons completed did make a difference in reading achievement. However, the majority of intervention group students completed 80% or more of the program as well as the recommended number of lessons for their particular grade level. Other than those results, Vaughan et al. (2006) stated there was not enough data to investigate this aspect properly. The results of this study advocated that completing a majority of the MRC lessons did contribute to students improving in reading.

Serido and Wilhelm (2008) replicated an earlier study during the 2007-2008 school year to extend findings from their previous research on the effects of MRC to a larger number of students. This study was a randomized control study of over 1,300 struggling readers in first grade through twelfth grade from four elementary schools and one high school. Serido and Wilhelm (2008) examined two things: the rate at which MRC had an impact on reading skills and the overall effect on gains in reading. The earlier study used a smaller sample size with only elementary students, and the results showed greater gains compared to the students who did not use MRC

Serido and Wilhelm's (2008) study expanded upon the previous research study by using two intervention software programs: MRC and FLRT (another MindPlay program). FLRT is an online reading fluency program that focuses on comprehension skills while increasing the speed of reading. FLRT provides exercises to improve eye movement, such as tracking, and contains reading passages for students to increase the speed of silent reading and comprehension over material read. FLRT starts students at an appropriate passage based on individual reading levels. Students advance through FLRT to more difficult passages as reading skills increase.

Serido and Wilhelm (2008) reviewed data to determine how quickly students using MRC learned pre-reading and decoding skills as compared to control students and identifying the factors that contributed to better reading performance for students using MRC. The data used in this study were gathered from teachers' assessment data of their students' reading level established by the students' classroom performance in reading on past and current assessments. The reading ability varied among the participating students. Seventy-nine percent of the students in the study read below their current grade

level. Seventy-seven percent of the participants were elementary students, and 23% were high school students. Fifty-four percent were male, and 46% were female. Fifty-one percent of the students were in the treatment group and used MRC, and 49% were in the control group (Serido & Wilhelm, 2008).

Serido and Wilhelm (2008) randomly assigned students to either the treatment or control group. Students in the treatment group used MRC an adequate amount of time in a week as recommended based on grade level, met one-on-one and in small groups with the teacher to reinforce comprehension skills and exercises, and after the students had mastered the decoding skills in MRC, they began to use FLRT weekly. Students in the control group followed the reading program prescribed by their school and the necessary curriculum aimed at their personal learning needs. The control group students did not use MRC or FLRT.

Serido and Wilhelm (2008) used Reading Analysis & Prescription (RAPS) as the online diagnostic tool to assess students' phonemic awareness and phonetic skills. The treatment students were administered a pretest before starting a unit and a posttest each time they mastered a unit to monitor progress consistently. The Metropolitan 8 (MAT 8), a norm-referenced assessment for K-12 students, was used as the pre-and post-assessment of reading comprehension, vocabulary, and spelling at the start and end of the study.

Serido and Wilhelm (2008) used data within MRC and FLRT to measure the fidelity of these programs for the treatment group. MRC logged two types of data: time spent using MRC and lessons achieved. The time logged for each student measured the total minutes each student spent using MRC and the number of successfully mastered lessons. The FLRT program recorded individual data on for the reading rate and reading

comprehension level for each student. Serido and Wilhelm (2008) measured the improvement of reading speed and comprehension as logged by the FLRT program to assess improvement in reading fluency and comprehension. The improvement was based on the difference between the ending and starting rate.

Overall, Serido and Wilhelm (2008) found that the rate of reading and the improvement of skills in the treatment group surpassed the results of the control group. Students in the treatment group improved both phonemic awareness and phonics skills. Reading improvement happened faster for the treatment students compared to the control students. Students who completed MRC and FLRT had more gains on almost all of the measured skills and experienced more improvement than the control students. The results from Serido and Wilhelm's study support that the intervention made a positive difference in increasing reading achievement of students in the treatment group when compared to students in the control group.

Slavin, Lake, Chambers, Cheung, and Davis (2009) conducted a review of reading programs from 1970-2009. The intent of this review was to gather and compare research from programs used to improve reading achievement on a common scale to provide unbiased information to be used when selecting reading programs. Slavin et al. searched for practical intervention programs that have been used on a large scale and were implemented over significant amounts of time. The researchers divided the review into four categories: programs focusing on reading curricula, interventions that used instructional technology, programs with an emphasis on the instructional process, and combinations of both reading curricula and instructional process. MRC was included in the instructional technology category.

Slavin et al. (2009) reviewed 31 instructional technology studies for second through sixth grades that included more than 10,000 students. These 31 studies were divided into three sub-categories: Supplemental computer assisted instructional programs, computer-managed learning systems, and innovative technology applications. MRC was included as one of 25 programs in supplementary computer-assisted instruction. Supplementary computer-assisted instruction was defined in the review as programs intended for additional instruction that places students at assessed levels of needs that supplements classroom instruction (Slavin et al., 2009). Only one study included MRC. That study was *The Effects of My Reading Coach on Reading Achievement of Elementary Education Students* conducted by Vaughan, Serido, and Wilhelm (2006).

The conclusion reached by Vaughan et al. (2006) indicated that the overall effects of computer-assisted reading invention instruction were minimal. Furthermore, none of the three sub-categories had positive effects. Most of the studies involving technology used computers as a supplement to regular classroom instruction one to three times per week for about 30 minutes each time. However, MRC is a more intensive program that produced more positive effects, which could be due to the increased recommended amount of time to 45 minutes each day.

Summary

This review of the literature provided an overview of the historical movements of teaching reading with a focus on the trends of phonemic awareness and phonics in America. Also included was research-based evidence for teaching phonemic awareness and phonics to struggling readers, as well as data to show the outcomes of using

computer assisted instruction for supplementary reading support. Lastly, an overview of MRC was discussed along with research-based results of using MRC with struggling readers. In chapter three, the research design, population, sample, and sampling procedures including the instrumentation and measurement tools used in the study are discussed. Additionally, the data collection procedures are presented, as well as a description of the study's data analysis and hypothesis testing and limitations.

Chapter Three

Methods

The purpose of this study was to determine if MRC is an effective reading intervention program to improve students' reading scores. This study was conducted to compare the achievement of elementary students who were assigned to MRC as a technology component of a reading intervention program to those students who were not assigned to MRC as part of their reading intervention program because MRC was not used at their schools. Additionally, the purpose of the study was to determine whether there were relationships between the change in achievement with the number of lessons completed and time spent using the program, and whether those relationships differed by gender.

This chapter includes the research design, population, and sample used in this study, as well as a clarification of the sampling procedures. The instrumentation, including the measurement, reliability, and validity, are then presented. Finally, data collection procedures, data analysis and hypothesis testing, and limitations are clarified in this chapter.

Research Design

A quasi-experimental study was designed using archival data collected by District L. Two already formed groups of students were involved in the study: students who used MRC and students who did not use MRC. The students were in second, third, fourth, fifth, and sixth grades during the 2012-2013 or 2013-2014 school years. The dependent variable in this study was the change in reading scores, measured as the difference in R-CBM fall 2012 to spring 2013 or fall 2013 to spring 2014 assessment scores. The

independent variables in the study were participation status of MRC, grade level, and gender. Other variables included the number of MRC lessons completed and time spent engaged in MRC.

Population and Sample

The population of this study included students enrolled in second, third, fourth, fifth, and sixth grades in one suburban public school district in the Kansas City metropolitan area. The experimental group consisted of elementary students who had reading deficiencies. All students in the sample read below their current grade level as identified by the R-CBM in fall 2012 or fall 2013. The students attended one of six elementary schools that used MRC during the 2012-2013 or 2013-2014 school years. These students were identified by their classroom teachers as qualifying for MRC reading intervention in addition to regular classroom instruction. The control group attended an elementary school in the same school district that did not use MRC as a reading intervention program. Therefore, these students had never utilized MRC lessons to improve reading skills.

Sampling Procedures

Purposive sampling was used in this study. Lunenburg and Irby (2008) state that purposive sampling “involves selecting a sample based on the researcher’s experience of knowledge of the group to be sampled” (p. 10). Student data were included in the sample if the students met the following established criteria:

- The students attended the chosen suburban public school district in the Kansas City metropolitan area for the entire 2012-2013 or 2013-2014 school years.
- The students must have been in the second, third, fourth, fifth, or sixth grade.

- The students were identified by their classroom teachers as reading below their current grade level as measured by R-CBM results at the start of the school year.
- The students took the fall 2012 and spring 2013 or fall 2013 and spring 2014 R-CBM assessments.

Students in the second, third, fourth, fifth, and sixth grades were chosen for the study because each of these grade levels took the R-CBM in both the fall and spring of 2012-2013 or 2013-2014. By using elementary grade levels, the largest sample of students at a similar reading level who used MRC as well as an equal sample of students who did not use MRC in the same school district could be used in the study.

Instrumentation

The R-CBM was designed to measure the rate of reading progress and is typically used to make decisions regarding the efficiency of intervention efforts for individuals experiencing academic difficulties (Silberglitt & Hintze, 2007). All students in District L take the R-CBM three times throughout the school year: fall, winter, and spring. Teachers chose probes according to the student's grade level. Therefore, students at each grade level and each school read different probes. However, each student read the same probe at each screening period during the 2012-2013 or 2013-2014 school year (Pearson, 2012).

The R-CBM was administered one-on-one with the examiner and a student in a reasonably quiet area away from distractions. The examiner gave the student a grade level appropriate paper copy of each probe. The student read each probe aloud for one minute. The examiner recorded errors using a computer. Errors commonly included

words that are mispronounced, substituted, omitted, had a three second pause or struggle, or read out of sequence that the student does not correct within three seconds (Shinn & Shinn, 2002). Using the AIMSweb computer monitoring system, each student's results were recorded and calculated (Pearson, 2012).

Some accommodations are allowed for students with disabilities. These accommodations can be made as long as they are consistently applied each monitoring period. Accommodations could have included enlarging the text, repeating spoken directions, and modifying the testing environment. Some accommodations are not allowed, such as extending the administration time, providing feedback, allowing for practice, or allowing students to pre-read the passages. The examiner documents accommodations that are made for a student (Pearson, 2012).

Measurement. The R-CBM was administered three times each academic school year to second, third, fourth, fifth, and sixth graders at all elementary schools in District L to measure the change in reading scores and indicate possible reading deficiencies. The classroom teacher recorded student performance during the R-CBM assessment using the AIMSweb monitoring software. Student performance was indicated by the number of words read correctly by the student. The 2012-2013 range of scores on the AIMSweb National Norms Table for R-CBM was the following: second grade was 64-106 words read correctly (WRC), third grade was 89–125 WRC, fourth grade was 109-140 WRC, fifth grade was 122-152 WRC, and sixth grade was 140-166 WRC (Pearson, 2014). The AIMSweb software calculated a score and an individual graph for each student. Each graph indicated the student's fall, winter, and spring scores compared to the district average and compared to the national average.

Based on the research questions and the hypotheses identified in the study, the change in reading scores was used for all students. For this study, fall and spring R-CBM data for the respective years that students were assessed using R-CBM were calculated and stored in the AIMSweb monitoring software owned by the school district. Fall and spring R-CBM scores were used to measure a change in reading scores for all students in the study, including the treatment group and control group. R-CBM fall and spring scores were required to address all research questions.

Validity and reliability. CBM is a valid and reliable assessment used to gather data on individual students to support educational decisions. The reliability and validity of CBM were achieved using standardized procedures for frequent sampling of performance in reading skills. Unlike most informal assessment measures, the psychometric concepts of reliability and validity are primary characteristics of CBM (Good & Jefferson, 1998). Much research has demonstrated that CBM can be used effectively to gather student performance data to support a range of educational decisions (Deno, 2003).

Hintze and Silberglitt (2005) researched the validity and reliability of R-CBM by comparing statistical and methodological approaches to standard settings to determine cut scores using R-CBM and performance on high-stakes tests. In their study, 1,766 first through third grade students were followed using the R-CBM benchmark assessment. These students also took the Minnesota Comprehensive Assessment (MCA). Results indicated that R-CBM is strongly associated with MCA performance at each grade level.

Daniel (2010) examined the reliability of R-CBM scores through were data obtained from two studies. The first study was conducted to examine the development of

inter-probes used in the R-CBM assessment. Daniel’s (2010) study was conducted to ensure that the variety of probes used in the assessment was readability correct for each grade level and assessments produced similar results in each grade level. Table 2 shows the reliability report of one AIMSweb R-CBM benchmark probe used at second, third, fourth, fifth, and sixth grades. This average was derived from a sample of 204 students. In each testing session, each student completed three R-CBM probes. The mean of three probes was calculated by applying the Spearman-Brown formula to the single probe reliabilities. The true reliability of the benchmark scores in Table 2, fall between the two values provided (Daniel, 2010).

Table 2

R-CBM Alternate-Form Reliability

Grade	Single Probe	Mean of Three Probes
2	0.82	0.93
3	0.85	0.94
4	0.85	0.94
5	0.88	0.96
6	0.85	0.94

Note. Adapted from “Reliability of AIMSweb Reading Curriculum-Based Measurement (R-CBM) (Oral Reading Fluency),” by M. H. Daniel, 2010, p. 2.

Christ and Silbergitt (2007) evaluated reliability over a 4-month lapse of time. Christ and Silbergitt (2007) evaluated R-CBM benchmark data, the median of three probes, for 8,200 elementary students from data collected over eight successive school years. R-CBM probes were used for three of these years. Table 3 displays the connections between benchmark scores at fall–winter and winter–spring at each grade

level. The data are similar to the values in Table 2 for the mean of the three probe scores. Daniel (2010) explained the reliability of R-CBM using these two studies because both studies show a benchmark score in the low 0.90s. These scores show consistency between the two studies.

Table 3

Reliability of AIMSweb Scores Obtained as Benchmarks

Grade	Fall-Winter	Winter-Spring
2	0.93	0.94
3	0.94	0.95
4	0.95	0.95
5	0.92	0.93

Note. Adapted from “Reliability of AIMSweb Reading Curriculum-Based Measurement (R-CBM) (Oral Reading Fluency),” by M. H. Daniel, 2010, p. 3.

MRC Measurement

Data obtained from the MRC software were used to measure MRC completion levels. Time spent in MRC automatically tracked by students’ logging into MRC and logging out was used to measure MRC time using MRC. Completion rate of the 61 MRC lessons was used in RQ4 and RQ5. Time spent on task in MRC was used in RQ6 and RQ7.

Data Collection Procedures

A written request for permission to conduct research and gather data was submitted to the Associate Superintendent of Instruction. The request was presented to District L Instructional Operation Team for the approval process (see Appendix B). The Associate Superintendent of Instruction granted permission (see Appendix C). An

Institutional Review Board (IRB) request was submitted to Baker University on May 22, 2015 (see Appendix D). After the Baker University Institutional Review Board approved the request (see Appendix E) requested MRC and R-CBM data were obtained. District L does not archive MRC data from year to year. However, due to the communication between the researcher and the Associate Superintendent of Instruction, MRC data were pulled from the MRC database and saved until all approvals were granted.

The archived data received from the District L included levels of completed MRC lessons and time on task for each student. These data were given to the district's Executive Director of Assessment and Data Analysis. The Executive Director of Assessment and Data Analysis added R-CBM data from AIMSweb for each student. The Executive Director of Assessment and Data Analysis identified the students in the control group of students who matched the treatment group by grade level, similar fall R-CBM scores, and gender.

An Excel workbook was created for this study. The Executive Director of Assessment and Data Analysis replaced names of all students with a number. Inside the Excel workbook, one spreadsheet contained data for students who used MRC and included grade level, gender, R-CBM scores from fall 2012 or 2013 and R-CBM scores from spring 2013 or 2014, the number of lessons completed in MRC, and the total time in hours and minutes spent using MRC. The second spreadsheet contained data for students who did not use MRC and included grade level, gender, R-CBM scores from fall 2012 or 2013, and R-CBM scores from spring 2013 or 2014. Student names and schools attended remained anonymous. Next, data were uploaded into the IBM[®] SPSS[®] Statistics Faculty Pack 23 for Windows for data analysis.

Data Analysis and Hypothesis Testing

The hypothesis testing that addresses each of the seven research questions presented in the study is discussed in this section. Each research question is followed by the associated hypothesis. The method used to test each hypothesis is described.

RQ1. To what extent is there a difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program?

H1. There is a difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program.

RQ2. To what extent is the difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program, different between males and females?

H2. The difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program between males and females.

RQ3. To what extent is the difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program, different among grade levels?

H3. The difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in MRC program and those who did not participate in the MRC programs among grade levels.

A factorial (ANOVA) was conducted to address RQ1, RQ2, and RQ3. The three categorical variables used to group the dependent variable of change in reading scores were participation in the MRC program (did participate, did not participate), gender (male, female), and grade level (2, 3, 4, 5, and 6). The factorial ANOVA can be used to test for main and interaction effects. The main effect for participation was used to test H1. The interaction between participation and gender was used to test H2. The interaction between participation and grade level was used to test H3. The level of significance was set at .05.

RQ4. To what extent is there a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate?

H4. There is a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between students' change in reading scores and completion rate. A one-sample *t* test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05.

RQ5. To what extent is the relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate different between males and females?

H5. The relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate is different between males and females.

A Fisher's z test was conducted to test H5. The two sample correlations were compared. The level of significance was set at .05.

RQ6. To what extent is there a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the MRC program?

H6. There is a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the MRC program.

A Pearson product moment correlation coefficient was calculated to index the strength and direction of the relationship between students' change in reading scores and time spent in the program. A one-sample t test was conducted to test for the statistical significance of the correlation coefficient. The level of significance was set at .05.

RQ7. To what extent is the relationship between change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the program different between males and females?

H7. The relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the program is different between males and females.

A Fisher's z test was conducted to test H7. The two sample correlations were compared. The level of significance was set at .05.

Limitations

Lunenburg and Irby (2008) explained that all studies have limitations.

Limitations are the factors for which the researcher has no control of happening that may or may not make a difference in the results of a study. One limitation was that there were no records of the students' reading interventions prior to the 2012-2013 or 2013-2014 school years. Therefore, students in the sample may have attended another school district prior to the current school district and received MRC intervention. Another limitation was that the attentiveness each student had when completing MRC was unknown. For example, it was unknown if the student was in a quiet setting or had other distractions in the room while completing MRC. One final limitation was the assumption that MRC matches the reading needs of the students, and the students were correctly placed in using this intervention. For example, MRC is a phonics-based program. If phonics is not the reading issue, MRC may or may not be the best intervention program for specific students.

Summary

Chapter three was organized to provide an overview of the quasi-experimental study that was used to determine the effect of MRC on the change in reading scores. The research design was described in detail, as well as the population and sample of students used in this study. The instrumentation, measurement, and validity and reliability were expounded in detail. Furthermore, the research questions along with the associated hypothesis and analysis were outlined. Finally, the limitations of this study were documented. Chapter four includes the results of the hypothesis testing.

Chapter Four

Results

The purpose of this study was to determine whether there was a difference in reading growth between elementary students who participated in My Reading Coach (MRC) reading intervention program and those who did not. The study was also conducted to examine whether the difference in the change in reading scores was affected by gender or grade level. Additionally, this study was completed to determine whether there was a relationship between participating students' reading scores and completion rates of the MRC program and whether the relationship differed by student gender. The last purpose was to determine whether there was a relationship between reading scores and time spent on task in the MRC program and whether the relationship differed by student gender.

Reading growth was measured using the difference in AIMSweb Reading-Curriculum Based Measurement (R-CBM) in fall 2012 to spring 2013 or fall 2013 to spring 2014 assessment scores. A factorial ANOVA was used for RQs 1, 2, and 3. Correlation coefficients were used for RQ4 and RQ6. Fisher's z tests were conducted for RQ5 and RQ7. The findings are presented beginning with an explanation of the descriptive statistics followed by hypothesis testing results.

Descriptive Statistics

The population for this study included elementary students in grades second through sixth from different elementary schools in the same school district. There were 110 (50%) students in the study who used MRC and 110 (50%) students who did not use MRC during the 2012-2013 or 2013-2014 school years. The number of participating

students in each grade varied; however, more primary students participated than intermediate students. See Table 4 for the distribution among each grade level.

Table 4

Grade Levels of the Sample

Grade	Frequency	Percent
2	56	25.5
3	70	31.8
4	62	28.2
5	20	9.1
6	12	5.5
Total	220	100.0

The sample included 110 (50%) female and 110 (50%) male students. All students participated in AIMSweb testing during the fall and spring of the respective school year in which they were part of the study. The IBM® SPSS® Statistics Faculty Pack 23 for Windows statistical program was used to analyze the data for this study.

Hypothesis Testing

The results of the hypothesis testing to address the seven research questions in the study are discussed in this section. Each research question is followed by its corresponding hypothesis. The method used to test each hypothesis is described along with the results of each test.

RQ1. To what extent is there a difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program?

H1. There is a change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program.

The results of the analysis indicated there was not a statistically significant main effect of participation status in MRC on the change in reading scores, $F = 1.768$, $df = 1$, 199 , $p = .185$. The mean change in reading scores for those students who participated in the MRC program ($M = 34.56$) was lower than the mean change in reading scores of those students who did not participate in the MRC program ($M = 37.76$). This does not support H1.

RQ2. To what extent is the difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program, different between males and females?

H2. The difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program is different between males and females.

The results of the analysis indicated there was not a statistically significant interaction effect of participation status in MRC and gender on the change in reading scores, $F = 2.336$, $df = 1$, 199 , $p = .128$. The mean change in reading scores for male students who participated in the MRC program ($M = 37.15$) was slightly higher than males who did not participate in the MRC program ($M = 36.67$). The mean change in reading scores for female students who participated in the MRC program ($M = 31.96$)

was lower than females who did not participate in the MRC program ($M = 38.84$). This does not support H2.

The results of the analysis indicated there was not a statistically significant main effect of gender on the change in reading scores, $F = 0.394$, $df = 1, 199$, $p = .531$. There was not a significant difference in the change in reading scores between males and females.

RQ3. To what extent is the difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program, different among grade levels?

H3. The difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in MRC program and those who did not participate in the MRC programs is different among grade levels.

The results of the analysis indicated there was not a statistically significant interaction effect of participation status in MRC and grade level on the change in reading scores, $F = 0.859$, $df = 4, 199$, $p = .489$. See Table 5 for the means for this analysis. The mean change in reading scores were higher for second grade and fifth grade students who used MRC when compared to their peers who did not use MRC. The mean change in reading scores were lower for third, fourth, and sixth grade students who used MRC when compared to their peers who did not use MRC. This does not support H3.

Table 5

Descriptive Statistics for H3

Group	<i>M</i>
Grade 2	
Participated in MRC	50.02
Did not Participate in MRC	49.12
Grade 3	
Participated in MRC	35.59
Did not Participate in MRC	40.32
Grade 4	
Participated in MRC	29.42
Did not Participate in MRC	31.09
Grade 5	
Participated in MRC	36.13
Did not Participate in MRC	33.88
Grade 6	
Participated in MRC	21.63
Did not Participate in MRC	34.38

However, the results indicated a statistically significant main effect of grade level on the change in reading scores, $F = 16.528$, $df = 4, 199$, $p < .001$. A follow-up post hoc analysis is included in Table 6.

Table 6

Post Hoc Results for H3

Grade Levels	Mean Difference	<i>p</i>
2-3	12.009	.000
2-4	19.283	.000
2-5	15.259	.000
2-6	21.342	.000
3-4	7.274	.021
3-5	3.250	.880
3-6	9.333	.186
4-5	-4.024	.780
4-6	2.059	.989
5-6	6.083	.738

RQ4. To what extent is there a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate?

H4. There is a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate.

The correlation coefficient ($r = .19$) provided evidence for a weak relationship between the change in reading scores and completion rate. The results of the one-sample *t* test indicated there was not a statistically significant relationship between reading scores and completion rate, $t = -0.288$, $df = 199$, $p = .774$. This does not support H4.

RQ5. To what extent is the relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate different between males and females?

H5. The relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate is different between males and females.

Due to the relationship between the change in reading scores and MRC program completion rate not being statistically significant, the Fisher's z test could not be completed for RQ5.

RQ6. To what extent is there a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the MRC program?

H6. There is a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the MRC program.

The correlation coefficient ($r = .091$) provided evidence for a weak relationship between reading scores and time spent in the program. The results of the one-sample t test indicated there was not a statistically significant relationship between reading scores and time spent in the program, $t = 0.962$, $df = 199$, $p = .338$. This does not support H6.

RQ7. To what extent is the relationship between change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the program different between males and females?

H7. The relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the program is different between males and females.

Due to the relationship between the change in reading scores and amount of time spent by students who participated in the program not being statistically significant, the Fisher's z test could not be completed for RQ7.

Summary

This chapter included descriptive statistics and results of hypothesis testing to describe the extent there were differences in the change in reading scores between students who used MRC and those who did not use MRC, including the differences between males and females as well as among grade levels. Described in chapter five are the findings related to literature, implications for action, conclusions, and recommendations for future research.

Chapter Five

Interpretation and Recommendations

Developing students to become fluent and confident readers is a goal for many schools. School leaders research to find intervention programs to meet the needs of students who struggle to learn how to read. This study was conducted to determine whether MRC made a difference in reading growth among elementary students who used this reading intervention and those who did not use MRC. The results of this study add to the collection of research about the effects of MRC as a method of a reading intervention program. Chapter five includes a summary of the study, the findings of the study, and recommendations for future research of MRC.

Study Summary

Reading is a basic skill that is necessary for success in school and life. For some students, learning to read is a challenge. Therefore, school districts strive to provide intervention strategies to help struggling readers become good readers. Some students struggle with the basic reading skills of phonemic awareness and phonics. MRC, the focus of this study, is one program that concentrates on building phonemic awareness and phonics. Provided in the following sections are an overview of the problem, purpose statement and research questions, review of the methodology, and major findings.

Overview of the problem. Limited research has been conducted on the effects of MRC for students who struggle with learning to read. While a few studies exist about MRC, most of the studies are linked to research by the MindPlay Company and few studies were conducted by independent entities. The current research was conducted to determine the effects of MRC on reading growth for elementary students in one school

district. Until the current study, educators in District L had not assessed whether MRC was successful in meeting the needs of students who struggled with reading.

Purpose statement and research questions. The purpose of this study was to investigate whether there was a difference in reading growth among elementary students who participated in MRC and those who did not as measured by a difference in AIMSweb Reading-Curriculum Based Measurement (R-CBM) fall 2012 to spring 2013 or fall 2013 to spring 2014 assessment scores. The data collected were used to determine if statistically significant differences were present in reading growth. To guide the study, seven research questions were developed: (1) To what extent is there a difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program?; (2) To what extent is the difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program, different between males and females?; (3) To what extent is the difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program, different among grade levels?; (4) To what extent is there a relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate?; (5) To what extent is the relationship between the change in reading scores, as measured by R-CBM fall to spring assessment scores, and MRC program completion rate different between males and females?; (6) To what extent is there a relationship between the change in

reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the MRC program?; and (7) To what extent is the relationship between change in reading scores, as measured by R-CBM fall to spring assessment scores, and the amount of time spent by students who participated in the program different between males and females?

Review of the methodology. A quasi-experimental study was designed using archival data from District L. Two predetermined groups of students were used for the study: students who used MRC and students who did not use MRC. Half of the students attended schools that participated in MRC and half of the students attended schools that did not use MRC. Students who did not use MRC students were matched for the study based on both gender and reading ability determined by fall R-CBM scores. The students were in second, third, fourth, fifth, and sixth grades during the 2012-2013 or 2013-2014 school years. The students were assessed by their changes in reading scores, measured as the difference in R-CBM fall 2012 to spring 2013 or fall 2013 to spring 2014 assessment scores. The independent variables in the study were participation status of MRC, grade level, and gender. Other variables included the number of MRC lessons completed and time spent engaged in MRC. A factorial ANOVA was used for RQ1, RQ2, and RQ3. Correlation coefficients were used for RQ4 and RQ6. Fisher's z tests were conducted for RQ5 and RQ7.

Major findings. The results of the data analysis indicated that there was not a difference in the change in reading scores, as measured by R-CBM fall to spring assessment scores, between students who participated in the MRC program and those who did not participate in the MRC program. There was not a statistically significant

interaction effect of participation status in MRC and gender on the change in reading scores. The mean change in reading scores for male students who participated in the MRC program was slightly higher than males who did not participate in the MRC program; conversely, the mean change in reading scores for female students who participated in the MRC program was lower than females who did not participate in the MRC program. The results of the analysis indicated there was not a statistically significant main effect of gender on the change in reading scores.

There was not a statistically significant interaction effect of participation status in MRC and grade level on the change in reading scores; however, the results indicated a statistically significant main effect of grade level. The mean change in reading scores were higher for second grade and fifth grade students who used MRC when compared to their peers who did not use MRC. The mean change in reading scores were lower for third, fourth, and sixth grade students who used MRC when compared to their peers who did not use MRC.

There were not statistically significant relationships between reading scores and completion rate or reading scores and time spent in the program. Due to the relationships between the change in reading scores and amount of time spent by students who participated in the program not being statistically significant, the Fisher's z tests could not be completed for to assess differences in these relationships between males and females.

Findings Related to the Literature

Previous studies have compared the results of two groups of students: those using a technology intervention program and those not using a technology intervention

program. Research question one was conducted to examine the extent there was a difference in the change in reading scores between students who participated in the MRC program and those who did not participate in the MRC program. The results of this study indicated there was not a statistically significant main effect of participation status in MRC on the change in reading scores. These results are similar to those of Cheung and Slavin (2013). Cheung and Slavin (2013) found that the use of technology applications did not create a statistically significant difference in student achievement when used with struggling readers compared to regular classroom instruction.

This study was designed to determine the extent there was a difference in the change in reading scores between students who participated in the MRC program and those who did not participate in the MRC program as compared between males and females. The results of the analysis indicated there was not a statistically significant main effect of gender on the change in reading scores between males and females. This result does not support the results found by Vaughan et al. (2006) who determined a positive effect of MRC on reading achievement of students regardless of gender.

Additionally, this study was designed to determine if there was a difference in the change in reading scores between students who participated in the MRC program and those who did not participate in the MRC program among grade levels. The overall result of the analysis indicated there was not a statistically significant interaction effect of participation status in MRC and grade level on the change in reading scores. However, there was a statistically significant main effect of grade level. Furthermore, the results only showed more growth for earlier grades, regardless of whether the students were in the program. These results support other studies whose results indicated that reading

interventions in early grades show greater results. Second grade was the youngest grade level in this study. Results showed there were statistically significant differences between grade 2 and all other grades in the study. Jeffs et al. (2006) determined that 83% of first graders at various reading levels had gains after using WordMaker. Torgesen et al. (2010) determined that at the end of first grade, students who received the LIPS intervention had slightly higher growth in reading scores than students who did not receive the LIPS intervention. At the end of second grade, students who were in the RWT and LIPS groups during first grade continued to outperform the control group in all areas (Torgesen et al., 2010).

The next research question was the extent was there a relationship between the change in reading scores and MRC program completion rate. Results indicated there was not a statistically significant relationship between reading scores and completion rate. Therefore, the number of lessons completed did not make a difference in reading gains for students in this study. These results contradict the finding of Bliss, Larrabee, and Schnitzler (2002). They conducted a study to evaluate how many MRC lessons a student would need to complete before the students showed progress in reading comprehension. At the time of the study, MRC included 47 lessons (the version used in the current study had 61 lessons). Of the 26 students in the study, results indicated that the more lessons that were completed, the higher posttest results were for the student.

After examining the completion rate, the next research question dealt with the extent the relationship between the change in reading scores and MRC program completion rate was different between males and females. Due to the relationship between the change in reading scores and MRC program completion rate not being

statistically significant, this test could not be completed. This conclusion is similar to that of Vaughan et al. (2006) where it was stated that there was not enough data to investigate this aspect properly.

There was a weak relationship between the change in reading scores and the amount of time spent by students who participated in the MRC program. This result did not support the findings by Bliss (2000). The purpose of Bliss' (2000) study was to determine the amount of time to complete MRC. The results determined the average amount of time to complete MRC was 34 hours. The scores of the students in Bliss' study indicated that improvements in reading were made. Furthermore, the results of the current study contradict the results Macaruso et al.'s (2006) analysis of Lexia. The software is intended to be used two to four times each week in 20–30 minute sessions (Macaruso et al., 2006). Macaruso et al.'s (2006) findings indicated that the students who used Lexia, with the required time spent on task, made significant reading gains during their first grade school year.

Lastly, the relationship between the change in reading scores and the amount of time spent in MRC differing between males and females was examined. Due to the relationship between the change in reading scores and amount of time spent by students who participated in the program not being statistically significant, this analysis could not be completed for this study. Serido and Wilhem's (2008) study extended their findings from previous research on the effects of MRC to a larger number of students. This study was a randomized control study of over 1,300 struggling readers in first grade through twelfth grade students, 54% male and 46% female. The results from Serido and Wilhelm's (2008) study contradicted the current study, as Serido and Wilhelm were able

to show that the intervention made a positive difference in increasing reading scores of students in the treatment group when compared to students in the control group, regardless of gender.

Conclusions

District L is faced with the demands of NCLB legislation to support students who struggle with reading. District L provided a reading intervention program to seven of 18 elementary schools that requested to use the MRC program. The findings from this study have implications for stakeholders ranging from district level administrators to those creating education expectations on a state and national level. The following section outlines implications for action, recommendations for future research, and concluding remarks.

Implications for action. On the R-CBM assessments, second and fifth grade students who used the sixth version of MRC Platinum v.2 had positive reading growth. However, third, fourth, and sixth graders who used the sixth version of MRC Platinum v.2 had less growth in reading when compared to students who did not use MRC. Therefore, continuing the use of this version of the MRC program may be counterproductive in increasing reading growth for students in District L. District L should exam the fidelity of other reading programs used in its other elementary schools. In 2012, MindPlay (2015) launched a new version of MRC, Virtual Reading Coach. District L might consider investigating and compare it to other intervention programs. In addition, all teachers who support students using MRC should be trained to offer students the one-on-one support the program requires. This individualized instruction may be necessary to meet the needs of students struggling with the content of the program.

There was no statistically significant difference in reading growth as measured by the R-CBM assessment, between students who participated in the MRC program and those who did not participated in the program. Furthermore, there was no statistically significant difference in reading growth as measured by the R-CBM assessment, between male and female students who participated in the MRC program and those who did not participated in the program. District L should review the criteria related to reading skills that can be strengthened by using a particular intervention program. Programs should match the needs of the learner as not all reading programs work for all struggling students. For example, MRC was designed to begin with strengthening phonemic awareness and phonics skills. Therefore, only students who need remediation in phonemic awareness and phonics skills should be assigned to MRC.

There was no statistically significant difference in reading growth as measured by the R-CBM assessment, among third, fourth, and sixth grade levels of students who participated in the MRC program and those who did not participated in the program. District L should consider the maturity of the learner when placing students in a predominantly independent learning program. Although MRC suggests use for students as young as second grade, students in elementary grades who require adult intervention to keep on task should be supervised. Technology should be the driving mode of content, but the teacher should be present to observe and intervene when a student struggles.

There was no statistically significant relationship between reading growth, as measured by the R-CBM assessment, and MRC completion rate. Perhaps a pilot experience with students from District L using the program would allow feedback from

District L students as well as teacher observation prior to full implementation. MRC does not allow students to control their learning experience. Lou, Abrami, and D'Apollonia (2001) and Luik (2007) showed that the effects of a program were higher when the learner had control over pacing and timing, rather than the system being in complete control. Hattie's (2009) research also supports that programs with the highest effects allow the student to be in control of the learning while working on goals. Perhaps a program that allows for some student control would have a better completion rate at District L.

There was no statistically significant relationship between reading growth, as measured by the R-CBM assessment, and time spent using the MRC program. Time is valuable during the school day. The sixth version of My Reading Coach Platinum v.2 could only be used by students while physically at school. Therefore, natural time restraints and schedule demands made it challenging for District L teachers to allow time on a consistent basis. District L should search for a program that allows students to use the program outside of school time to complete lessons.

Recommendations for future research. Several recommendations have been generated to help further the success for students who struggle to learn how to read. The first recommendation is to extend this study to include a qualitative component. Teachers could provide input about how they were trained and used supplemental MRC materials. Additionally, the daily practices when using MRC could be compared to the suggested guidelines by MindPlay. The benefits of this study might help District L determine if the lack of positive results were due to the program or the implementation by teachers.

The second recommendation is to conduct a similar study utilizing a different technology-based reading intervention used in District L. Since MRC is one of several intervention programs, it would be beneficial for District L to evaluate the effectiveness of those programs on students using them compared to students who are not using the program. Another study could compare reading growth among students enrolled in these programs to decide which program is working best in District L. Results could help determine which interventions truly help students learn how to read.

The third recommendation would be to replicate this study using the updated version of MRC, My Virtual Reading Coach (MVRC). The results of the study would be beneficial to know if the improvements to MVRC have a positive effect on students' reading skills. Furthermore, these results would add value to the intervention evaluation process for the districts that have used both versions of MRC.

Concluding remarks. The ability to read is a critical component of being successful in life. Even though some students learn to read at a steady and progressive rate, other students struggle. The need to bridge the gap between good readers and struggling readers is a focus in schools. Since the adoption of NCLB in 2001 (NCLB), educators continue to be challenged to address how to bridge these gaps in literacy (Tankersley, 2005). Districts, like District L, must match student needs with a program that could best help them show improvements in reading.

Matching an intervention program with an individual's reading needs can be a difficult task. Students' reading needs vary from foundations in phonemic awareness and phonics, to fluency, or to an understanding of using new vocabulary and comprehension. Students who struggle with reading need an intervention program that matches their

needs for improving reading skills. School districts must take the time to find reading programs that match the exact needs of each student as well as evaluate the data on the effectiveness of those programs. Equally important, school districts must also make a commitment to training teachers in all aspects to make a program an effective tool for students. MRC is a technology integration program contained a component of re-teaching difficult concepts by one-on-one interaction between the student and the teacher. However, in this study it was unknown as to the extent that student and the teacher interaction occurred while using the program.

The results of this study indicate that MRC did not meet the reading improvement desires for this population of students. Whether District L continues to use MRC, the district may still have still have students who struggle with reading. There is a need to investigate reading intervention programs used in District L for effectiveness with their population. Furthermore, if District L continues to use MRC or use other programs, the district needs to dedicate time to properly train and retrain the teachers who are using technology invention programs with their students.

The task of teaching all students to read is challenging for school districts. The task of learning to read is challenging for the some students as well. Providing engaging and effective intervention programs that are properly implemented is essential for success. It is also important for District L to develop intervention plans for all students to have the most success possible.

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Appendices

Appendix A: Survey for Teachers or Administration

Technology Reading Intervention Used 2012-13 and/or 2013-14

* Required

School*

Technology Reading Intervention Used 2012-13 and/or 2013-14 (just choosing one is helpful) *

Please do not include this year, 2014-15

- Read 180
- FLRT
- Reading Assistant
- Accelerated Reader
- STAR Reading
- Unknown, I wasn't at this school during those years
- None (if other programs, please tell in Other)
- Other:

Submit

Never submit passwords through Google Forms.

Appendix B: Permission Request to District L to Conduct Research

Document Provided to Intended Researcher by:

Signature _____
 (Building Principal for District Employee
 or [REDACTED] for Out-of-district Researchers)

Date: _____

INSTRUCTIONAL OPERATIONS TEAM

[REDACTED]
 [REDACTED]
 [REDACTED]

REQUEST FOR PERMISSION TO CONDUCT RESEARCH/GATHER DATA
 IN THE [REDACTED]
 TO MEET A COURSE REQUIREMENT

DIRECTIONS:

The applicant should complete this form, obtain the necessary approval and signatures, and return to:

Associate Superintendent of Instruction & School
 Leadership

[REDACTED]

1. **Please describe concisely the basic concepts and goals of your proposed project, and include an explanation of how the project meets a course requirement within the field of education.**

The purpose of this study is to determine if the My Reading Coach (MRC) software is an effective reading intervention program. The study will compare the achievement of elementary students who are assigned to MRC as a technology component of a reading intervention program and those students who are not assigned to MRC as part of their reading intervention program. The study will determine if MRC is an effective intervention program.

Research questions:

- To what extent is there a difference in the change from fall to spring Aimsweb assessment scores between those students who participated in the MRC program and those who did not?
- To what extent is the difference in the change from fall to spring Aimsweb assessment scores between those students who participated in the MRC program and those who did not affected by gender?
- To what extent is the difference in the change from fall to spring Aimsweb assessment scores between those students who participated in the MRC program and those who did not affected by grade level?

- To what extent is there a difference in the change from fall to spring Aimsweb assessment scores among the completion rate ranges of those students who participated in the MRC program?
- To what extent is there a difference in the change from fall to spring Aimsweb assessment scores among the categories of time spent of those students who participated in the MRC program?

By completing this research project, I will obtain and share data on the effectiveness of MRC within the [REDACTED]. This data can be used to assist [REDACTED] in evaluating if MRC is an effective RTI program. Furthermore, this research project will allow me to complete degree requirements to obtain a doctorate in Educational Leadership from Baker University. See page 6 for Baker University Dissertation Requirements.

2. **List the names of all data collection instruments you intend to use and enclose a copy of each with this application. Also, enclose a copy of each parent/student consent form. Please describe in detail the distribution, implementation, and collection methods you intend to use in your data collection.**

My Reading Coach (MRC) Data:

- Elementary students who participated in MRC during the 2012-2013 and 2013-2014 school years. Students will not be identified by name. Students will be assigned a number and identified by gender, school, and grade level of the year participating in MRC.
- From this data, I will record the amount of time each student spent in MRC and the percentage of lessons (levels) completed by each student.

Aimsweb Reading Curriculum-Based Measurement (RCBM) Data:

- Fall and spring reading data from the 2011-12, 2012-13, and 2013-14 school years from elementary students who are enrolled in MRC. The fall scores will show the need for a reading intervention program and the spring scores will show the change in reading after using MRC. Scores from the year prior to the students using MRC will be used to show there was little or no growth in reading which validates the student needing a reading intervention program.
- Fall and spring reading data from the 2011-12, 2012-13, and 2013-14 school years from elementary students who are not enrolled in MRC, but had similar reading results and a need for reading intervention. These students did not use MRC (not all LSR7 schools use MRC). The fall scores will show the need for a reading intervention program and the spring scores will show the change in reading at the end of the school year. Scores from the year prior to the student using MRC will be needed to show there was little or no growth in reading which validates the student needing a reading intervention program.
- Group results from each elementary grades in the 2012-2013 and 2013-14 school years who qualified for reading intervention, but did not participate in MRC. This

will determine if MRC brought the struggling readers to the same growth rate as non-struggling readers.

Other possible data needed for the study:

- MAP test results. For the students who have taken the MAP test, those test results might be used to show another means of measure.

I plan to select the students who were enrolled in MRC in the 2012-2013 and 2013-2014 school years. If there is a significant amount of data from students enrolled in MRC in 2012-2013 to run the study, I will only use those students. If the number of participants in the 2012-2013 school year is not sufficient to run the study, I will use the data from MRC from the 2013-2014 school year. After this has been determined, I will place these students into various subgroups:

- Those using MRC and those who are not
- Gender
- Grade level
- Amount of completion of MRC - those who completed 80% to 100% of MRC and those to completed 60 to 79% and less than 60%

I will use the 2011-12 and 2012-13 Aimsweb RCBM to data to show these students had little reading growth and were placed in the MRC reading intervention program by a teacher. Since Aimsweb Reading Curriculum-Based Measurement (RCBM) is a standard benchmark at LSR7, it will be assumed these students were placed in MRC due to the data in Aims RCBM.

The Aimsweb RCBM score during the 2013-14 school year will be used to examine if each student obtained more growth due to the MRC intervention program. Furthermore, each grade level will be compared to the whole group data. For example, the growth of all third graders who were part of the study will be compared to the whole group growth of all LSR7 third graders.

Students will not be identified by names. As soon as data is pulled and collected, students will be assigned a number from 1 through the final amount used in the study. Therefore, parent permission may not be necessary.

3. **Give the names of the [REDACTED] public school(s), you intend to involve to meet the project requirements. Are there certain demographics required for the project (ie: grade level, gender, etc.)**

Elementary schools using MRC include: [REDACTED]

Demographics: Gender and grade level

4. **What amount of time would be required of staff or students in the [REDACTED] schools in order to meet project requirements?**

None. Students are already enrolled and using MRC.

5. **Are there any other school records you would require (for example, achievement test scores or attendance?). If so, please provide a detailed explanation of your process to code such records to ensure confidentiality.**

No, all data needed was listed in #2.

6. **Give the name of each person who will enter the schools. For non-district employees, please provide existing background checks for individuals or a plan to ensure background checks are in place prior to entry in schools.**

No non-district personnel will enter any building for the purpose of this study. No interaction with students will be part of this study. Data will be collected from sources students are already required to use.

7. **What is the date you wish to begin?** Immediately
8. **By what date do you anticipate being finished?** May 2014 (if using 2012-13 data) or December 2014 (if using 2013-2014 data)
9. **Please obtain the signature of your instructor responsible for this assignment and attach a copy of the assignment guidelines.**

Signature:

Position:

University/College/School/Department/Division:

10. Name of applicant (please print)

Signature

Address

Position/Status

Date

Phone Number

CRITERIA FOR APPROVAL OR DISAPPROVAL

The approval or disapproval of requests will be made within the following general guidelines.

1. The only projects which will generally be approved are those which:
 - a) contribute to the improvement of education in the [REDACTED] Schools;
 - b) contribute to the improvement of education in general.
2. Even within the above categories, studies will generally be disapproved if they:
 - a) appear to infringe on the privacy of pupils, parents, or staff members;
 - b) present a burden to pupils or staff members;
 - c) threaten school-community relations in any way.
3. Research solely for a course requirement will be considered only [REDACTED] [REDACTED] staff.
4. At any point in the research process, [REDACTED] staff can terminate the study if determined necessary for any reason.
5. The [REDACTED] School District reserves the right to access any results or product created as a result of projects conducted using [REDACTED] students, staff, or facilities.

PARTICIPATION OF THE SCHOOLS

Generally, participation in any research study conducted by an outside agency or individual will be completely voluntary on the part of the principals, teachers, pupils and any other personnel involved.

DISSERTATION REQUIREMENTS

The doctoral dissertation research is conducted in accordance with guidelines established for doctoral candidates of Baker University. The doctoral study follows recommendations found in "The Role and Nature of the Doctoral Dissertation: A Policy Statement," Council of Graduate Schools.

Purpose

The doctoral dissertation is a clinical research study that

1. Reveals the candidate's ability to analyze, interpret, and synthesize information;
2. Demonstrates the candidate's knowledge of the literature relating to the research project and acknowledges prior scholarship on which the study is built;
3. Describes the methods and procedures used;
4. Presents results in a sequential and logical manner;
5. Displays the candidate's ability to discuss fully and coherently the meaning of the results; and
6. Informs the field and improves practice.

The dissertation is the beginning of the candidate's scholarly work, not the culmination. Clinical research is expected to provide the candidate with hands-on, directed experience in the primary research methods of the discipline and should provide for the type of research that is expected after the Doctor of Education degree is awarded.

Dissertation Process Guidelines

Once a candidate has entered the program, he or she receives a full description of the process for completing the study, including the following:

- Clinical research proposal development and approval.
- Clinical research style guide.
- Dissertation Resources Moodle site.
- Statement on originality.
- Format and publication of the research document.
- Adviser-Advisee relationship.
- Administrative and faculty support.
- Study presentation process.
- Deadline to complete the research project.

General Content

Following approval of the study proposal by the candidate's major advisor and committee, the candidate submits the study to include the following:

- Chapter 1: Introduction and Rationale – A description the study including the purpose and research questions.
- Chapter 2: Review of the literature – A logical link of data to the proposition.
- Chapter 3: Methodology – The hypothesis(es) and a description of the unit or units of analysis to be used.
- Chapter 4: Results – A description of the findings.
- Chapter 5: Discussion – A description of the interpretations made from the results, including the criteria for interpreting the findings and the applications to future studies.

Appendix C: Permission Granted from District L to Conduct Research

Research Request

Monday, November 25, 2013 05:00PM

To: Julie Jensen

[Show Details](#)

Julie,

The Instructional Operations Team approved your request for research and are looking forward to a presentation on the student achievement results from My Reading Coach software. It is so important that student time is used wisely and your research will provide the district with some critical information as we continue to make decisions regarding interventions.

Good luck as you work on your dissertation. Let me know if there is anything else you need to support you through the process.

Sincerely,

Ph.D.
Assistant Superintendent
Instruction and Leadership

CONFIDENTIALITY NOTICE AND DISCLAIMER: This email and any attachments may be confidential and may contain privileged or copyright information. If you are not the intended recipient, please call (816) 986-1027 and inform us that you have received this message in error. Please do not copy, distribute or use this email or the information contained in it for any purpose.

Appendix D: IRB Form



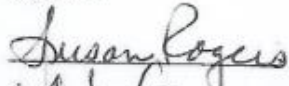

SCHOOL OF EDUCATION
GRADUATE DEPARTMENT


Date: _____
IRB PROTOCOL NUMBER _____
(IRB USE ONLY)

IRB REQUEST
Proposal for Research
Submitted to the Baker University Institutional Review Board

I. Research Investigator(s) (Students must list faculty sponsor first)

Department(s) School of Education Graduate Department

Name	Signature	
1. Susan Rogers		Major Advisor
2. Katie Hole		Research Analyst
3. Harold Frye		University Committee Member
4. Amy Gates		External Committee Member

Principal Investigator: Julie Jensen 
Phone: 816-525-8322
Email: tjensen@kc.rr.com
Mailing address: 2422 NE Old Paint Ct, Lee's Summit, MO 64086

Faculty sponsor: Susan Rogers
Phone: 913-344-1226 (OP office); 785-230-2801 (cell)
Email: srogers@bakeru.edu

Expected Category of Review: Exempt Expedited Full

II: Protocol: The Effect of My Reading Coach on the Change in Reading Scores

Summary

In a sentence or two, please describe the background and purpose of the research.

Archived data for this study will be collected on students who were in second, third, fourth, fifth, and sixth grades in the ██████████ School District during either the 2012-2013 or 2013-2014 school years. The archived data will include fall and spring R-CBM reading scores from all students in the study and My Reading Coach (MRC) data from students in the study who used MRC reading intervention software. This data will be used to compare the achievement of elementary students who were assigned to MRC as a technology component of a reading intervention program and data of those students who were not assigned to MRC as part of their reading intervention program because MRC was not used at their school. The purpose of this study is to determine if the MRC software is an effective reading intervention program to improve students' reading. Additionally, the purpose of the study is to determine whether the difference in achievement is affected by gender, grade level, number of lessons completed, and time spent using the program. This study will add to the body of research containing technology-based reading intervention strategies using MRC.

Briefly describe each condition or manipulation to be included within the study.

There are no conditions or manipulations in this study.

What measures or observations will be taken in the study? If any questionnaire or other instruments are used, provide a brief description and attach a copy. Will the subjects encounter the risk of psychological, social, physical, or legal risk? If so, please describe the nature of the risk and any measures designed to mitigate that risk.

Two groups of students will be involved in this quasi-experimental the study. One group will be a convenience sample, as the researcher will use an already formed group of students who have used MRC. The other group will include matching participants who had similar reading deficiencies, but did not participate in MRC.

The dependent variable in this study will be the change in reading scores. The dependent variable will be measured as the difference in R-CBM fall to spring assessment scores for one school year. The independent variables in the study will include students using MRC and students not using MRC, grade level, gender. Other variables include the number of MRC lessons completed, and time spent engaged in MRC.

Subjects will not encounter any psychological, social, physical, or legal risk.

Will any stress to subjects be involved? If so, please describe.

There will not be any stress to subject involved in the study.

Will the subjects be deceived or misled in any way? If so, include an outline or script of the debriefing.

The subjects will not be deceived or misled in any way.

Will there be a request for information which subjects might consider to be personal or sensitive? If so, please include a description.

There will not be requests for information that subjects might consider personal or sensitive.

Will the subjects be presented with materials, which might be considered to be offensive, threatening, or degrading? If so, please describe.

Students will not be presented with materials, which might be considered offensive, threatening, or degrading.

Approximately how much time will be demanded of each subject?

This study includes archival data. No time will be demanded of subjects.

Who will be the subjects in this study? How will they be solicited or contacted? Provide an outline or script of the information which will be provided to subjects prior to their volunteering to participate. Include a copy of any written solicitation as well as an outline of any oral solicitation.

Achieved data will be collected for the sample from second, third, fourth, fifth, and sixth grade students in the [REDACTED] School District identified as reading below their current grade level as identified by the R-CBM in the fall of 2012 or fall of 2013. Half of the data will come from struggling readers who used MRC during either the 2012-2013 or the 2013-2014 school year. The other half of the data will come from struggling readers who did not use MRC during either the 2012-2013 or the 2013-2014 school year. I will not be contacting any of the participants.

What steps will be taken to insure that each subject's participation is voluntary? What if any inducements will be offered to the subjects for their participation?

All students are required by the school district to be administered these assessments.

How will you insure that the subjects give their consent prior to participating? Will a written consent form be used? If so, include the form. If not, explain why not.

Since the district requires participation in the assessments, no consent is necessary.

Will any aspect of the data be made a part of any permanent record that can be identified with the subject? If so, please explain the necessity.

No part of the data obtained from this study will be made part of any permanent record.

Will the fact that a subject did or did not participate in a specific experiment or study be made part of any permanent record available to a supervisor, teacher or employer? If so, explain.

Nothing will be made part of any permanent record available to a supervisor, teacher, or employer.

What steps will be taken to insure the confidentiality of the data?

To protect anonymity and insure confidentiality, the Director of Assessment and Data Analysis from the school district will randomly assign a number to each student that corresponds to MRC and R-CBM data. All data provided to the researcher will remain confidential and will only be utilized by the researcher. Data will be saved on the hard drive of the researcher's computer and stored in that location for three years after the study is completed. After three years, data will be destroyed.

If there are any risks involved in the study, are there any offsetting benefits that might accrue to either the subjects or society?

There are not any risks to subjects involved in the study, or any offsetting benefits that might accrue to either the subjects or society.

Will any data from files or archival data be used? If so, please describe.

All data in this study is archival data. The archived data used in this study includes gender, grade level, MRC lessons completed, total time spent in MRC, either fall 2012 or 2013 R-CBM scores, and either spring 2013 or 2014 R-CBM scores.

Appendix E: IRB Approval



Baker University Institutional Review Board

May 22, 2015

Dear Julie Jensen,

The Baker University IRB has reviewed your research project application and approved this project under Exempt Status Review. As described, the project complies with all the requirements and policies established by the University for protection of human subjects in research. Unless renewed, approval lapses one year after approval date.

Please be aware of the following:

1. Any significant change in the research protocol as described should be reviewed by this Committee prior to altering the project.
2. Notify the IRB about any new investigators not named in original application.
3. When signed consent documents are required, the primary investigator must retain the signed consent documents of the research activity.
4. If this is a funded project, keep a copy of this approval letter with your proposal/grant file.
5. If the results of the research are used to prepare papers for publication or oral presentation at professional conferences, manuscripts or abstracts are requested for IRB as part of the project record.

Please inform this Committee or myself when this project is terminated or completed. As noted above, you must also provide IRB with an annual status report and receive approval for maintaining your status. If you have any questions, please contact me at CTodden@BakerU.edu or 785.594.8440.

Sincerely,

Chris Todden EdD
Chair, Baker University IRB

Baker University IRB Committee
Verneda Edwards PhD
Sara Crump PhD
Erin Morris PhD
Scott Crenshaw